



## Original Research Article

## Knowledge and attitude of dental practitioners regarding the association of oral health and systemic diseases; a survey-based study in Riyadh

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## ABSTRACT

Dental specialists in Saudi Arabia see an expanding number of patients with systemic conditions. The association between dental conditions and systemic diseases is a known factor, and the knowledge in treating such systemically compromised patients due to the changes occurring in the oral cavity is needed for better diagnosis and treatment. Hence this cross-sectional survey was conducted to know the knowledge and attitude of dental practitioners regarding the association of oral health and systemic diseases in Riyadh.

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## 1. Introduction

In the past ten years, dental practice on the significance of oral health has been highly prioritized as an essential part of complete health and well-being. Additionally, there is a strong relationship between oral health, particularly periodontal eminence and systemic circumstances. Typically, the phrase "oral-systemic link" is broadly used to relate oral and systemic health. Extraordinarily, 90% of the systemic diseases can be found by an oral examination. Moreover, an additional 120 diseases can be diagnosed only by the oral examination as listed by the World Health Organization International Classification of Diseases and Somatology. Thus, the phrase "the mouth is a mirror" clearly indicates the deep relation between oral and systemic health.<sup>1-3</sup>

Several previous articles show a deficiency in information related to oral-systemic indications in employees of medical background. A recent study carried out in the United States concluded that 49% of the obstetricians rarely or never asked for an oral inspection whereas a small count of 9% do an oral examination in their daily practice.<sup>4</sup> A study conducting in health providers

in the city of Riyadh, Kingdom of Saudi Arabia reported the candidates had little information about oral health. Less than 37% of the doctors chipping in knew that dental plaques cause gingival inflammation.<sup>5</sup>

Therefore, doctors practicing in Riyadh, Kingdom of Saudi Arabia have almost no depth of information regarding oral health which ultimately leads to more complicated cases of oral-systemic diseases landing in front of dentists. Forbes et al. recently advised all diabetic patients to keep a regular follow up for oral health. Even though dentists are not accountable for the early diagnosis and then the treatment of the systemic diseases, but it will surely be of great help in the benefit of the patients.<sup>6</sup>

The goals of the modern dentistry have upgraded as their role from being there looking after the carious teeth have been promoted to well-being campaign and teaching, and information of the oral-systemic disease amid medical caretakers. Subsequently, the job of dentists has grown up. This can be demonstrated by noticing the changes in a previous couple of years in dental hygiene workers. Previously the dentist was only responsible for scaling and cleaning services, but now they provide screening procedures, assessment of oral health conditions, oral cancer screening, and dietary counselling.<sup>7</sup>

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The primitive researches which tried to correlate the knowledge and practices of dentists with systemic conditions were not productive enough to yield this topic on a more prominent forum. Few studies are carried out to discover the information and approach of dentists related to oral-systemic disease relationship. A detailed article was currently offered with the lack of data from North America and the Middle East. An analysis conducted in North Carolina, United States of America stated that oral hygiene caretakers had unified oral-systemic evidence in their health services out of which half of them were highly motivated to refer their patients to medical workers for a checkup. Additional research summed up that dentists in North Carolina, United States of America had the right amount of information related to oral-systemic diseases relationship and shall be further briefed upon complications of pregnancy and osteoporosis.<sup>8</sup>

Researches have concluded that medical or dental diseases have better outcomes if diagnosed and treated in the early stages. Oral health caretakers should be competent enough to pick out systemic problems from oral examination and refer to the concerned physician. Vice versa, doctors should have a command to identify and register the dental complications as early treatment is always beneficial for the patient.<sup>9</sup> The information and attentiveness the medical practitioners have related to orodental difficulties and their relation with systemic diseases and some life-threatening dental conditions are inadequate hence this study was planned to know the knowledge and attitude of dental practitioners regarding the association of oral health and systemic diseases.

## 2. Materials and Methods

### 2.1. Study design

This is a cross-sectional study, which utilized a closed-ended questionnaire.

### 2.2. Questionnaire design

The questionnaire was constructed online using Google forms and began with questions related to demographics, including age, gender, educational level, socioeconomic status etc. Furthermore, questions were asked about the perception of dental professionals towards systemic and oral disease association; each systemic disease having a direct or indirect relation with oral health was enquired.

### 2.3. Study Sample

This study was targeted towards the dental professionals in Riyadh city, after obtaining the approval by the Institutional Ethical Committee and Review Board (IRB) of Riyadh Elm University (REU) under number "FRP/2020/229/136/135".

### 2.4. Validity and Reliability of the Questionnaire

The questionnaire was sent to the experts in research, which include a few faculty members of REU in order to confirm the validity. As far as the reliability is concerned, a pilot study was conducted using 20 online questionnaires filled randomly by university students. Reliability was tested using Chronbach's coefficient alpha in the Statistical Package for Social Sciences (SPSS) version 24.

### 2.5. Statistical analysis

Collected data was transferred from Google sheets to SPSS version 24, where descriptive as well as inferential statistics were conducted. Comparisons between groups were made with the value of significance kept under <0.05.

## 3. Results

The statistics show that almost three fourth of the respondents were females, and one fourth were males. Out of the total respondents, half of them were studying dentistry, whereas around 23% of them were practicing currently, and the rest were working as consultants and specialists. Out of those who are practicing and dealing with the patients, half of them only had around 3 to 4 patients per day whereas 43% of the doctors had 5-8 patients daily and the remaining had 9 or more patients visiting per day (Table 1).

The regularity with which the doctors are systematically treating their patients as low as 39% of them doesn't treat systematically. Whereas more than half of them treat with standard systematic treatment and very few, i.e. 4% of the doctors treat their patients with proper systematic treatment, the results of the data compared with the gender, current professional status and the number of patients treated daily is listed in (Tables 2, 3 and 4).

## 4. Discussion

In a study specially conducted by Garg, the level of awareness was notably lower as compared to the studies conducted earlier. A study was conducted in the year 2012, in North Carolina, United States where almost 91% people agreed to the fact that smoking, genetics and DM are the prime reasons that can lead to periodontitis. On the other hand, in our study, only around 60% of the people who participated mentioned DM as a risk factor for periodontitis, nearly half of them stated smoking followed by around 30% who stated genetics as a critical reason for periodontitis.<sup>10</sup>

It was also observed that the people who were the part of our study were aware of the risk factors for adverse pregnancy and osteoporosis and their difficulties in the situations. Another study conducted by Bell et al. showed the same results regarding the respondents.<sup>11</sup> Analysis done on varied subjects have shown that the education level

**Table 1:** Demographic characteristics of the participants

Gender	Male	48 (29%)
	Female	116 (71%)
Current Professional Status	Dental Students	88 (54%)
	General Dental Practitioner	38 (23%)
	Specialist	22(13%)
	Consultant	15 (9%)
Number of Patients Treated Daily	1-4 Patients	85 (52%)
	5-8 Patients	70 (43%)
	9+ Patients	9 (5%)
Frequency of treating Patients with Systemic Diseases	Low	63 (39%)
	Moderate	94 (58%)
	High	6 (4%)

**Table 2:** Comparison on the basis of gender

Item	Male	Female	p - value
In general, systemic health is associated with oral health?	Strongly Disagree 2% Disagree 0% Neutral 13% Agree 65% Strongly Agree 21%	Strongly Disagree 2% Disagree 3% Neutral 9% Agree 63% Strongly Agree 24%	0.742
Do hormonal disorders (diabetes, incipendus, hypothyroidism, thyroid disease, iodine deficiency) affect oral health?	Strongly Disagree 2% Disagree 0% Neutral 4% Agree 77% Strongly Agree 17%	Strongly Disagree 3% Disagree 3% Neutral 4% Agree 64% Strongly Agree 25%	0.498
Do cardiac disorders (cardiovascular disease, angina, hypertension) affect oral health?	Strongly Disagree 0% Disagree 0% Neutral 6% Agree 81% Strongly Agree 13%	Strongly Disagree 3% Disagree 4% Neutral 10% Agree 64% Strongly Agree 18%	0.180
Do metabolic disorders (diabetes mellitus, obesity, metabolic acidosis, and phenylketonuria) affect oral health?	Strongly Disagree 0% Disagree 0% Neutral 13% Agree 70% Strongly Agree 17%	Strongly Disagree 4% Disagree 3% Neutral 3% Agree 62% Strongly Agree 28%	0.042
Do blood disorders (anemia, haemophilia, sickle cell disease, iron deficiency) affect oral health?	Strongly Disagree 0% Disagree 0% Neutral 4% Agree 66% Strongly Agree 30%	Strongly Disagree 1% Disagree 4% Neutral 7% Agree 61% Strongly Agree 27%	0.550
Do autoimmune disorders (rheumatoid disorders, sjogren syndrome, and connective tissue disease) affect oral health?	Strongly Disagree 0% Disagree 2% Neutral 11% Agree 66% Strongly Agree 21%	Strongly Disagree 2% Disagree 2% Neutral 5% Agree 61% Strongly Agree 31%	0.482
Do pulmonary disease (asthma, tuberculosis, bronchitis) affect oral health?	Strongly Disagree 0% Disagree 4% Neutral 25% Agree 56% Strongly Agree 15%	Strongly Disagree 3% Disagree 4% Neutral 16% Agree 55% Strongly Agree 22%	0.412
Do infectious diseases (aids, hepatitis B, and candidiasis) affect oral health?	Strongly Disagree 0% Disagree 4% Neutral 4% Agree 63% Strongly Agree 29%	Strongly Disagree 3% Disagree 2% Neutral 8% Agree 61% Strongly Agree 27%	0.590
Does Pregnancy affect oral health?	Strongly Disagree 0% Disagree 2% Neutral 6% Agree 74% Strongly Agree 17%	Strongly Disagree 3% Disagree 1% Neutral 9% Agree 65% Strongly Agree 22%	0.563
You require more knowledge about the association of systemic disease with oral health?	Strongly Disagree 0% Disagree 4% Neutral 8% Agree 54% Strongly Agree 33%	Strongly Disagree 1% Disagree 3% Neutral 16% Agree 63% Strongly Agree 18%	0.205

of the respondents has been a key factor in the level of awareness they have regarding these problems. The degree holders were much more informed than the diploma holders. Besides education, gender was also a crucial factor, and this was observed when the people mentioned race as one of the risk factors for osteoporosis.<sup>12</sup>

In the issues of menopause, females were better informed than the males due to better knowledge. But there was not any significant difference between the level of knowledge

between females and males on the subject of pregnancy. The reason behind which can be the commonness of this situation and state, as mentioned in the study carried out by Kothimbakkam et al., 2018.<sup>13</sup>

It has been observed in the research conducted by Scully that the periodontal disease is another most common disease; the oral cavity is affected. That is the reason it is a common and frequent practice for practicing doctors to treat periodontal patients. We have also identified that

**Table 3:** omparison on the current professional status

Item	Dental Student	General Dental Practioner	Specialist	Consultant	p - value
In general, systemic health is associated with oral health?	Strongly Disagree1% Disagree 1% Neutral 10% Agree 64% Strongly Agree 24%	Strongly Disagree5% Disagree 5% Neutral 13% Agree 53% Strongly Agree 24%	Strongly Disagree 0% Disagree 0% Neutral 9% Agree 77% Strongly Agree 14%	Strongly Disagree 0% Disagree 0% Neutral 0% Agree 67% Strongly Agree 33%	0.483
Do hormonal disorders (diabetes, insipidus, hypothyroidism, thyroid disease, iodine deficiency) affect oral health?	Strongly Disagree2% Disagree 0% Neutral 2% Agree 70% Strongly Agree 25%	Strongly Disagree6% Disagree5% Neutral11% Agree53% Strongly Agree24%	Strongly Disagree0% Disagree5% Neutral0% Agree86% Strongly Agree9%	Strongly Disagree0% Disagree0% Neutral7% Agree67% Strongly Agree27%	0.082
Do cardiac disorders (cardiovascular disease, angina, hypertension) affect oral health?	Strongly Disagree3% Disagree2% Neutral9% Agree67% Strongly Agree18%	Strongly Disagree3% Disagree5% Neutral14% Agree62% Strongly Agree16%	Strongly Disagree0% Disagree5% Neutral0% Agree86% Strongly Agree9%	Strongly Disagree0% Disagree0% Neutral7% Agree73% Strongly Agree20%	0.787
Do metabolic disorders (diabetes mellitus, obesity, metabolic acidosis, and phenylketonuria) affect oral health?	Strongly Disagree2% Disagree1% Neutral7% Agree63% Strongly Agree27%	Strongly Disagree8% Disagree3% Neutral3% Agree61% Strongly Agree25%	Strongly Disagree0% Disagree5% Neutral9% Agree68% Strongly Agree18%	Strongly Disagree0% Disagree0% Neutral7% Agree73% Strongly Agree20%	0.771
Do blood disorders (anemia, haemophilia, sickle cell disease, iron deficiency) affect oral health?	Strongly Disagree0% Disagree2% Neutral5% Agree63% Strongly Agree31%	Strongly Disagree3% Disagree5% Neutral16% Agree57% Strongly Agree19%	Strongly Disagree0% Disagree5% Neutral0% Agree68% Strongly Agree27%	Strongly Disagree0% Disagree0% Neutral0% Agree67% Strongly Agree33%	0.222
Do autoimmune disorders (rheumatoid disorders, sjogren syndrome, and connective tissue disease) affect oral health?	Strongly Disagree1% Disagree0% Neutral7% Agree59% Strongly Agree33%	Strongly Disagree3% Disagree5% Neutral11% Agree59% Strongly Agree22%	Strongly Disagree0% Disagree0% Neutral0% Agree82% Strongly Agree18%	Strongly Disagree0% Disagree7% Neutral7% Agree53% Strongly Agree33%	0.330
Do pulmonary disease (asthma, tuberculosis, bronchitis) affect oral health?	Strongly Disagree2% Disagree2% Neutral16% Agree57% Strongly Agree23%	Strongly Disagree3% Disagree11% Neutral24% Agree50% Strongly Agree13%	Strongly Disagree0% Disagree0% Neutral18% Agree64% Strongly Agree18%	Strongly Disagree0% Disagree7% Neutral13% Agree53% Strongly Agree27%	0.663
Do infectious diseases (aids, hepatitis B, and candidiasis) affect oral health?	Strongly Disagree2% Disagree3% Neutral5% Agree63% Strongly Agree27%	Strongly Disagree3% Disagree0% Neutral16% Agree53% Strongly Agree29%	Strongly Disagree0% Disagree0% Neutral0% Agree73% Strongly Agree27%	Strongly Disagree0% Disagree7% Neutral7% Agree60% Strongly Agree27%	0.487
Does Pregnancy affect oral health?	Strongly Disagree1% Disagree1% Neutral9% Agree67% Strongly Agree22%	Strongly Disagree5% Disagree0% Neutral16% Agree59% Strongly Agree19%	Strongly Disagree0% Disagree0% Neutral0% Agree86% Strongly Agree14%	Strongly Disagree0% Disagree7% Neutral0% Agree67% Strongly Agree27%	0.199
You require more knowledge about the association of systemic disease with oral health?	Strongly Disagree0% Disagree1% Neutral13% Agree64% Strongly Agree23%	Strongly Disagree3% Disagree5% Neutral18% Agree53% Strongly Agree21%	Strongly Disagree0% Disagree0% Neutral14% Agree73% Strongly Agree14%	Strongly Disagree0% Disagree13% Neutral7% Agree47% Strongly Agree33%	0.231

**Table 4:** Comparison on the basis of number of patients treated daily

Item	1-4 Patients	5-8 Patients	9+ Patients	p - value
In general, systemic health is associated with oral health?	Strongly Disagree 4% Disagree 2% Neutral 13% Agree 52% Strongly Agree 29%	Strongly Disagree 0% Disagree 0% Neutral 6% Agree 80% Strongly Agree 14%	Strongly Disagree 0% Disagree 11% Neutral 11% Agree 44% Strongly Agree 33%	0.010
Do hormonal disorders (diabetes, insipidus, hypothyroidism, thyroid disease, iodine deficiency) affect oral health?	Strongly Disagree 5% Disagree 4% Neutral 6% Agree 55% Strongly Agree 31%	Strongly Disagree 0% Disagree 0% Neutral 3% Agree 88% Strongly Agree 9%	Strongly Disagree 11% Disagree 0% Neutral 0% Agree 33% Strongly Agree 56%	0.000
Do cardiac disorders (cardiovascular disease, angina, hypertension) affect oral health?	Strongly Disagree 4% Disagree 5% Neutral 13% Agree 58% Strongly Agree 20%	Strongly Disagree 1% Disagree 0% Neutral 11% Agree 86% Strongly Agree 11%	Strongly Disagree 0% Disagree 11% Neutral 22% Agree 44% Strongly Agree 22%	0.008
Do metabolic disorders (diabetes mellitus, obesity, metabolic acidosis, and phenylketonuria) affect oral health?	Strongly Disagree 6% Disagree 2% Neutral 7% Agree 51% Strongly Agree 34%	Strongly Disagree 0% Disagree 1% Neutral 4% Agree 81% Strongly Agree 13%	Strongly Disagree 0% Disagree 0% Neutral 11% Agree 56% Strongly Agree 33%	0.016
Do blood disorders (anemia, haemophilia, sickle cell disease, iron deficiency) affect oral health?	Strongly Disagree 1% Disagree 6% Neutral 7% Agree 52% Strongly Agree 33%	Strongly Disagree 0% Disagree 0% Neutral 4% Agree 80% Strongly Agree 16%	Strongly Disagree 0% Disagree 0% Neutral 11% Agree 22% Strongly Agree 67%	0.003
Do autoimmune disorders (rheumatoid disorders, sjogren syndrome, and connective tissue disease) affect oral health?	Strongly Disagree 2% Disagree 1% Neutral 8% Agree 55% Strongly Agree 33%	Strongly Disagree 0% Disagree 1% Neutral 6% Agree 75% Strongly Agree 17%	Strongly Disagree 0% Disagree 11% Neutral 0% Agree 22% Strongly Agree 67%	0.009
Do pulmonary disease (asthma, tuberculosis, bronchitis) affect oral health?	Strongly Disagree 4% Disagree 6% Neutral 15% Agree 53% Strongly Agree 22%	Strongly Disagree 0% Disagree 3% Neutral 16% Agree 64% Strongly Agree 17%	Strongly Disagree 0% Disagree 0% Neutral 67% Agree 11% Strongly Agree 22%	0.007
Do infectious diseases (aids, hepatitis B, and candidiasis) affect oral health?	Strongly Disagree 4% Disagree 4% Neutral 9% Agree 53% Strongly Agree 31%	Strongly Disagree 0% Disagree 1% Neutral 3% Agree 77% Strongly Agree 19%	Strongly Disagree 0% Disagree 0% Neutral 11% Agree 22% Strongly Agree 67%	0.011
Does Pregnancy affect oral health?	Strongly Disagree 4% Disagree 1% Neutral 12% Agree 58% Strongly Agree 26%	Strongly Disagree 0% Disagree 1% Neutral 4% Agree 81% Strongly Agree 13%	Strongly Disagree 0% Disagree 0% Neutral 13% Agree 50% Strongly Agree 38%	0.100
You require more knowledge about the association of systemic disease with oral health?	Strongly Disagree 1% Disagree 4% Neutral 16% Agree 55% Strongly Agree 24%	Strongly Disagree 0% Disagree 3% Neutral 7% Agree 69% Strongly Agree 21%	Strongly Disagree 0% Disagree 0% Neutral 33% Agree 44% Strongly Agree 22%	0.416

periodontal disease has been a rich source that pushes for chronic low-grade inflammation. This deteriorates the immune system of a human body and sometimes leads to damage that cannot be overcome or healed.<sup>14</sup>

Henceforth, it is must for all the staff working in a dental hospital/clinic to be aware of the leading factors for periodontal diseases including underlying pathological process, etiology, adverse effects on other tissues and other connected risk factors. Our study has shown that around 85% of the subject's knowledge regarding periodontal-systematic interactions is a present-day update. Correspondingly, many of the respondents have stated that they give detailed information and guidance regarding periodontal therapies to the patients. But in general, our study has shown that the information regarding the study items we included have been much lower among the respondents, which is a matter of concern. Moreover, more than half of the dentists in our earlier studies mentioned that CVDs 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. This fact has been a common observation with other studies too.

## 5. Conclusions

1. No statistically significant association between gender and knowledge was revealed.
2. No statistically significant association of current professional status and knowledge was reported.
3. The number of patients treated daily was statistically significant when compared with the knowledge of systemic diseases and oral health.

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None.

## 8. Conflict of Interest

None.

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