



Awareness of the Relationship Between Oral Health and Systemic Health Among High School Students in the United States: A Cross-Sectional Study

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Abstract

Background:

Oral health is an important component of systemic health. Emerging evidence demonstrates associations between periodontal disease and systemic conditions such as cardiovascular disease, diabetes mellitus, respiratory disorders, and adverse pregnancy outcomes. These associations are primarily mediated through systemic inflammation and the dissemination of oral bacteria into the bloodstream.

Objective:

To evaluate awareness regarding the relationship between oral health and systemic health among high school students in the United States.

Methods:

A cross-sectional survey was conducted among 300 high school students aged 14–18 years. A structured questionnaire was used to collect information on demographic characteristics, knowledge of oral health, awareness of the oral–systemic health relationship, and oral hygiene practices. Data were analysed using descriptive statistics and chi-square tests.

Results:

Approximately 80% of participants believed that oral health affects overall health. However, only 58% were aware that gum disease may increase the risk of cardiovascular disease, and 51% recognized the relationship between periodontal disease and diabetes mellitus. About 70% of students reported brushing twice daily, while only 38% visited a dentist regularly for preventive care.

Conclusion:

Although most students acknowledged the importance of oral health, awareness regarding the oral–systemic health connection remains limited. School-based oral health education programs may improve awareness and promote preventive behaviours among adolescents.

Keywords:

Oral health awareness, systemic health, periodontal disease, adolescents, cross-sectional study.

Introduction

Oral health plays a fundamental role in overall health and well-being. Oral diseases such as dental caries and periodontal disease represent major public health concerns affecting individuals across all age groups. Periodontal disease is a chronic inflammatory condition that affects the supporting structures of teeth and has been associated with various systemic diseases.

Recent studies suggest that periodontal disease may contribute to systemic conditions such as cardiovascular disease, diabetes mellitus, and respiratory disorders. The biological mechanisms underlying these associations involve the systemic dissemination of oral pathogens and inflammatory mediators from periodontal tissues into the bloodstream.

Systemic inflammation resulting from periodontal infection may promote endothelial dysfunction and atherosclerosis, thereby increasing the risk of cardiovascular disease. Similarly, diabetes mellitus has been shown to have a bidirectional relationship with periodontal disease, in which poor glycaemic control increases susceptibility to periodontal infection while periodontal inflammation can worsen metabolic regulation.

Despite growing scientific evidence regarding the oral–systemic health relationship, awareness among the general population remains limited. Adolescence represents a critical stage for developing lifelong health behaviours, including oral hygiene practices and preventive dental care.

Therefore, assessing awareness of the oral–systemic health connection among high school students is essential for developing effective educational programs and preventive strategies.

Objectives

Primary Objective:

To evaluate awareness of the relationship between oral health and systemic health among high school students in the United States.



Secondary Objectives:

1. To assess knowledge regarding oral diseases among students.
2. To evaluate oral hygiene practices among high school students.
3. To determine the frequency of dental visits among adolescents.

Materials and Methods:

Study Design:

Cross-sectional questionnaire-based survey.

Study Population:

High school students aged 14–18 years enrolled in selected schools in the United States.

Sample Size

300 students.

Inclusion Criteria

1. High school students aged 14–18 years.
2. Students currently enrolled in public or private high schools in the United States.
3. Students who are able to understand and respond to the questionnaire in English.
4. Students who provide informed assent, along with parental/guardian consent where required.
5. Students who are present at the time of data collection and willing to participate.

Exclusion Criteria

- 1.

Students below 14 years or above 18 years of age.

2. Students not enrolled in high school (e.g., middle school, college students).
3. Students with cognitive, visual, or hearing impairments that prevent completion of the questionnaire (unless assistance is provided and validated).
4. Students who decline participation or whose parents/guardians do not provide consent.
5. Incomplete or improperly filled questionnaires that affect data reliability.

Data Collection Tool

The questionnaire consisted of four sections:

1. Demographic characteristics
2. Knowledge of oral health
3. Awareness of oral–systemic health link
4. Oral hygiene practices

Statistical Analysis

Data were analysed using SPSS software (version 26).

Statistical methods included:

- Frequency distribution
- Percentages
- Chi-square test

A p-value < 0.002 was considered statistically significant.

II. Results

Demographic Characteristics

Variable	Frequency	Percentage
Male	155	51.7%
Female	145	48.3%

Age distribution:

- 14–15 years – 42%
- 16–17 years – 44%
- 18 years – 14%

Awareness of Oral-Systemic Health Link

Question	Yes	No	Not sure
Oral health affects overall health	80%	10%	10%
Gum disease linked to heart disease	58%	18%	24%
Oral health affects diabetes	51%	22%	27%

Oral Hygiene Practices

Practice	Percentage
Brush twice daily	70%
Brush once daily	22%
Irregular brushing	8%

Dental visits:

- Routine check-up within 6 months – 20%
- Within 1 year – 42%
- Only during pain – 38%



III. Discussion

The present study assessed awareness of the relationship between oral health and systemic health among high school students in the United States.

The findings revealed moderate awareness among adolescents. Although most participants acknowledged that oral health influences overall health, awareness of specific systemic associations such as cardiovascular disease and diabetes remained limited.

Scientific evidence indicates that periodontal disease contributes to systemic inflammation and may increase the risk of cardiovascular disease through endothelial dysfunction and inflammatory cytokine release.

Furthermore, diabetes mellitus and periodontal disease share a bidirectional relationship, where each condition can influence the progression of the other through inflammatory mechanisms.

These findings emphasize the importance of improving public awareness regarding the oral-systemic health connection.

School-based educational programs can play a critical role in promoting oral hygiene practices and improving knowledge among adolescents.

Limitations

- The study was limited to selected schools.
- Self-reported responses may introduce bias.
- Cross-sectional design limits causal inference.

IV. Conclusion

High school students demonstrated basic awareness regarding the importance of oral health; however, knowledge of the oral-systemic health connection remains limited.

Implementing school-based oral health education programs may improve awareness and promote preventive oral health behaviours among adolescents.

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