



Are Oral Health Conditions Associated with Schoolchildren's Performance and School Attendance?

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ABSTRACT

Aim: To examine the relationship between children's oral health-related quality of life and their academic achievement and school attendance.

Materials and Methods: Data was gathered from the answers to a structured questionnaire from 150 children aged 7-12 years. Their demographic data, the children's/parents' oral health conditions, their academic performance/school absenteeism, and their intraoral examination outcomes were recorded via a structured questionnaire. The Silness & Loe plaque index was used to assess their dental plaque scores and DMFT/DMFS, dmft/dmfs indices according to the WHO criteria were used to determine their dental caries scores.

Results: The mean age of the 150 pediatric patients [72 girls (48%) and 78 boys (52%)] was 9.23±1.44 years. Due to dental care-related issues, 82% of schoolchildren missed less than two weeks, and 18% missed more than two weeks of school. Furthermore, 21% of these missed days were related to toothache or infections, and 34% were due to going to dental treatment appointments. The association between nail biting and hard object biting and the school achievement of the children was shown to be statistically significant ($p=0.02$ and $p=0.03$, respectively). According to the results of the present study, it was determined that school absenteeism was higher in those children who needed dental treatment. It was also observed that there was a negative correlation between school absenteeism and academic success ($p=0.01$).

Conclusion: Dental problems can cause school-aged children to be absent from school and affect their school performance negatively.

Keywords: Oral health-related quality of life, school absenteeism, school performance

Introduction

Oral health is one of the fundamental components of general health, and oral diseases impact the quality of life. The mouth is a conduit via which infectious organisms can enter the body, and dental health is regarded as a reflection of general health (1). Caries, dental pain, or periodontitis in children are considered oral health indicators (2). One of the most prevalent diseases in the world, dental caries, affects 60-90% of school-aged children. Especially, dental caries

in primary dentition is a common public health challenge observed in approximately 621 million children (3). Feeding, breathing, speaking, smiling, and other physical and social functions, notably social adaptability, depend on good dental health (4).

Untreated dental caries result in pain, difficulty in feeding, weight loss, speech difficulties, and aesthetic problems. Children can miss school because of toothache, and in order to attend their dental appointment for caries

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treatment. Children who have oral diseases may experience discomfort, humiliation, delayed cognitive growth, low self-esteem, and/or difficulties in day-to-day activities (4).

Education is a critical component of both self-improvement and societal progression. It is essential to offer every child and teenager the chance to realize their full academic potential. Actually, many variables determine how students learn and perform in class. Some examples of factors which can affect academic performance are medical conditions, intellectual disability, psychological issues, school absenteeism and insufficient sociocultural context (5). It is accepted that poor dental health and unfavorable socio-economic circumstances negatively affect quality of life. In summary, oral health problems are medical conditions which can affect a child's education.

Attendance to school and academic performance are related to each other and indicators which affect a child's educational process (2,6). The issue of absenteeism from school is particularly significant since it may compromise children's quality of life by causing them to miss out on educational opportunities.

There are studies examining the relationship between dental health and academic performance in various regions. The relationships between children's oral health, academic achievement, and psychological status have been reported in the literature (7). However, there have been relatively few studies undertaken in Turkey.

The present study aimed to evaluate the association between oral health conditions and academic performance and school absenteeism in Turkish schoolchildren. This study hypothesized that children with poor oral health were more likely to have reduced school attendance and inadequate academic performance.

Materials and Methods

Ethical Considerations and Sample Selection

The present study was approved by the Ethical Committee of the Faculty of Medicine, Ege University (dated 20.04.2017 protocol number: 17-4/18). All children and their parents received written and verbal information about the procedure, and written informed consent was obtained before this study.

Study Design and Data Collection Tool

In the second part of the questionnaire, questions were asked about the children's academic performance and their school absenteeism. This part includes questions about their year-end achievement score, their homework

status, and their total number of school days missed during the academic year because of toothache and/or dental treatment appointments. Furthermore, a question was asked to the parents in order to find out their point of view on whether there was any association between oral health conditions and a child's academic performance.

In the third part of the questionnaire, several questions were asked to determine the child's oral health conditions. These questions covered oral health topics such as the frequency of a child's tooth brushing, their consumption of sugary foods, and the presence of oral habits which cause malocclusion problems. In addition, past dental treatment experiences of the mother/father are investigated in the questionnaire.

In the last part of the survey, intraoral examinations were performed by a pediatric dentist. These intraoral examinations of the children were performed with the help of a mirror and a probe under a reflector light. The dental caries scores were recorded with DMFT/DMFS, dmft/dmfs indices according to the WHO criteria (8). The Silness & Løe plaque index was used to evaluate plaque scores in the children (9).

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA) with the chi-squared test, the Mann-Whitney U test, the Kruskal-Wallis test and descriptive statistics.

Results

Demographic Data

Seventy-eight male and 72 female participants (n=150) with a mean age of 9.23 ± 1.44 years were included in this study. 32% of mothers and 44% of fathers' educational level was higher than 12 years. 78% of the parents lived together. 27% of the families had low income.

Academic Performance and School Absenteeism of Children

The year-end achievement scores of 19% of participants had points between 85-100 (very good), 62% of them had 70-84 points (good), 8% of them had 55-69 points (moderate), and 11% of them had 45-54 points (a passing grade). While 6% of students never did their homework, 36% did it sporadically, 49% usually and 9% did their homework consistently.

Seventy-six out of 150 parents reported school absenteeism in their children due to dental care-related

Table I. Association between caries groups and dental treatment-related absenteeism from school

		Caries free DMFT + dmft=0 (n)	Low caries DMFT + dmft=1-4 (n)	High caries DMFT + dmft>4 (n)	p-value
School Absenteeism due to dental care-related reasons	<2 weeks	8	19	35	0.02
	≥2 weeks	-	3	11	

reasons. 82% of schoolchildren missed less than 2 weeks and 18% of them missed more than 2 weeks due to dental care-related reasons.

21% of these missed days were explained by the presence of toothache or infection and 34% of these resulted from going for dental treatment. 77% of the parents believed there was a relation between the child's dental health and their academic performance but 23% of them did not agree with this idea.

A negative correlation was found between school performance and school absenteeism ($p=0.01$).

Children's and Parent's Oral Health Conditions

The children were asked how often they brushed their teeth, and 21% reported two to three times per day, 36% reported once per day, and 43% reported brushing their teeth irregularly.

24% of the children consumed sugary food only with their main meal, 41% of them 1-2 times, and 35% of them 2-3 times at times other than with their main meal. 65% of the mothers and 68% of the fathers had dental problems and treatment experiences in the past.

Bad oral habits which may cause malocclusion problems: nail biting (27%), prolonged use of bottles/pacifiers (23%), infantile swallowing (12%), thumb sucking (32%), tongue/lip/cheek biting (27%), mouth breathing (21%) and bruxism (44%) were observed in the patients. A statistically significant correlation was found between nail biting and hard object biting and their school performance ($p=0.02$ and $p=0.03$, respectively).

Intraoral Examination Outcomes

The caries index scores were grouped as follows; caries free: DMFT+dmft=0, low caries: DMFT+dmft=1-4, high caries: DMFT+dmft >4. A statistically significant correlation was found between the student's absenteeism from school due to dental treatment and their caries scores ($p=0.02$). Table I shows the relationship between the caries groups and absenteeism from school due to dental problems (dental caries, eruption problems, orthodontic anomalies).

When assessing the periodontal health of the children, the Silness & Løe plaque index was used to analyze their plaque scores, and their mean plaque value was reported to be 2.18. A statistically significant correlation was found between the student's absenteeism from school and their dental plaque scores ($p=0.03$).

Discussion

A child's dental health may have an effect on several aspects of their growth and development, as well as their overall health and quality of life (10). Despite recent advancements in the general quality of children's oral health, dental issues are still highly prevalent in young children. Oral health problems affect children's daily activities, according to studies which used quality of life as a metric for success. It has been noted in several studies that children with toothache have difficulty in concentration and learning and have low school success as a result of absenteeism from school due to dental pain or treatment. A significant association between dental caries and academic achievement has been reported in some articles in the literature (6,7,11-15), but not in others (2,16,17).

Gift et al. (18) conducted one of the first studies examining the relationship between dental health and academic performance. They discovered that 117,000 school hours were lost for every 100,000 American children. Another study showed that approximately 504,000 (7%) of California's 7,240,000 schoolkids ages 5-17 had missed at least one day of school due to a dental problem during a one-year period (19).

Six hundred primary schoolchildren's data were examined in India and their oral health status was recorded using the dft index according to the WHO criteria. The outcomes of that study established that the relationship between school performance and mean dft score was statistically significant, which is the same as the present study. Also, that study's results revealed a decline in the children's school performance due to the effects of poor dental health (11).

El-Sayed et al. (7) examined data from 380 Sudanese students and found that dental caries was highly related to poor academic performance, with statistically significant p-values of 0.008 and 0.023 for dmft and DMFT, respectively. In their study conducted with Sudanese children, only 1.73% of the 380 children were absent from school for more than 7-9 days due to dental treatment/pain; when compared to our study, this is a lower percentage (7). One hundred and fifty children participated in the present study, and 76 were absent from school due to dental problems/treatment. The absence of 18% of these children exceeded two weeks during the one-year period. When the results of another study involving one thousand and sixty-three 12- and 811 15-year-old Thai students were evaluated, it was discovered that one out of every 20 children was missing from school due to toothache (16). On the other hand, another study carried out in Thailand using data from 925 kids found no significant association between dental conditions and school achievement (20).

Almeida et al. (17) analyzed 374 children's data from Brazil and found that poor oral health status was not associated with school absence due to dental pain. Additionally, there was no link between academic achievement as determined by the year end exam and carious lesions or toothache (17). In a study conducted in Southern Brazil with university students, school absenteeism was assessed with the question "In the last six months, have you missed some class for dental reasons?" and 114 out of 1,850 people answered as "yes" (21).

Another study with 466 schoolchildren aged 7-8 years in the Kingdom of Bahrain highlighted that dental caries correlated with low academic achievement but not with school attendance, which is the same as our study's results (15). Another study performed in Nepal with 1,151 schoolchildren revealed that the high frequency of untreated dental caries and their repercussions (pain, infection) significantly influenced the pupils' oral health-related quality of life (13).

Studies investigating the relationship between dental status and school absenteeism/academic success in Turkey are very limited. However, when the effect of dental caries on the quality of life was examined in one study conducted in 2021, it was revealed that 3.79% of 206 pre-school children, mean age 4.09 ± 0.97 years, were absent from school very often and 3.03% of them were frequently absent from school due to caries (22).

A tooth decay condition causes pain and anxiety and reduces the quality of life. New carious lesions, pain and

extractions were the major factors contributing to dental fear and anxiety (23). Due to various negative dental treatment experiences, children with active caries may be more stressed (24). Also, nail biting is a common stress-related bad oral habit. It has been reported that people who bite their nails have more anxiety issues than those who do not (25). In addition, stress and pressure at school are among the factors which cause the development of bad oral habits such as nail biting and thumb sucking (26). In one study, it was reported that there was a relationship between nail biting and attention deficit disorder (27). In the present study, the oral habits of the patients were investigated and the relationship with their academic achievement was also examined. A statistically significant correlation was found between the nail biting and hard object biting habits of the children with their school achievement.

Study Limitations

The school achievement data obtained in this study were evaluated according to the end-of-year exam grades obtained from the families. Therefore, we have not fully measured the success of education and many factors affect this success. In addition to all these, the characteristics of schools with education centers were not evaluated, and differences between private and public schools in our country were not considered.

Conclusion

Children with lower oral health conditions were more likely to have dental pain, difficulty attending school, and a decline in academic performance. Dental caries and its repercussions have a significant impact on academic achievement. Therefore, preventing and treating dental problems and enhancing oral health may help children's academic performance in addition to their cognitive and intellectual development.

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Ethics

Ethics Committee Approval: This study was approved by the Ethics Committee of Faculty of Medicine, Ege University (dated: 20.04.2017, protocol number: 17-4/18).

Informed Consent: The parents were informed about the research and their written consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: D.Ç., Concept: D.Ç., C.S., M.E.M., Design: D.Ç., C.S., M.E.M., Data Collection and/or Processing: D.Ç., C.S., M.E.M., Analysis and/or Interpretation: D.Ç., C.S., M.E.M., Literature Search: D.Ç., Ö.Ö., A.A., Writing: D.Ç., Ö.Ö., A.A.

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