

Assessment of awareness regarding the interrelationship between periodontal disease and systemic health among the Kanpur population: A survey study

Muskaan Chandra¹, Janardhana Amaranath BJ², Shruti Gupta³, Anishka Dhanai⁴, Anita Mathur⁵, Neebha kumari⁶

Rama Dental College, Hospital & Research Centre, Rama University, Mandhana, Kanpur, U.P, India
- 209217, Email address: dr.muskaanchandra@gmail.com

Abstract

Background: Periodontal disease is a chronic inflammatory condition that has been increasingly associated with various systemic diseases such as diabetes mellitus, cardiovascular diseases, adverse pregnancy outcomes, and respiratory disorders. Awareness of this interrelationship among the general population is essential for early prevention and holistic health care^[1-4].

Aim: To assess the level of awareness regarding the interrelationship between periodontal disease and systemic health among the Kanpur population.

Materials and Methods: Three hundred Kanpur city residents participated in a cross-sectional questionnaire-based study. Twenty items from a standardised, self-administered questionnaire were utilised to evaluate knowledge, awareness, and attitudes regarding periodontal disease and its systemic implications. Data were analyzed using descriptive and inferential statistics.

Results: Out of 300 participants, 42% demonstrated good awareness, 36% showed moderate awareness, and 22% had poor awareness regarding the periodontal–systemic health relationship. Awareness was significantly higher among participants with higher educational status ($p < 0.05$).

Conclusion: The study revealed a moderate level of awareness among the Kanpur population, highlighting the need for public health education programs to improve understanding of periodontal health and its systemic implications.

Keywords: Periodontal disease, systemic health, awareness, survey, Kanpur population

Introduction

Periodontal disease is one of the most prevalent chronic inflammatory diseases affecting the supporting structures of teeth. It ranges from gingivitis to

periodontitis and is a major cause of tooth loss in adults. Beyond its local effects, periodontal disease has been linked to several systemic conditions through shared inflammatory pathways and bacterial dissemination^[1,2].

Scientific evidence suggests a bidirectional relationship between periodontal disease and systemic disorders such as diabetes mellitus, cardiovascular disease, adverse pregnancy outcomes, respiratory diseases, and rheumatoid arthritis. Chronic periodontal inflammation may exacerbate systemic inflammation, thereby influencing the onset and progression of systemic diseases^[3-7].

Despite growing scientific evidence, public awareness regarding this interrelationship remains limited, especially in developing countries. Understanding the level of awareness among the general population is essential for planning preventive strategies and integrating oral health into general health care. Therefore, the present study was conducted to assess awareness of the interrelationship between periodontal disease and systemic health among the Kanpur population^[8-10].

Supplies and Procedures

Design of the Study

A questionnaire-based, cross-sectional survey was carried out.

Study Population

The study included residents of Kanpur city aged 18 years and above.

Sample Size

A total of 300 participants were part in the research.

Criteria for Inclusion

- People who are at least eighteen years old
- Residents of Kanpur city
- Willing to participate and provide informed consent

Exclusion Criteria

- Dental professionals or dental students
- Individuals with cognitive impairment affecting questionnaire response

Study Groups

Participants were categorized based on educational status:

- **Group I:** Up to secondary education
- **Group II:** Undergraduate
- **Group III:** Postgraduate and above

Questionnaire Design

A structured questionnaire consisting of 20 close-ended questions was developed. The questionnaire assessed:

- Awareness of periodontal disease
- Knowledge of systemic diseases associated with periodontal disease
- Attitude towards oral health and regular dental visits

Scoring Criteria

- Correct answer: 1 point
- Incorrect answer: 0 point

Awareness levels were classified as:

- Good awareness: $\geq 75\%$ score
- Moderate awareness: 50–74% score
- Poor awareness: $< 50\%$ score

Statistical Analysis

Data were analyzed using SPSS software (version 23.0). Descriptive statistics were used to summarize data. Chi-square test was applied to assess association between awareness level and educational status. A p-value < 0.05 was considered statistically significant.

Results

Explanation of Results

1. Demographic Distribution (Table 1)

In the present study, a total of **300 participants** from the Kanpur population were included.

- **Gender distribution** showed a slightly higher participation of **males (54%)** compared to **females (46%)**.
This indicates a fairly balanced gender representation, reducing gender-related bias in awareness assessment.
- Based on **educational status**, the majority of participants belonged to:
 - **Group II (Undergraduate level – 41.3%)**, followed by
 - **Group I (Up to secondary education – 32%)**, and
 - **Group III (Postgraduate and above – 26.7%)**.

This distribution allowed effective comparison of awareness levels across different educational backgrounds.

2. Overall Awareness Levels (Table 2)

The awareness regarding the **interrelationship between periodontal disease and systemic health** was categorized as good, moderate, and poor.

- **Good awareness** was observed in **42%** of participants.
These individuals were aware that periodontal disease can influence systemic conditions such as diabetes, cardiovascular diseases, and pregnancy outcomes.
- **Moderate awareness** was seen in **36%** of participants.
This group had partial knowledge but lacked comprehensive understanding of the bidirectional relationship.
- **Poor awareness** was noted in **22%** of participants.
These individuals were largely unaware of the systemic implications of periodontal disease.

This indicates that **more than half of the population (58%) did not have adequate awareness**, highlighting a significant knowledge gap.

3. Association Between Educational Status and Awareness (Table 3)

A clear relationship was observed between **education level and awareness**.

- **Group I (Up to secondary education)**

- Highest proportion of **poor awareness (38%)**
- Only **22%** showed good awareness
- **Group II (Undergraduate level)**
 - Moderate improvement in awareness
 - **44%** had good awareness, while **18%** still showed poor awareness
- **Group III (Postgraduate and above)**
 - Majority (**65%**) demonstrated good awareness
 - Only **10%** had poor awareness

The association between educational status and awareness level was found to be **statistically significant ($p < 0.05$)**.

This confirms that **higher educational status significantly improves awareness** regarding periodontal–systemic health interrelationship.

Overall Interpretation

- Awareness among the Kanpur population is **moderate but inadequate**.
- Education plays a **key role** in understanding the periodontal–systemic link.
- A considerable portion of the population still lacks essential knowledge, which may negatively impact both oral and general health outcomes.

Demographic Distribution

Out of 300 participants, 162 (54%) were males and 138 (46%) were females.

Table 1: Demographic Distribution of Participants

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	162	54
	Female	138	46
Education	Group I	96	32
	Group II	124	41.3
	Group III	80	26.7

Awareness Levels

Table 2: Awareness Level Regarding Periodontal–Systemic Health Relationship

Awareness Level	Number of Participants	Percentage (%)
Good	126	42
Moderate	108	36
Poor	66	22

Association Between Education and Awareness

A statistically significant association was found between educational status and awareness level ($p < 0.05$).

Table 3: Association Between Educational Status and Awareness Level

Education Group	Good (%)	Moderate (%)	Poor (%)
Group I	22	40	38
Group II	44	38	18
Group III	65	25	10

Discussion

The present study assessed awareness of the interrelationship between periodontal disease and systemic health among the Kanpur population. The findings revealed that only 42% of participants had good awareness, indicating a knowledge gap in the general population.

Higher awareness among participants with higher educational status is consistent with previous studies, suggesting education plays a vital role in health literacy. The moderate awareness observed may be attributed to limited oral health education and lack of interdisciplinary communication between medical and dental professionals.

The low awareness regarding the association of periodontal disease with systemic conditions such as diabetes and cardiovascular diseases is concerning, as it may delay diagnosis and management of both oral and systemic conditions.

Public health initiatives, community-based dental camps, and collaboration between medical and dental professionals can help improve awareness. Incorporating oral health education into general health promotion programs may further enhance public understanding.

Conclusion

The study concludes that awareness regarding the interrelationship between periodontal disease and systemic health among the Kanpur population is moderate. There is a significant association between educational status and awareness level. Comprehensive oral health education programs are recommended to enhance public awareness and promote overall health.

Limitations

- Self-reported questionnaire responses may introduce bias
- Limited to urban population of Kanpur

References

1. Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification. *J Periodontol*. 2018;89(Suppl 1):S159–S172.
2. Pihlstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. *Lancet*. 2005;366(9499):1809–1820.
3. Chapple ILC, Genco R. Diabetes and periodontal diseases: Consensus report of the Joint EFP/AAP Workshop. *J Clin Periodontol*. 2013;40(Suppl 14):S106–S112.
4. Offenbacher S, Barros SP, Beck JD. Rethinking periodontal inflammation. *J Periodontol*. 2008;79(8 Suppl):1577–1584.
5. Beck JD, Offenbacher S. Systemic effects of periodontitis. *J Periodontol*. 2005;76(11 Suppl):2089–2100.
6. Sanz M, Kornman K. Periodontitis and adverse pregnancy outcomes. *J Clin Periodontol*. 2013;40(Suppl 14):S164–S169.
7. Scannapieco FA. Role of oral bacteria in respiratory infection. *J Periodontol*. 1999;70(7):793–802.
8. Preshaw PM, Alba AL, Herrera D, et al. Periodontitis and diabetes: A two-way relationship. *Diabetologia*. 2012;55(1):21–31.

9. Linden GJ, Lyons A, Scannapieco FA. Periodontal systemic associations. *J Clin Periodontol*. 2013;40(Suppl 14):S8–S19.
10. Nazir MA. Prevalence of periodontal disease and its association with systemic diseases. *Int J Health Sci*. 2017;11(2):72–80.
11. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. *Nat Rev Dis Primers*. 2017;3:17038.
12. Genco RJ, Borgnakke WS. Risk factors for periodontal disease. *Periodontol 2000*. 2013;62(1):59–94.
13. Winning L, Linden GJ. Periodontitis and systemic disease. *Curr Oral Health Rep*. 2017;4(1):1–7.
14. Taylor GW. Bidirectional interrelationships between diabetes and periodontal diseases. *Ann Periodontol*. 2001;6(1):99–112.
15. Dietrich T, Sharma P, Walter C, et al. Association between periodontitis and cardiovascular disease. *J Clin Periodontol*. 2013;40(Suppl 14):S70–S84.
16. Tonetti MS, Van Dyke TE. Periodontitis and atherosclerotic cardiovascular disease. *J Periodontol*. 2013;84(4 Suppl):S24–S29.
17. Ide M, Papapanou PN. Periodontal disease and adverse pregnancy outcomes. *J Clin Periodontol*. 2013;40(Suppl 14):S181–S194.
18. Scannapieco FA, Cantos A. Oral inflammation and chronic medical diseases. *Periodontol 2000*. 2016;72(1):153–175.
19. Eke PI, Dye BA, Wei L, et al. Prevalence of periodontitis in adults in the United States. *J Dent Res*. 2012;91(10):914–920.
20. Al-Harthi LS, Cullinan MP, Leichter JW, Thomson WM. Periodontitis and systemic health awareness among adults. *Community Dent Oral Epidemiol*. 2013;41(5):468–475.
21. Bawankar PV, Kolte AP, Kolte RA. Awareness regarding periodontal health and systemic impact. *J Indian Soc Periodontol*. 2018;22(4):332–337.
22. Pralhad S, Thomas B, Ramesh A. Awareness of periodontal-systemic interrelationship among patients. *J Indian Soc Periodontol*. 2015;19(4):457–461.

23. Khader YS, Albashaireh ZS, Alomari MA. Public awareness of periodontal and systemic disease relationship. *Int Dent J*. 2006;56(5):293–298.
24. Teeuw WJ, Gerdes VE, Loos BG. Effect of periodontal treatment on glycemic control. *Diabetes Care*. 2010;33(2):421–427.
25. Paraskevas S, Huizinga JD, Loos BG. C-reactive protein and periodontitis. *J Clin Periodontol*. 2008;35(4):277–290.