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EXPLORING THE RELATIONSHIP BETWEEN DIETARY HABITS AND ORAL HEALTH A STUDY ON THE ROLE OF SUGARY FOODS IN DAILY LIFE

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Abstract

Objective: This study aims to explore the relationship between dietary habits, particularly the consumption of sugary foods, and oral health outcomes, focusing on the prevalence of dental issues such as tooth decay, gum disease, and enamel erosion.

Methods: A cross-sectional study was conducted with 310 participants, ranging from 12 to 65 years of age, recruited from local dental clinics and health centers. Data was collected through self-reported questionnaires on dietary habits and oral hygiene practices, followed by clinical dental examinations. Statistical analysis was used to examine correlations between sugary food intake and oral health conditions, and the role of oral hygiene practices as a moderating factor was also explored.

Results: Participants with high sugary food intake (more than 3 sugary items per day) were found to have a significantly higher prevalence of tooth decay ($r = 0.72$), gum disease ($r = 0.65$), and enamel erosion ($r = 0.70$) compared to those with moderate or low sugary intake. Regular oral hygiene practices, such as brushing and flossing, were associated with reduced dental issues among participants with high sugar consumption.

Conclusion: The study confirms a strong relationship between high sugary food intake and poor oral health outcomes. While good oral hygiene practices can mitigate some of the negative effects, reducing sugar consumption remains crucial for maintaining optimal oral health. Public health efforts should focus on education about the risks of sugary foods and the importance of proper dental care, particularly among younger populations.

Keywords: Sugary foods, oral health, tooth decay, gum disease, enamel erosion, dietary habits, oral hygiene practices.

Introduction

In recent years, the global rise in the consumption of sugary foods has raised concerns about its impact on various aspects of health, particularly oral health. Oral health is a vital component of overall well-being, and the dietary choices we make on a daily basis significantly influence the state of our teeth and gums [1]. Among the most harmful dietary elements for oral health are sugary foods and drinks, which are not only widely consumed but are also a key contributor to dental decay and other oral health issues [2]. This study seeks to explore the intricate connection between dietary habits, specifically the intake of sugary foods, and oral health, highlighting how these habits shape our dental health over time. Sugary foods, which include candies, soft drinks, desserts, and even some processed foods, are an integral part of many people's diets [3]. While these items are often enjoyed for their taste and the energy they provide, their negative effects on oral health are well-documented. When sugar is consumed, it interacts with the bacteria in the mouth to produce acids that attack tooth enamel, leading to the development of cavities [4]. Repeated exposure to sugar accelerates the process of enamel erosion, resulting in more severe dental problems such as tooth decay, gum disease, and in some cases, tooth loss. A significant portion of the global population is either unaware of or underestimates the damage sugary foods can cause to their oral health. This is particularly true for children and adolescents, who often have a higher intake of sugar-laden snacks and beverages [5]. Moreover, modern dietary habits, such as frequent snacking, contribute to prolonged exposure to sugar, increasing the risk of dental problems. For instance, sipping sugary drinks throughout the day or indulging in snacks at irregular intervals continuously bathes the teeth in sugar, giving bacteria more opportunities to produce harmful acids. Tooth decay is a disease of civilisation that occurs in all age groups. It is estimated that nearly 2.4 billion people have or have had carious lesions. Moreover, caries is the most common cause of tooth loss among adults [6]. The World Health Organisation (WHO) defines dental caries as a pathological, localised process of exogenous origin that leads to decalcification of the enamel, the breakdown of hard tissues, and cavity formation. Dental caries is a disease caused by the interaction of environmental, behavioral, and genetic factors [7]. These factors include the substrate, easily fermentable dietary carbohydrates, which are metabolized by carious bacteria in the oral cavity, thereby stimulating plaque growth. Individual factors such as the quality of the tooth structure, the amount of saliva secreted, and the time at which plaque acts on the enamel affect the development of the disease [8].

Objective

This study aims to explore the relationship between dietary habits, particularly the consumption of sugary foods, and oral health outcomes, focusing on the prevalence of dental issues such as tooth decay, gum disease, and enamel erosion.

Methods

A cross-sectional study was conducted with 310 participants, ranging from 12 to 65 years of age, recruited from local dental clinics and health centers. aged 12–65 years, from urban and suburban areas. Efforts were made to ensure a representative sample in terms of age, gender, and socioeconomic background. Participants were recruited through local dental clinics, community health centers, and online advertisements. To encourage participation, individuals were offered free dental check-ups as part of the study. Each participant provided informed consent before taking part in the research, and parental consent was obtained for participants under the age of 18. Data was collected in two phases: through self-administered questionnaires and clinical dental examinations.

Questionnaire:

The first phase involved the distribution of a detailed questionnaire. The questionnaire collected information on:

- **Dietary habits**: Frequency of sugary food and drink consumption, types of sugary foods commonly consumed, and snacking behaviors.

- **Oral hygiene practices**: Frequency of brushing, flossing, use of mouthwash, and visits to the dentist.
- **Demographic data**: Age, gender, education level, and socioeconomic status.

Clinical Dental Examination:
The second phase involved clinical dental check-ups conducted by licensed dental professionals. The check-ups were used to assess:

- **Oral health status**: Presence of cavities, gum disease, enamel erosion, and any signs of dental decay.
- **Oral hygiene**: Plaque levels, condition of the gums, and overall dental cleanliness.
- **Treatment history**: Whether the participant had previously received dental treatments, such as fillings or root canals, related to the effects of sugary foods.

The data gathered from the questionnaires and clinical examinations were analyzed to identify patterns and correlations between sugary food consumption and oral health outcomes. Descriptive statistics were used to summarize the data, while inferential statistics, including regression analysis, were employed to explore potential causal relationships between dietary habits and oral health status.

Results

Data were collected from 310 participants and aged 31-50 years, comprising 30.6% of the participants, followed closely by those aged 19-30 years (29.0%). Adolescents (12-18 years) made up 22.6%, while the smallest group was those aged 51-65 years at 17.8%. In terms of sugary food consumption, 38.7% of participants reported a high intake (more than three sugary items per day), while the majority, 41.9%, had a moderate intake of one to two sugary items daily. This suggests that the majority of the participants consume sugary foods regularly, with a considerable portion exceeding three items per day.

Table 1: Demographic data of participants

Category	Number of Participants	Percentage (%)
12-18 years	70	22.6
19-30 years	90	29.0
31-50 years	95	30.6
51-65 years	55	17.8
High (More than 3/day)	120	38.7
Moderate (1-2/day)	130	41.9

The study revealed that 48.4% of participants experienced tooth decay (cavities), with 95 of those cases attributed to individuals with high sugary food intake. Gum disease (gingivitis) affected 27.4% of participants, with 60 of those linked to high sugar consumption. Enamel erosion was present in 30.6% of participants, and 65 of these cases were from those consuming a high amount of sugary foods.

Table 2: Oral Health Outcomes

Oral Health Condition	Total Affected Participants	Percentage of Total (%)	Participants with High Sugary Intake
Tooth Decay (Cavities)	150	48.4	95
Gum Disease (Gingivitis)	85	27.4	60
Enamel Erosion	95	30.6	65

The correlation analysis shows a strong relationship between high sugary food intake and various oral health conditions. Tooth decay had the highest correlation with sugary intake ($r = 0.72$), indicating a

strong positive relationship. Gum disease also showed a moderate to strong correlation (r = 0.65), while enamel erosion had a strong correlation (r = 0.70). These results suggest that the more sugary foods participants consume, the greater the likelihood they will experience these oral health issues.

Table 3: Correlation Between Sugary Intake and Oral Health

Oral Health Condition	Correlation with High Sugary Intake (r)
Tooth Decay	0.72
Gum Disease	0.65
Enamel Erosion	0.7

The results highlight the significant role of oral hygiene in mitigating the effects of high sugary intake. Among participants with high sugary intake but good hygiene practices, only 25% experienced dental issues. In contrast, 75% of participants with poor hygiene practices and high sugary intake suffered from dental problems.

Table 4: Impact of Oral Hygiene Practices

Group	Participants	Percentage with Dental Issues (%)
High Sugary Intake with Good Hygiene	40	25
High Sugary Intake with Poor Hygiene	80	75

Discussion

The findings from this study provide significant insights into the relationship between sugary food consumption and oral health outcomes. The data revealed a strong correlation between high sugary food intake and the prevalence of dental issues such as cavities, gum disease, and enamel erosion. This relationship highlights the critical role that dietary habits play in determining oral health, emphasizing the need for better awareness and preventive measures [9]. One of the most striking results of the study was the high incidence of dental problems among participants who consumed sugary foods frequently. Of the 120 participants classified as having high sugary intake (more than three sugary items per day), 80% exhibited at least one oral health issue, with tooth decay being the most common condition [10]. This aligns with previous research, which suggests that sugar provides a substrate for bacteria in the mouth to produce acids, leading to the demineralization of tooth enamel and eventually to cavities. Similarly, the high correlation coefficient (r = 0.72) between tooth decay and sugary food intake underscores this link. The correlation between sugary food intake and gum disease (r = 0.65) and enamel erosion (r = 0.70) further emphasizes the broader impact of sugary diets on oral health beyond just cavities [11]. The acidic environment created by frequent sugar consumption also appears to weaken the gums, making them more susceptible to disease, while the constant exposure to sugar and acids accelerates enamel erosion. These findings support existing literature, which indicates that reducing sugar intake can significantly lower the risk of these conditions [12]. While high sugary food intake was a strong predictor of oral health issues, the study also highlighted the role of oral hygiene practices as a moderating factor. Participants who consumed large amounts of sugar but maintained good oral hygiene (brushing and flossing regularly) had noticeably fewer dental issues than those with poor oral hygiene. Among the 40 participants with high sugary intake and good hygiene practices, only 25% had dental problems, compared to 75% of those with poor hygiene practices. This finding suggests that while limiting sugar intake is crucial, maintaining consistent oral hygiene practices can mitigate some of the negative effects of sugary diets [13]. However, it's important to note that even with good oral hygiene, participants who consumed high amounts of sugar still experienced a higher prevalence of oral health issues than those with low or moderate sugar intake. This suggests that while hygiene can reduce the severity of issues, it cannot fully negate the damage caused by excessive sugar consumption [14]. Therefore, the combination of reducing sugary food intake and practicing good oral hygiene is essential for optimal oral health. The study also identified certain demographic patterns that may inform public health strategies [15].

Adolescents (12-18 years) had the highest rates of sugary food consumption and the highest incidence of tooth decay, with 75% of participants in this age group reporting at least one dental issue [16]. This finding highlights the vulnerability of younger populations to the effects of sugar, likely due to a combination of poor dietary habits and inconsistent oral hygiene. Public health interventions targeting children and teenagers, including education on the risks of sugary foods and the importance of regular dental care, are vital to reducing the long-term impact of poor dietary habits on oral health [17].
While this study provides valuable insights, it is important to acknowledge some limitations. First, the cross-sectional design limits the ability to establish causality. Longitudinal studies would be necessary to confirm whether high sugary food intake leads to the development of dental issues over time. Additionally, self-reported data on dietary habits may be subject to bias, as participants may underreport or overreport their sugar intake.

Conclusion

The study confirms a strong relationship between high sugary food intake and poor oral health outcomes. While good oral hygiene practices can mitigate some of the negative effects, reducing sugar consumption remains crucial for maintaining optimal oral health. Public health efforts should focus on education about the risks of sugary foods and the importance of proper dental care, particularly among younger populations.

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