



# Effect of Sedentary Lifestyle on the Oral Health in a Group of Iranian Children

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## Abstract

**Background:** Sedentary life style may affect dental health, growth, and general well-being of children, requiring the participation of health care providers. The aim of the present study was to assess the relation between oral health (dental plaque index) and sedentary lifestyle pattern in children.

**Methods:** In this cross-sectional and descriptive-analytical study, 219 children aged 8 to 12 from the schools of Shahrekord city were selected by cluster random sampling in 2021–2022. After obtaining informed consent, parents filled a questionnaire about their child lifestyle pattern. Children chew disclosing agent and then Plaque index was recorded by examination according to tooth coloring pattern. Data were analyzed using Spearman correlation coefficient, K-square in SPSS 22 software. The level of significance was considered less than 0.05.

**Results:** The mean dental plaque index was  $1.37 \pm 0.53$  in the total population of Shahrekord children ( $1.23 \pm 0.49$  in girls and  $1.54 \pm 0.55$  in boys). Children spend most of their time studying and watching television and spend less time on calls and listening to music. There was no significant relationship between the mean score of overall sedentary entertainment and plaque index ( $p$ -value=0.092). However, there was a direct and significant relation between watching television and computer games with dental plaque index ( $p$ -value<0.05).

**Conclusion:** Increasing sedentary entertainment in children, such as watching television or playing computer games, may affect children's oral health. Therefore, it is important for dentists to consider children's lifestyle as an influencing factor in oral health.

**Keywords:** Child, Cross-sectional studies, Female, Male, Music, Schools, Sedentary behavior, Video games

## Introduction

Sedentary life style may affect dental health, growth, and general well-being of children, requiring the participation of health care providers. Childhood obesity is associated with a greater risk for type 2 diabetes, cardiovascular diseases, asthma, arthritis, and general poor health (1). In obese children, the adipose tissue secret inflammatory markers that may increase gingival inflammation and promote bacterial proliferation on the tooth surface (2).

Overweight children have less physical activity and eat more frequently. These children prefer to eat sweet and fast food over fruit and vegetables and dairy products. Sedentary lifestyle pattern and inappropriate eating habits could lead to obesity and cause poor oral hygiene and periodontitis. Treatment intervention for obese children is to consider lifestyle modification (3).

Sedentary lifestyle is closely associated with being overweight and oral disease in children. Sedentary activities such as watching television, working at desk jobs, using computers, and playing video games influence child physical activity level (4).

The mediating agents between obesity and poor lifestyle is leisure time activities. Watching TV for long time in children promotes consumption of unhealthy food high in fat, sweetened beverages and snacks, sugar, and salt, nutrients associated with obesity, and therefore expose them to higher rates of caries and other chronic diseases. Several studies revealed the association between children's weight and dental caries. Willerhausen *et al* (5) in their study found a significant association between caries frequency and weight in school children. Willerhausen *et al* (6) also in another study revealed a significant correlation between the Body Mass Index (BMI) and caries frequency in primary school pupils. However, in Pinto *et al*'s study (7), no correlation was found between dental decay in obese and non-obese children.

As lifestyle factors and leisure time activities may affect dental health, growth, and general well-being of children, the participation of health care providers in implementing the oral health promotion programs among children is necessary (8). The aim of the present study was to assess the relation between oral health (dental plaque index) and sedentary lifestyle

pattern in children.

## Materials and Methods

This analytical cross-sectional study was approved by Ethics Committee of Isfahan University of Medical Sciences with the ethics code of IR.MUI.REC.1397.3.071, and conducted on 219 children between 8 to 12 years (101 boys, 118 girls) selected by cluster random sampling from schools of Shahrekord in 2021-2022. This framework was divided into primary schools of first and second regions in Shahrekord. A simple random sample was obtained of many clusters from all possible classrooms and data were obtained on child in each of the randomly selected classrooms. Children were enrolled in the study by choosing a random number from the students' class list.

A checklist was prepared to obtain parents informed consent before their enrollment and inform them about study purpose, risks and benefits. The inclusion criteria were children who did not have any systemic, mental disease or developmental anomalies. Also, the parents who did not respond to more than 20 percent of the questions were excluded from the study.

The questionnaire was designed based on previous studies. The content validity of the questionnaire was assessed and approved by experts and professors in the related field (pedodontists, community oral health specialists, and pediatricians).

In order to confirm the reliability, the questionnaire was also given to thirty parents in a pilot study. The Cronbach alpha was determined 0.82, indicating an acceptable reliability. The final questionnaire consisted of demographic information, child's physical activities, sedentary life style pattern, and parental attitude in this regard.

Plaque-disclosing agent was used in the form of a chewable tablet in children. Intraoral examination was done by one practitioner using a dental mirror and a headlight, and the oral hygiene was recorded according to dental plaque index (9).

The results obtained from the questionnaire and oral health clinical examinations of children were entered into SPSS version 22 (IBM Corp, Armonk, New York, USA). The descriptive statistical analysis was performed and reported by frequencies, percentage and mean and standard deviation. The relation between plaque index and other variables was assessed by

using chi-square and Spearman correlation coefficient tests. Also, independent sample T-Test was utilized to assess differences by variable sex. The level of significance was considered less than 0.05.

## Results

In the present study, the relation between oral health (dental plaque index) and sedentary lifestyle pattern was assessed in 218 primary school children between 8-12 years (46% boys, 54% girls) in Shahrekord. The mean age of the girls and boys in the study was  $10.5 \pm 1.88$  and  $10.37 \pm 1.55$ , respectively. The results of T-Test showed that the difference between the ages of the two sexes was not statistically significant ( $p$ -value=0.553). The relationship between the mean age of children and mean dental plaque index was not significant ( $p$ -value=0.058).

Most of the parents participating in the study were older than 35 years (67.1%), had a Bachelor's degree (50.7%) and two children (55.3%). The relationship between mean age of parents and dental plaque index was not significant ( $p$ -value=0.330). There was a significant and reverse relation between parental education and dental plaque index. It means that by increasing parental education, dental plaque index was decreased ( $p$ -value=0.001).

The mean dental plaque index was  $1.37 \pm 0.53$  in the total population of Shahrekord children (considered 0-3). Dental plaque index in girls was  $1.23 \pm 0.49$  and in boys was  $1.54 \pm 0.55$ . Dental plaque index was significantly higher in boys ( $p$ -value<0.001).

The time spent on different entertainments in the children studied was collected and assessed using a questionnaire filled by parents (0, <30 min, 30 min -1 hr, 1-3 hr, >1 hr). Leisure time activities were categorized into 7 groups: watching television or movies, computer or video games, art and crafts, mental game, reading, talking on the phone, and listening to music. Children spend most of their time reading and watching television and spend less time on phone calls and listening to music (Figure 1). The time spent watching television and computer games was significantly higher in boys ( $p=0.041$  and  $p$ -value<0.001, respectively) and the time spent painting and studying is significantly higher girls ( $p=0.020$  and  $p$ -value<0.001, respectively). There was a significant and direct relationship between sedentary entertainment and parental age. It means that by increasing parental age, children have more sedentary entertainments ( $p$ -value=0.040). There was also a significant reverse relationship between the level of sedentary entertainment and parental education. On the other hand, the higher the level of parental education, the fewer children had sedentary entertainment ( $p$ -value=0.011).

According to the parental report, 48.9% of the children had physical activity 4-5 days a week and 42.5% of them attended gym classes 0-2 times a month. Physical activity was significantly higher in girls ( $p$ -value<0.001).

There was no significant relationship between the mean score of overall sedentary entertainment and

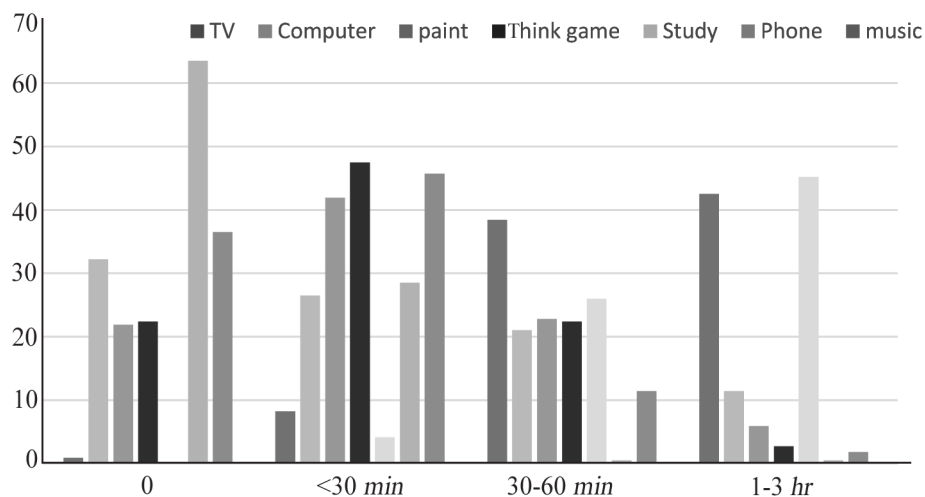


Figure 1. The prevalence of different sedentary entertainment in children per day.

plaque index (p-value=0.092). However, there was a direct and significant relationship between the watching television and computer games with dental plaque index (p-value<0.001). Moreover, the relation between mean physical activity and dental plaque index was not significant (p-value=0.140).

## Discussion

Dental and periodontal diseases as the most common chronic diseases are very important due to their high adverse effects on the children and society. Dental plaque plays an important role in the development of caries and periodontal diseases (10). Unlike the significant reduction of dental caries in developed countries in recent decades, it remains the major problem of developing societies (11). Plaque removal is essential for controlling periodontal disease and dental caries, therefore methods of preventing plaque index should be taken in prevention. One of these methods is to correct the life style (12).

Studies show that there is a relationship between quality of life and dental diseases (13-15). Proper health behavior is influenced by several factors such as demographic characteristics (age, sex, race), psychosocial factors (personal and family characteristics, social properties and peers), and structural factors (disease information) (16). The prevalence of overweight and obesity in children and adolescents is rapidly increasing with the development of urbanization and changes in human lifestyles (such as inactivity). Malnutrition behaviors, such as high intake of sugars, beverages, sweets, chocolates, and dairy deficiencies are inappropriate lifestyles in children. This unpleasant life style leads to obesity (increased BMI) and high prevalence of caries (17).

In the current study, mean dental plaque index was  $1.37 \pm 0.53$  in Shahrekord children indicating that oral hygiene in Shahrekord children is not good. Among Shahrekord children, more than half spend above one hour a day watching television; above sixty percent, study more than 1 hr a day, but other entertainments are less common. There was no relationship between sedentary entertainment and oral hygiene, but television watching and computer games were associated with poor oral hygiene and dental plaque. As watching TV is one of the most common sedentary entertainments among Shahrekord

children, increasing the time children spent watching television can lead to increased obesity and disorders, including periodontal disease.

Anand *et al* (4) similarly stated that children who spend more time per day watching television or playing computer games have poor oral health. Bawadi *et al* (18) found that people with more physical activities have less dental plaque and gingival attachment loss which is in accordance with the result of the present study. Other studies have also shown that children who spend more time watching television per day have a higher BMI. A study conducted by Al-Zharani *et al* (19) reported a significant association between body fat and periodontal disease among young people. Wood *et al* (20) also found a relationship between BMI with gingival attachment loss and pocket depth, gingival bleeding and calculus index.

Also, various studies have found that more dental caries occur in obese children (21-23). Poor children's oral health in families with high socioeconomic status is related to obesity and improper eating habits (24). Sedentary lifestyle and unhealthy eating habits can lead to poor oral hygiene and increased susceptibility to periodontal disease in children. The immunological activity of adipose tissue plays an important role in the development of insulin resistance and periodontal diseases. Obesity, dental caries and periodontal diseases are the most important public health concerns that affect the development of children (25). Therefore, each child's dental examination should include BMI assessment, leisure activities and dietary habits and socioeconomic status.

Watching television is one of the most common sedentary entertainments in different societies. Sedentary activities as watching TV, working at desk jobs, using computers, playing video games, driving cars can result in obesity (4).

The results of this study demonstrated that parents with lower educational level had higher dental plaque index, and consequently, poor oral hygiene in their child. On the other hand, in higher educated families, the level of sedentary activity is lower. As parents become more aware, they recommend their children more physical activities. Also, in older families, children were more likely to have sedentary activities. This may be due to less time spent by parents for their children's leisure time. Low educated-families need to

be informed by dentists due to insufficient awareness in monitoring their children's oral hygiene.

The results of the present study showed that boys were more likely to watch television and computer games. Therefore, a significant increase in PI (dental plaque index) in boys can be attributed to increased sedentary activity and consequently more periodontal diseases. Blanco *et al* (26) indicated that girls had less dental plaque and in families with higher socioeconomic status, dental plaque and caries were lower in children. Sedentary entertainment involves a large percentage of leisure time for children and cause more time sitting at work and at home. This "sit time" is a major contributor to burning few calories could lead to obesity at young ages (4). Obesity and overweight are predisposing factors for childhood chronic health disorders, cardiovascular disease, hypertension, diabetes, sleep apnea and asthma (27). Therefore, it is important for dentists to consider children's lifestyle as an influencing factor in oral health and to include it in routine examinations.

## Conclusion

Increasing sedentary entertainment in children, such as watching television or playing computer games, may affect children's oral health. Therefore, it is important for dentists to consider children's lifestyle as an influencing factor in oral health.

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## Conflict of Interest

Authors have no conflict of interest.

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## References

- Marcenes W, Steele JG, Sheiham A, Walls AWG. The relationship between dental status, food selection, nutrient intake, nutritional status, and body mass index in older people. *Cad Saude Publica* 2003;19:809-15.
- Keller A, Rohde JF, Raymond K, Heitmann BL. Association between periodontal disease and overweight and obesity: a systematic review. *J Periodontol* 2015;86(6):766-76.
- Hong L, Ahmed A, McCuniff M, Overman P, Mathew M. Obesity and dental caries in children aged 2-6 years in the United States: National health and nutrition examination survey 1999-2002. *J Public Health Dent* 2008;68(4):227-33.
- Anand N, Suresh M, Chandrasekaran S. Effect of obesity and lifestyle on the oral health of pre adolescent children. *J Clin Diagn Res* 2014;8(2):196.
- Willerhausen B, Blettner M, Kasaj A, Hohenfellner K. Association between body mass index and dental health in 1,290 children of elementary schools in a German city. *Clin Oral Investig* 2007;11(3):195-200.
- Willershausen B, Moschos D, Azrak B, Blettner M. Correlation between oral health and body mass index (BMI) in 2071 primary school pupils. *Eur J Med Res* 2007;12(7):295.
- Pinto A, Kim S, Wadenya R, Rosenberg H. Is there an association between weight and dental caries among pediatric patients in an urban dental school? A correlation study. *J Dent Educ* 2007;71(11):1435-40.
- Cinar B, Murtomaa H. Clustering of obesity and dental health with lifestyle factors among Turkish and Finnish pre-adolescents. *Obes Facts* 2008;1(4):196-202.
- Löe H. The gingival index, the plaque index and the retention index systems. *J Periodontol* 1967;38(6P2):610-6.
- Thomson WM, Sheiham A, Spencer AJ. Sociobehavioral aspects of periodontal disease. *Periodontol* 2000 2012;60(1):54-63.
- Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. *Am J dent* 2009;22(1):3-8.



12. Abanto J, Carvalho TS, Mendes FM, Wanderley MT, Bönecker M, Raggio DP. Impact of oral diseases and disorders on oral health-related quality of life of preschool children. *Community Dent Oral Epidemiol* 2011;39(2):105-14.
13. Corrêa-Faria P, Paixão-Gonçalves S, Paiva SM, Martins-Júnior PA, Vieira-Andrade RG, Marques LS, et al. Dental caries, but not malocclusion or developmental defects, negatively impacts preschoolers' quality of life. *Int J Paediatr Dent* 2016;26(3):211-9.
14. Mota-Veloso I, Soares MEC, Alencar BM, Marques LS, Ramos-Jorge ML, Ramos-Jorge J. Impact of untreated dental caries and its clinical consequences on the oral health-related quality of life of schoolchildren aged 8–10 years. *Qual Life Res* 2016;25(1):193-9.
15. Ramos-Jorge J, Alencar BM, Pordeus IA, Soares MEdC, Marques LS, Ramos-Jorge ML, et al. Impact of dental caries on quality of life among preschool children: emphasis on the type of tooth and stages of progression. *Eur J Oral Sci* 2015;123(2):88-95.
16. Koletsi-Kounari H, Tzavara C, Tountas Y. Health-related lifestyle behaviours, socio-demographic characteristics and use of dental health services in Greek adults. *Community Dent Health* 2011;28(1):47.
17. Mobley C, Marshall TA, Milgrom P, Coldwell SE. The contribution of dietary factors to dental caries and disparities in caries. *Acad Pediatr* 2009;9(6):410-4.
18. Bawadi H, Khader Y, Haroun T, Al-Omari M, Tayyem R. The association between periodontal disease, physical activity and healthy diet among adults in Jordan. *J Periodontal Res* 2011;46(1):74-81.
19. Al-Zahrani MS, Bissada NF, Borawski EA. Obesity and periodontal disease in young, middle-aged, and older adults. *J Periodontol* 2003;74(5):610-5.
20. Wood N, Johnson RB, Streckfus CF. Comparison of body composition and periodontal disease using nutritional assessment techniques: third national health and nutrition examination survey (NHANES III). *J Clin Periodontol* 2003;30(4):321-7.
21. Alshihri AA, Rogers HJ, Alqahtani MA, Aldossary MS. Association between dental caries and obesity in children and young people: a narrative review. *Int J Dent* 2019; 21(4):121-7.
22. Fernandez MR, Goettems ML, Demarco FF, Correa MB. Is obesity associated to dental caries in Brazilian schoolchildren? *Braz Oral Res* 2017;31:e83.
23. Hall-Scullin EP, Whitehead H, Rushton H, Milsom K, Tickle M. A longitudinal study of the relationship between dental caries and obesity in late childhood and adolescence. *J Public Health Dent* 2018;78(2):100-8.
24. Park JB, Han K, Park YG, Ko Y. Association between socioeconomic status and oral health behaviors: the 2008-2010 Korea national health and nutrition examination survey. *Exp Ther Med* 2016;12(4):2657-64.
25. Harada S, Akhter R, Kurita K, Mori M, Hoshikoshi M, Tamashiro H, et al. Relationships between lifestyle and dental health behaviors in a rural population in Japan. *Community dentistry and oral epidemiology*. 2005;33(1):17-24.
26. Blanco M, Pérez-Ríos M, Santiago-Pérez MI, Smyth E. Oral health and hygiene status in galician schoolchildren. *An Pediatr (Barc)* 2016;85(4):204-9.
27. Van Cleave J, Gortmaker SL, Perrin JM. Dynamics of obesity and chronic health conditions among children and youth. *Jama*. 2010;303(7):623-30.