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Original Research Article

Assessment of Public Awareness Regarding the Link Between Periodontal Disease and Systemic Health: A Cross-Sectional Study

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Abstract: ***Background:*** Periodontal disease is a chronic inflammatory condition affecting the supporting structures of teeth and has been increasingly associated with several systemic diseases including diabetes mellitus, cardiovascular diseases, adverse pregnancy outcomes, and respiratory diseases. Despite growing scientific evidence supporting these associations, public awareness regarding the oral–systemic health connection remains limited. The present study aimed to evaluate the level of awareness regarding periodontal disease and its systemic associations among the general population in Ghaziabad, India. A descriptive cross-sectional survey was conducted among 300 participants aged between 18 and 65 years using a structured questionnaire consisting of 22 close-ended questions. The questionnaire assessed oral hygiene practices, awareness of periodontal disease, and knowledge regarding systemic health associations. The results demonstrated moderate awareness of periodontal disease among participants. Approximately 25% of individuals reported gingival bleeding while brushing, and 23.7% observed gingival recession. Although 80% considered gum disease a serious condition, only 54.3% were aware of gingivitis or periodontitis. Preventive dental visits were limited, with 41% visiting a dentist only when symptoms occurred. Awareness regarding systemic associations was also limited, with only 30.3% recognizing the relationship between periodontal disease and cardiovascular disease. The study highlights the need for improved public education programs and interdisciplinary collaboration between dental and medical professionals to enhance awareness regarding periodontal–systemic health relationships and promote preventive oral healthcare practices.

Keywords: Periodontal disease, periodontal medicine, oral-systemic health, public awareness, systemic diseases.

INTRODUCTION

Periodontal disease is a chronic inflammatory condition affecting the supporting structures of the teeth, including the gingiva, periodontal ligament, cementum, and alveolar bone. It is considered one of the most prevalent oral diseases worldwide and remains a major cause of tooth loss in adults. Periodontal diseases range from reversible gingival

inflammation (gingivitis) to irreversible destruction of periodontal tissues known as periodontitis[12]. The pathogenesis of periodontitis involves complex interactions between pathogenic microbial biofilms and the host immune-inflammatory response, which ultimately leads to connective tissue breakdown and alveolar bone resorption[3].

Traditionally, periodontal disease was regarded as a localized infection limited to the oral cavity. However, increasing scientific evidence over the past few decades has demonstrated that periodontal disease may have systemic implications. The concept of **periodontal medicine**, introduced by Offenbacher in the mid-1990s, highlighted the potential role of periodontal infections in the development and progression of several systemic diseases[4]. Since then, numerous epidemiological and clinical studies have explored the association between periodontal disease and systemic conditions such as cardiovascular disease, diabetes mellitus, adverse pregnancy outcomes, chronic kidney disease, respiratory infections, and rheumatoid arthritis[56].

The biological plausibility of these associations is supported by several mechanisms. Periodontal pathogens and their virulence factors may enter systemic circulation through ulcerated periodontal pockets, resulting in transient bacteremia and systemic inflammatory responses[7]. In addition, inflammatory mediators produced in periodontal tissues, including interleukin-1β, interleukin-6, tumor necrosis factor-α, and C-reactive protein, can disseminate into the bloodstream and contribute to chronic low-grade systemic inflammation[8]. Such inflammatory processes are known to play a crucial role in the pathogenesis of many non-communicable diseases.

Among systemic conditions, the relationship between periodontal disease and **diabetes mellitus** is one of the most extensively studied and is widely recognized as bidirectional. Individuals with poorly controlled diabetes are at increased risk of developing severe periodontal destruction, while periodontal infection can adversely affect glycemic control by increasing systemic inflammatory burden[910]. Similarly, periodontal disease has been associated with cardiovascular diseases through mechanisms involving endothelial dysfunction, atheroma formation, and systemic inflammation[11].

In addition, periodontal disease has been implicated in adverse pregnancy outcomes such as preterm birth and low birth weight. Periodontal pathogens and inflammatory mediators may reach the fetal-placental unit via the bloodstream and contribute to inflammatory responses associated with premature delivery[12]. Associations have also been reported between periodontal disease and respiratory diseases, chronic kidney disease, and certain neurodegenerative conditions, further highlighting the systemic relevance of periodontal health[13].

Despite the growing body of evidence supporting the relationship between periodontal disease and systemic health, awareness among the general population remains limited. Many individuals perceive periodontal disease primarily as a dental problem rather than a condition with potential systemic consequences. Studies assessing public awareness have shown that although people may recognize common symptoms such as bleeding gums or tooth mobility, knowledge regarding the broader health implications of periodontal disease is often inadequate[14].

Improving public awareness regarding the oral-systemic health connection is essential for promoting preventive healthcare practices and encouraging timely dental visits. Enhanced awareness may contribute to early diagnosis and management of periodontal disease, thereby reducing its impact on both oral and systemic health outcomes. In addition, interdisciplinary collaboration between dental and medical professionals is necessary to integrate oral health considerations into overall healthcare strategies.

Therefore, the present study was conducted to evaluate the level of awareness regarding periodontal disease and its association with systemic health among the general population in Ghaziabad, India.

II. Aim and Objectives

Aim: To evaluate awareness regarding the relationship between periodontal disease and systemic health.

Objectives:

• To assess awareness of periodontal disease and its symptoms.

• To evaluate knowledge regarding systemic associations.

• To determine awareness regarding periodontal disease as a cause of tooth loss.

• To assess perception regarding oral-systemic health relationships.

III. Materials and Methods

Study Design

A descriptive cross-sectional survey was conducted to assess awareness regarding periodontal disease and its systemic associations among the general population.

Study Population

The study included **300 participants aged between 18 and 65 years** from Ghaziabad, India. Participants were selected from community centers, public places, and dental outpatient departments.

Inclusion Criteria

- Individuals aged 18 years and above

- Residents of Ghaziabad willing to participate in the study
- Individuals able to understand the questionnaire

Exclusion Criteria

- Dental or medical professionals
- Individuals unwilling to participate
- Participants unable to complete the questionnaire

Questionnaire Design

A pre-validated questionnaire consisting of **22 close-ended questions** was used. The questionnaire included three sections:

1. Oral hygiene practices and dental visit behavior
2. Awareness of periodontal disease and its symptoms
3. Knowledge regarding systemic associations of periodontal disease

Data Collection

Data were collected using both **paper-based questionnaires and online forms** distributed through community outreach programs and dental camps.

Statistical Analysis

The collected data were analyzed using **SPSS software version 26.0**. Descriptive statistics including frequencies and percentages were calculated.

RESULTS

A total of **300 participants aged between 18 and 65 years** were included in the present study. The responses obtained from the questionnaire were analyzed using descriptive statistics and presented in the form of **tables and graphical representations**.

Table 1

Bleeding from gums during brushing or flossing

Response	Frequency	Percentage
Yes	75	25%
No	187	62.3%
Maybe	33	11%
Don't know	5	1.7%

Table 2

Frequency of dental visits among participants

Response	Frequency	Percentage
Twice a year	57	19%
Once a year	65	21.7%
Only when problem occurs	123	41%
Rarely/Never	55	18.3%

The results indicated that **41% of participants visited a dentist only when they experienced dental problems**, suggesting limited emphasis on preventive dental care.

Table 3

Perception regarding seriousness of gum disease

Response	Frequency	Percentage
Very serious	140	46.7%
Moderately serious	100	33.3%
Not serious	35	11.7%
Unsure	25	8.3%

A majority of respondents (**80%**) perceived gum disease as a serious health problem.

Table 4

Awareness of gum disease (gingivitis or periodontitis)

Response	Frequency	Percentage
Yes	163	54.3%
No	95	31.7%
Not sure	42	14%

Only **54.3% of participants were aware of gingivitis or periodontitis**, indicating moderate awareness levels.

Table 5

Perceived causes of bad breath

Cause	Frequency	Percentage
Gum disease	115	38.3%
Stomach problems	79	26.3%
Poor brushing	48	16%
Food	30	10%
Don't know	28	9.4%

The majority of respondents identified **gum disease as the most common cause of bad breath**.

Table 6

Diagnosis of gum disease by a dentist

Response	Frequency	Percentage
Yes	60	20%
No	200	66.7%
Maybe	25	8.3%
Don't remember	15	5%

Table 7

Observation of gingival recession

Response	Frequency	Percentage
Yes	71	23.7%
No	189	63%
Not sure	40	13.3%

Table 8

Tooth mobility among participants

Response	Frequency	Percentage
Yes	70	23.3%
No	200	66.7%
Maybe	30	10%

Table 9

Tooth loss following tooth mobility

Response	Frequency	Percentage
Yes	30	10%
No	250	83.3%
Don't remember	20	6.7%

Table 10

Awareness that untreated gum disease may cause tooth loss

Response	Frequency	Percentage
Yes	210	70%
No	45	15%
Maybe	45	15%

A majority of participants **(70%)** recognized that untreated gum disease could result in tooth loss.

Table 11

Presence of systemic conditions among participants

Condition	Percentage
Diabetes	12%
Heart disease	5%
Hypertension	20%
Rheumatoid arthritis	3%
Cancer history	2%

Table 12

Awareness of relationship between oral health and systemic health

Response	Frequency	Percentage
Yes	180	60%
No	49	16.3%
Maybe	58	19.3%
Don’t know	13	4.4%

Table 13

Information from healthcare professionals regarding oral-systemic health

Response	Frequency	Percentage
Yes	98	32.7%
No	150	50%
Maybe	32	10.7%
Don’t remember	20	6.6%

Table 14

Advice regarding oral health during pregnancy

Response	Percentage
Yes	14.3%
No	60%
Don’t remember	10%
Not applicable	15.7%

Table 15

Belief that improving oral hygiene can help manage systemic diseases

Response	Percentage
Yes	47.7%
No	20%
Maybe	22%
Don’t know	10.3%

Table 16

Awareness that periodontal bacteria can enter bloodstream

Response	Percentage
Yes	45.3%
No	30%
Maybe	15%
Don't know	9.7%

Table 17

Knowledge regarding association between periodontal disease and heart disease

Response	Percentage
Yes	30.3%
No	45%
Maybe	15%
Don't know	9.7%

Table 18

Diabetes affecting gum health

Response	Percentage
Yes	24.3%
No	40%
Maybe	20%
Don't know	15.7%

Table 19

Awareness of association between oral hygiene and cancer

Response	Percentage
Yes	34.7%
No	40%
Maybe	15%
Don't know	10.3%

Table 20

Informing dentist about systemic illness

Response	Percentage
Yes	60%
No	15%
Maybe	15%
Don't know	10%

Table 21

Belief that treating periodontal disease improves general health

Response	Percentage
Yes	35.7%
No	25%
Maybe	25%
Don't know	14.3%

Table 22

Awareness of association between periodontal disease and memory problems

Response	Percentage
Yes	26%
No	40%
Maybe	20%
Don't know	14%

DISCUSSION

The present study assessed awareness regarding periodontal disease and its systemic associations among the general population. The findings demonstrated moderate awareness regarding periodontal disease but limited knowledge about its systemic implications.

Approximately 25% of participants reported gingival bleeding, which is an early indicator of gingival inflammation and periodontal disease[13]. However, many individuals may overlook such symptoms or fail to recognize their significance.

The results also revealed that 41% of participants visited a dentist only when experiencing dental problems. This indicates a lack of preventive dental care practices, which has been reported in several previous population-based studies[14].

Although a majority of participants considered gum disease a serious condition, awareness regarding its systemic associations was limited. Only a small proportion of participants recognized the link between periodontal disease and cardiovascular disease or diabetes. Similar findings have been reported in other awareness studies conducted among community populations[12].

These results highlight the need for improved oral health education programs and interdisciplinary collaboration between dental and medical professionals to enhance public understanding of periodontal-systemic health relationships.

VI. Conclusion

The present study demonstrated moderate awareness regarding periodontal disease among the general population; however, knowledge regarding its systemic implications remains insufficient.

Public health initiatives focusing on oral health education, preventive dental care, and interdisciplinary collaboration between dental and medical professionals are essential to improve awareness regarding periodontal disease and its systemic associations.

Increasing awareness regarding periodontal-systemic health relationships may contribute to improved overall health outcomes.

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Conflicts of Interest

The authors declare no conflicts of interest.

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