

# Assessment of Knowledge and Awareness Regarding Oro-systemic Link among General Population: A Cross-sectional Survey

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## ABSTRACT

**Aim:** Various surveys aimed at gathering the knowledge and awareness of health practitioners as well as students, both medical and dental, regarding the link between oral health and systemic diseases have been published. However, relatively few studies have attempted to examine the awareness of such knowledge among the general population. Therefore, the current study aimed to explore the public perception regarding the oro-systemic link.

**Materials and methods:** The present study was designed as a cross-sectional survey to be carried out in the Department of Periodontology and Oral Implantology, PGIDS, Rohtak. All survey participants were provided with a written questionnaire which was required to be completed by each participant independently. The study questionnaire was designed to collect demographic data followed by specific questions targeting the awareness and knowledge of the participants regarding the relationship between oral and systemic health.

**Results:** A total of 240 completed questionnaires were available for analysis. Only about a quarter of the total participants (27.5 %) believed that oral health status has any effect on the rest of the body. A positive response (YES) of 25% was observed for effect of diabetes and physician prescribed medicines on systemic health. Regarding the effect of pregnancy, smoking, stress, and obesity on systemic health, less than 20% positive response was recorded.

**Conclusion:** The findings indicate a very poor awareness regarding the impact of systemic conditions on oral status and vice versa, among the studied population.

**Clinical significance:** Pedodontists should lay emphasis on imparting knowledge about oro-systemic connections to their patients as well as accompanying guardians. This would go a long way in spreading much needed awareness among the general population as well as ensuring that children adopt healthy lifestyle habits right from childhood.

**Keywords:** Awareness, Oral health, Oro-systemic link, Survey, Systemic Health.

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## INTRODUCTION

A steadily growing body of evidence gathered in the past two decades seems to suggest a relationship between oral and systemic health. Periodontal disease has been found associated with an increased risk of cardiovascular disease,<sup>1</sup> premature, low-birth-weight babies,<sup>2</sup> and respiratory diseases.<sup>3</sup> Systemic reviews of the current literature already support a bidirectional relationship between diabetes mellitus (DM) and periodontal diseases.<sup>4</sup> Improvements in medical management of diseases have resulted in populations with special oral healthcare needs, including those who are immunocompromised, are of advanced age, suffer from chronic health diseases, and those who are receiving long-term prescription medications for chronic conditions (e.g., antihypertensives, anticoagulants, immunosuppressants, and antidepressants). These medications can cause adverse reactions in the oral cavity, such as xerostomia and ulceration leading to increased risk of tooth decay, periodontal disease, and infection.<sup>5</sup> It is therefore essential that professional attention is given to the link between periodontal diseases and systemic health.

Careful examination of the oral cavity may reveal findings indicative of an underlying systemic condition, and allow for early diagnosis and treatment. The examination should include evaluation for mucosal changes, periodontal inflammation, and

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general condition of the teeth.<sup>6</sup> Whether dental practitioners are putting into practice this body of knowledge into their routine clinical practice depends entirely on their level of familiarity and comprehension of such indispensable information. But another equally important aspect is the general level of public awareness regarding the impact of systemic diseases on oral health and vice

versa. Most of the general population assumes systemic diseases to be solely affecting a specific organ system without realizing the possible ill effects of various medical conditions and therapies on the oral cavity, as mentioned above. Conversely, it is not too often that people are aware of the fact that periodontal diseases are serious infections capable of affecting other body organs. It is assumed that patients who are equipped with such pertinent knowledge can definitely care for their overall health relatively better and resultantly experience an enhanced quality of life. Not only periodontists, but dental health professionals of every specialty, must focus on imparting the knowledge of oro-systemic connections to their patients. This is especially relevant for pedodontists since they deal with not one but two population demographics—the child as a patient and one or more adults as primary caregiver.

A careful search of the relevant literature found that there exist many surveys aimed at gathering the knowledge and awareness of health practitioners as well as students, both medical and dental, regarding the link between oral health and systemic diseases.<sup>7-10</sup> However, relatively few studies have attempted to examine the awareness of such knowledge among the general population.<sup>11,12</sup> Therefore, the current study aimed to explore the public perception regarding the oro-systemic link.

**MATERIALS AND METHODS**

The present study was designed as a cross-sectional survey to be carried out in the Department of Periodontics and Oral Implantology, PGIDS, Rohtak. The study population comprised of adult subjects attending the outpatient clinic of Department of Periodontics between the period of January 2014 to January 2015. Participation in the survey was completely voluntary and informed consent was obtained from the participants before filling out the survey form. All survey participants were provided with a written questionnaire which was required to be completed by each participant independently. To ensure this, possession of a matriculation certificate was a prerequisite for participation. The questionnaire was framed in simple language. Moreover, patients who were health care professionals in any capacity and expected to be aware of the oro-systemic link owing to their professional training or practice were excluded from the study. The study questionnaire was designed to collect demographic

data followed by specific questions targeting the awareness and knowledge of the participants regarding the relationship between oral and systemic health (Table 1).

**RESULTS**

**Study Population Demographics (Table 2)**

At the end of the study, a total of 240 completed questionnaires were available for analysis. A total of 117 (48.8%) were females while 123 (51.3%) participants were males. Of the total participants, 83 (34.6%) were school qualified while 157 (65.4%) were college qualified. Regarding the visit number, 111 (46.3 5%) participants were first time visitors to the periodontology outpatient clinic while the rest 129 (53.8%) were subsequent visit patients who had paid at least one or more visits previously. In terms of smoking habit, 25 (10.4%) were smokers while the rest 215 (89.6%) were nonsmokers.

**Knowledge Regarding Oro-systemic Link (Table 3)**

- In response to the question “Do you think oral health status has any effect on the rest of the body?,” 27.5 % participants replied “Yes,” 41.7% replied “No” and 30.8% replied “I don’t know.”
- In response to the next question “Do you think a person suffering from diabetes is more likely to suffer from gum disease,” 25% replied “Yes,” 39.6 % replied “No” and 35.45% replied “I don’t know.”
- In response to the question “Do you think pregnant females are more likely to suffer from gum disease?,” 17.5 % replied “Yes,” 61.3 % replied “No” and 21.3 % said “I don’t know.”
- In response to the question “Do you think obesity could have any impact on gums?,” 14.6 % said “Yes,” 58.3 % said “No” and 27.15% said “I don’t know.”
- In response to the question “Do you think smoking could have any impact on gums?,” 15% said “Yes,” 50.4% said “No” and 34.6% said “I don’t know.”
- In response to the question “Do you think stress could have any impact on gums?,” 19.2% said “Yes,” 38.3% said “No” and 42.5% said “I don’t know.”
- In response to the question “Do you think medicines prescribed by a doctor can have any impact on gums?” 25% said “Yes,” 42.1% said “No” and 32.9% said “I don’t know.”

**Table 1:** Study questionnaire

1.	Gender	M	F	
2.	Age			
3.	Educational qualification	School level	College level	
4.	Is this your first visit to a dentist?	Yes	No	
5.	Smoking habit	Yes	No	
6.	Do you think oral health status has any effect on the rest of the body?	Yes	No	I don't know
7.	Do you think a person suffering from diabetes is more likely to suffer from gum disease?	Yes	No	I don't know
8.	Do you think pregnant females are more likely to suffer from gum disease?	Yes	No	I don't know
9.	Do you think obesity could have any impact on gums?	Yes	No	I don't know
10.	Do you think smoking could have any impact on gums?	Yes	No	I don't know
11.	Do you think stress could have any impact on gums?	Yes	No	I don't know
12.	Do you think medicines prescribed by a doctor can have any impact on gums?	Yes	No	I don't know

**Table 2:** Participant characteristics: number of participants in the respective groups

Age	Total	Male	Female	First time patient	Subsequent visit patient	School education	College education	Smokers	Nonsmokers
18–29	77	38	39	36	41	29	48	07	70
30–39	67	40	27	34	33	25	42	04	63
40–49	54	26	28	19	35	13	41	10	44
50–59	30	13	17	14	16	11	19	02	28
60–69	09	04	05	06	03	05	04	02	07
70–79	02	01	01	01	01	0	02	0	02
80–89	01	01	0	01	0	0	01	0	01
Total	240	123	117	111	129	83	157	25	215

**Table 3:** Knowledge regarding oro-systemic link in the study population

	Effect of oral health on rest of body	Diabetes and gum disease	Pregnancy and gum disease	Obesity and gum disease	Smoking and gum disease	Stress and gum disease	Medicines and gum disease
Yes	27.5%	25%	17.5%	14.6%	15%	19.2%	25%
No	41.7%	39.6%	61.3%	58.3%	50.4%	38.3%	42.1%
I don't know	30.8%	35.45%	21.3%	27.15%	34.6%	42.5%	32.9%

## DISCUSSION

Various oral diseases share risk factors with the most prevalent lifestyle disorders (diabetes, cardiovascular diseases, and chronic respiratory diseases). These risk factors are on an increase globally, are often modifiable and include excessive alcohol intake, tobacco, and unhealthy food patterns.<sup>13</sup> The relationship between oral and systemic health has been under investigation for a long time now. It has already been more than two decades that the U.S. surgeon general acknowledged the significance of oral health to general health.<sup>14</sup> Systemic inflammations is capable of affecting the initiation as well as severity of oral diseases. On the other hand, the transfer of oral bacteria *via* the bloodstream can enhance systemic inflammation. The most accepted explanation for oro-systemic connection involves inflammatory routes which comprise of proinflammatory cytokines (tumor necrosis factor- $\alpha$ , interleukin-6, interleukin-1 $\beta$ , and C-reactive proteins).<sup>15,16</sup>

One of the most commonly studied association is that of diabetes and the initiation and progression of periodontitis. Periodontitis has been recognized as the sixth complication of diabetes.<sup>17</sup> Extensive research confirmed a bidirectional link between uncontrolled diabetes and periodontal disease.<sup>4,18</sup> Periodontal diseases is also recognized as a risk factor for certain adverse pregnancy outcomes.<sup>19</sup> Obesity is another condition that has been found associated with periodontitis. Evidence points towards the combination of periodontitis and obesity amplifying overall inflammation in the body.<sup>20</sup> Another important link between systemic conditions and oral diseases is the hypothesis that psychosocial stress is a risk indicator for periodontal disease.<sup>21</sup> It is recommended that clinical practitioners consider these factors during patient management. Regarding patient lifestyle patterns, smoking is regarded as one of the most important risk factors for periodontal disease, increasing the risk both for disease initiation as well as tooth loss manifold.<sup>22</sup> Lastly, systemic medications have also been found to affect periodontal disease and systemic disease (diabetes and cardiovascular disease) association.<sup>23</sup>

The current study was designed as a questionnaire survey and conducted among patients reporting to clinics of Department of

Periodontology at PGIDS, Rohtak to evaluate their knowledge and awareness of the link between systemic conditions and periodontal health. This is a preliminary but significant undertaking because a wealth of literature has been published in the past two decades on the oro-systemic link, as mentioned above. This topic is taught extensively not only at the postgraduate level in periodontology but is also a part of the dental curriculum at the graduate level. However, this knowledge should also be disseminated to the general public since awareness of impact of oral diseases, especially periodontal diseases on systemic health and vice versa, could potentially impact their behavior and choices. Al-Shammari et al. compared dental patients (smokers and nonsmokers) regarding differences in knowledge and awareness of the effects of smoking on oral health. The findings of the study stated that smoking dental patients were significantly less aware of the oral health effects of smoking than nonsmokers.<sup>24</sup> This points towards the impact patient education could have on health related choices and behavior adopted by people. Since the foundation of most lifestyle habits are laid in childhood itself, it may be assumed that the role of a pediatric dental specialist in imparting knowledge regarding the association between oral health and general health can play a very important role. Another advantage would be that the accompanying adult guardians could also gain from such instructions.

Akl et al.<sup>25</sup> conducted a systematic review to investigate the awareness of patients suffering from a chronic systemic condition regarding the association between oral health and their systemic condition. Twenty-four studies from across 14 countries were included in the review. The findings pointed towards poor knowledge and awareness (<50%) of the oral health associations to their condition among patients with major systemic conditions. Another systematic review conducted by Siddiqi et al.<sup>26</sup> among diabetic patients regarding their knowledge about the bidirectional link between systemic and oral health concluded that that approximately 73% of the diabetic patients were unaware of the link between periodontal health and DM.

In the current study (Table 3), only about a quarter of the total participants (27.5 %) believed that oral health status has any effect

on the rest of the body. A positive response (answer "YES") of 25% was observed for effect of diabetes and physician prescribed medicines on systemic health. Regarding the effect of pregnancy, smoking, stress, and obesity on systemic health, less than 20% positive response was recorded. These findings indicate a very poor awareness regarding the impact of systemic conditions on oral status and vice versa, among the studied population.

The results of present study should be viewed in consideration of its strengths and limitations. The questionnaire was administered only among patients visiting the OPD of Department of Periodontology. None of the participants was a health worker so as to reduce knowledge bias. Regarding the design of the questionnaire, it was done in simple language with only 12 questions so as to ensure that the survey took minimal time. Also, the survey questions referred both to the impact of oral health on systemic health and that of common chronic conditions (diabetes, obesity, stress), smoking, pregnancy, and medicines on oral health. However, among the limitations, it needs to be mentioned that the total number of respondents (those who completely filled out the questionnaire) was a little low.

To conclude, it may be stated that bearing the results of the present preliminary study in mind, more stress should be laid on the dissemination of knowledge regarding the oro-systemic link among the general population. Dental professionals can play a very vital role in this regard. Moreover, future prospective studies with a long-term follow-up on the same topic should be carried out in conjunction with an evaluation of oral health and general health status. It is expected that such research could shed light on the influence of patient education on final health outcomes.

### Clinical Significance

Pediatric dentists should lay emphasis on imparting knowledge about oro-systemic connections to their patients as well as accompanying guardians. This would go a long way in spreading much-needed awareness among the general population as well as ensuring that children adopt healthy lifestyle habits right from childhood.

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