Teeth Problem in Primary School Children: It's Relation to School Absenteeism and Academic Achievement

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Abstract

Teeth problems affect primary school children physically and psychologically and it harms their general health, nutrition, growth, and body weight. Also, it causes learning problems, affecting their academic performance and absence from school. **Aim**: To measure the effect of teeth problems on school absenteeism and academic achievement among primary school children. **Materials and methods**: **Design**: A descriptive cross-sectional correlational research design was used. **Sample**: included 576 primary school children who were selected randomly from two primary schools in Sohag city. **Tools:** A structured interview questionnaire was completed by the parents included five parts regarding 1) demographic characteristics of parents, 2) demographic characteristics of children; 3) question related to school absenteeism, 4) question related to school academic achievement, 5) question regarding homework completion, and The Decayed, Missing, Filled (DMF) index was used to collect data. **Results**: There was a significant relationship between school absenteeism and DMFT score (P = 0.001). There was a significant relation between school academic achievement in academic year subjects and DMFT score (P = 0.007). There was a significant relationship between homework completion and DMFT score (P = 0.002)**. Conclusion**: Teeth problems had a bad effect on absenteeism and academic achievement among primary school children. **Recommendation:** Establishing a health education program for parents about their children's teeth problems and frequent periodic teeth checkup is required.

Keywords: Teeth problems, school absenteeism, academic achievement, primary school children

Introduction

Oral diseases are considered a common problem present among children. Untreated caries is the most common preventable childhood disease in the world, being over 5 times as common as asthma among children aged **(Institute of Medicine and National Research Council, 2011).**

Teeth problems affect primary school children physically and psychologically and it harms their general health, nutrition, growth, and body weight. Also, it causes learning problems, affecting their academic performance and absence from school. Oral diseases also, cause systemic diseases, emergency visits to the hospital, hospital stays, medications, and even death. Moreover, oral disease can increase personal and financial needs and result in rising health care costs in general **(Texas Dental Association, 2018).**

Based on the data available from the World Health Organization oral health database, it was noticed that 200,335,280 teeth were decayed, filled, or missing among the indicator children their age group of 12 years **(Bali et al., 2014).**

Poor oral health causes pain, discomfort, decreasing self-esteem, and impairments of daily life activities. Poor oral health and untreated dental conditions can have a significant impact on the quality of life of children, which may lead to an overall deterioration of health **(Petersen, 2014)**.

Additionally, poor oral health with infection and pain can lead to long-lasting, effects on school attendance and academic performance. Conceptually, children with unmet dental needs may be absent owing to oral pain or to visit a dentist for treatment and

may have difficulty paying attention in class (**Paula et al., 2014).**

Poor oral health affects children and interferes with the child's ability to succeed in school. Studies mention that increase in missed school time caused by chronic health illnesses can lead to a decline in school performance **(Fowler et al., 2015).** School absenteeism data are one of the effective and efficient sources for monitoring disease activity and are potentially an alternative way for community-based disease surveillance (**Cheng et al., 2013).**

Parent reported that their child school grades who were suffering from poor oral health were low and were linked with their oral health status. Furthermore, low school performance was associated with school absence because of teeth pain or infection and not with the absence of routine dental care. Children suffering from both poor oral and general health were 2 times more likely to perform poorly in school than those with good health (**Jackson et al., 2011).**

Teeth problems were found to influence children's school performance and their absenteeism. Teeth problems hurt children such as missing school and parents missing school or work based on their 1-year recall. Also, there was a relationship between oral health and academic achievement and attendance (**Mulligan et al., 2011).**

The nurse's role of pediatric nursing and community health nursing is very important as they must concentrate on educating, counseling children and their parents regarding ideal steps of good oral care. Helping with doctors in oral health assessment and inadequacy of training provided (**Ong et al, 2018**). The Nursing and Midwifery Council mentioned the importance of the nurse's role in oral care and said that nurses should "assess needs for and provide appropriate oral, dental care and decide when an onward referral is needed" (**Nursing and Midwifery Council**, **2018**).

They must provide knowledge for children and their caregivers about how to achieve good oral health and how poor oral health is associated with other healthcare problems. Providing them with skills in oral health assessment gained through oral health training, resources to help with oral health assessment and management, and good oral hygiene care steps (**Health Education England**, **2016**).

Significance of the Study:

Oral diseases and their treatments may undermine self-image and self-esteem, discourage normal social interaction, and may also interfere with vital functions such as breathing, food selection, eating, swallowing, and speaking and with activities of daily living such as school attendance, academic performance, and family interactions. Children with poor oral health were 2.3 times more likely to do poorly in school than those with good health (**Oral Health in America, 2018**)

Operational definition:

Academic achievement: is the measurement of student performance across various academic subjects. Teachers and education officials typically measure achievement using classroom performance, graduation rates, and results from standardized tests.

Primary school children: children in elementary school or grade school who are from about four to eleven years old, in which they receive primary or elementary education.

Aim of the study

The study was aimed to measure the effect of teeth problem on school absenteeism and academic achievement among primary school children through:

1. Investigate the relationship between presence of teeth problems on attendance and academic performance between primary school children.

Research questions:

1. Is there a relationship between presence of teeth problems and student's absenteeism among primary school children?
2. Is there a relationship between presence of teeth problems and student's academic achievement among primary school children?

Operational definition:

Academic achievement: is the measurement of student performance across various academic subjects. Teachers and education officials typically measure achievement using classroom performance, graduation rates, and results from standardized tests.

Primary school children: children in elementary school or grade school who are from about four to eleven years old, in which they receive primary or elementary education.

Subjects and Methods

Research design:

A descriptive cross-sectional correlational research design was used in this study.

Research settings:

This study was applied in two primary schools in Sohag City which included Sohag El-Ebtedia and Omer Ebn El-Khatib primary schools. Sohag City contained 10 primary schools. The researchers selected 20% of the total number of schools by stratified random sample which was two schools.

Subjects:

They included 576 primary school children who were selected randomly from two primary schools in Sohag city in December 2019, after taking the consent from their parents. The researchers took 10% of primary school children from the two schools by simple random sample (576 primary school children). The inclusion criteria were: children enrolled in primary school from both sexes, free from disabilities, and aged from 6 - 12 years.

Tools for data collection:

Tool (I): A structured interview questionnaire was completed by the parents was used to collect data related to primary school children' demographic data, it was utilized to collect data pertinent to this study designed by the researchers based on reviewing the relevant literature**:** It was composed of four parts**: (Jackson et al., 2015 and Fowler et al., 2015)**

Part (1): It included the demographic characteristics of parents; it included 3 items related to age, educational level, and working status.

Part (2): It included the demographic characteristics of children; it included 3 items related to students' age, gender, and residence.

Part (3): It included a question related to school absenteeism among primary school children such as how many days you absent from school

Part (4): It included a question related to school academic achievement among primary school children such as marks were obtained in mathematics.

Part (5): It included a question regarding homework completion was obtained from the parents based on a 3-item scale question about how often the child completed his/her homework: (i) always, (ii) usually, and (iii) sometimes.

Tool (II): The Decayed, Missing, Filled (DMF) index: (Jay and David, 2008)

It has been used for almost 80 years and is well established as the key measure of caries experience in dental epidemiology. The DMF index is applied to the permanent dentition and is expressed as the total number of teeth or surfaces that are decayed (D), missing (M), or filled (F) in an individual. When the index is applied to teeth specifically, it is called the DMFT index. When written in lowercase letters, the DMF index is a variation that is applied to the primary dentition. The caries experience for a child is expressed as the total number of teeth or surfaces that are decayed (d), missing (m), or filled (f). The DMF index expresses the number of affected teeth in the primary dentition, with scores ranging from 0 to 20 for children. The DMF index expresses the number of affected surfaces in the primary dentition (five per posterior tooth and four per anterior tooth).

Calculating DMFT: The teeth not counted are unerupted teeth, congenitally missing teeth or supernumerary teeth, teeth removed for reasons other than dental caries, and primary teeth retained in the permanent dentition.

Counting the third molars is optional. When a carious lesion(s) or both carious lesion(s) and restoration are present, the tooth is recorded as a D. When a tooth has been extracted due to caries, it is recorded as an M. When a permanent or temporary filling is present, or when a filling is defective but not decayed, this is counted as an F. Teeth restored for reasons other than caries are not counted as an F.

Validity and reliability:

Content validity of the tool was tested and reviewed by a panel of five experts in pediatric nursing and community health nursing with more than ten years of experience in the field. The board ascertained the face and content validity of the tools. No modifications were done regarding the expert's panel judgment about the clarity of sentences, appropriateness of its content, and recording of the items. Reliability was assessed through Cronbach's alpha reliability for the tool was =0.89.

Administrative and Ethical consideration:

The official letters were obtained to conduct the study. Before starting this study, formal administrative approval was taken from authorities in the setting. Permission was obtained from the ministry of education in Sohag City, official permission from the managers of the two primary schools. After obtaining the written permission from the schools, a letter was sent to the parents of the studied children to inform them about the research and to request their written consent to participate in the study. The researchers explained the aim of the study at the beginning for all participants, so they were reassured that all gathered information would be confidential.

The parents and their primary school children informed that their participation was voluntary and had the ethical right to participate or refuse participation in the study. It further emphasized that their responses were confidential, and had their right to withdraw from the study at any time without giving further explanation. Privacy and confidentiality were resolutely kept in all data collection procedures. All ethical concerns were clarified in the letters sent to the children's parents.

Pilot study:

It was carried out on 10 % of the studied primary school children (58 children), for clarification and estimation of the time needed for completing the tools and testing the feasibility of the research process. Those who shared in the pilot study were included in the main study sample.

Field of the work:

Data was collected in December 2019; it was done by the researchers during the school day. The data collected according to every school policy. The actual work began by meeting the school managers throughout the morning school day; the researchers first introduced themselves to them and gave them a complete background about the study and the used tools translated by the researchers in the Arabic language to collect the required data. Then the researchers went to the participants' classes and introduced themselves to primary school children, and explained the aim for their visits and the research aims, and invited them to participate in the study by filling out the data collection tools by their parents. A cover letter was given to primary school children including an explanation about the research aims and invited them to participate in the study by filling out the used tools which distributed to 576 students and collected on the second day and for illiterate parents were helped by the researchers to fill out the used tools. The researchers attended the setting of the study three times / a week from 9 am to 12 pm. The researchers visited each school twice every week to collect data.

School absenteeism data for each child were collected from the absenteeism records in their previously mentioned schools. School absenteeism was measured as the percentage of school days missed in the last two months of the academic year of the first semester and it was recorded as follows. <6%, 5%–15%, and >15%. Academic achievement data included marks were obtained in academic year subjects assessments during the last two months of the academic year of the first semester. These data were collected from previous academic records. They were categorized as following: >80, 60–80, and <60. Data regarding homework completion were obtained from the

parents based on a 3-item scale question about how often the child completed his/her homework: (i) always, (ii) usually, and (iii) sometimes.

Statistical analysis:

The data obtained were reviewed, prepared for computer entry, coded and scored, then analyzed and tabulated. Data entry and analysis were performed using the statistical package for social sciences SPSS (a software package) version 17.0. Data are expressed as the means, SD, and percentage distribution. Person's correlation is used for the numeric variables. P > 0.05 was considered not significant, while P ≤ 0.05 was used as a cutoff for significance and P ≤ 0.001 for highly significant differences.

Results

A total of 576 primary school children participated in this study, **table (1)** revealed that the mean age of primary school children was 7.31 ± 3.91, the age group from 8 to 10 years was the most prevalent (39.7 %); it was found that males were more than females 63% compared to 37.0%. Regarding residence, 88% of children lived in the urban area.

Table (2) reported that (70%) of fathers and (53%) of mothers their age were ranged from 20 and <30 years. Concerning the educational level of fathers and mother had secondary education (40% and 41%) respectively. Regarding working 84% of fathers were working and 76 % of mothers were not working.

Table 3 presented the relation between DMFT score among primary school children regarding school absenteeism, school academic achievement in academic year subjects, and homework completion. It is observed from the table that high percentage (52%) of children were absent from 5-15 days along the past two months before the study due to teeth problem, 53% of them, their school academic achievement in academic year subjects were <60, and 57% of the children, their parents reported that they sometimes complete their homework. Also, it was noticed that there was a significant relation in the DMFT between the groups and, school absenteeism (P = 0.001), school academic achievement in academic year subjects (P = 0.003), and homework completion (P = 0.001).

Table 4 illustrated the relation between school absenteeism and DMFT score. There was a significant relationship between school absenteeism and DMFT score (P = 0.001).

Table 5 showed the relation between school academic achievement in academic year subjects and DMFT score. There was a significant relation between school academic achievement in academic year subjects and DMFT score (P = 0.007).

Table 6 showed the relation between homework completion and DMFT score. There was a significant relationship between homework completion and DMFT score (P = 0.002).

Table (1): Distribution of Studied Primary School Children Regarding their Demographic Characteristics (n=576)

Demographic data	No (576)	%
Age:		
- 6 to < 8	180	31.3
- 8 to < 10	229	39.7
- 10 -12	167	29.0
Mean± SD (7.31 ± 3.91)		
Gender :		
- Male	363	63
- Female	213	37
Residence		
- Rural	69	12.0
- Urban	507	88.0

Table (2): Distribution of Parents of Studied Primary School Children Regarding their Demographic Characteristics (n=576)

Socio-demographic characteristics	Fathers (n=256)		Mothers (n=320)	
	No	%	No	%
Age in years				
- 20 <30 years	179	70	170	53
- 30 ≤ 40years	77	30	150	47
Education level				
- Illiterate	49	19	48	15
-Primary education	51	20	77	24
-Secondary education	102	40	131	41
-University education	54	21	64	20
Working status				
- Working	215	84	77	24
- Not working	41	16	243	76

Table 3: Comparison of Decayed, Missed, and Filled Teeth index and school absenteeism, school academic achievement in academic year subjects, and homework completion

Items	Group	No	%	t-test	P
School absenteeism					
DMFT score	<5	173	30	17.89	0.001
	5-15	299	52		
	>15	104	18		
School achievement					
DMFT score	>80	69	12	15.23	0.003
	60-80	202	35		
	<60	305	53		
Homework completion					
DMFT score	Always	58	10	12.54	0.001
	Usually	190	33		
	Sometimes	328	57		

Table (4): Relation between school absenteeism of primary school children and their DMFT score (n=576)

Items	DMFT score		P
	0	≥1	
School absenteeism			0.001
<5	196	136	
5-15	60	95	
>15	24	65	

*Pearson Chi-square test. DMFT=Decayed, Missed, and Filled Teeth

Table (5): Relation between school achievement of primary school children and their DMFT score (n=576)

Items	DMFT score		P
	0	≥1	
School achievement			0.007
>80	166	100	
60-80	90	115	
<60	34	71	

*Pearson Chi-square test. DMFT=Decayed, Missed, and Filled Teeth

Table (6): Relation between homework completion of primary school children and their DMFT score (n=576)

Items	DMFT score		P
	0	≥1	
Homework completion			
Always	166	90	0.002
Usually	75	130	
Sometimes	54	61	

*Pearson Chi-square test. DMFT=Decayed, Missed, and Filled Teeth

Discussion

Oral health is considered a critical problem but an ignored topic of overall health and well-being, especially among children. Teeth problems such as dental caries and are considered a global health problem in both developed and developing countries. During the last three decades there were massive improvements in children's oral health in most industrialized countries, but the improvements in developing nations still low **(Singh and Purohit, 2012).** .Hence**,** the study is aimed to measure the effect of teeth problems on attendance and academic achievement among primary school children**.**

The finding of the current study revealed that more than half of children were absent from 5-15 days along the past two months before the study due to teeth problem, their school academic achievement in academic year subjects was <60, and their parents reported that they sometimes complete their homework. From the researchers' point of view, this is reflected the negative effect of teeth problems on primary school children regarding school absenteeism, school academic achievement in academic year subjects, and homework completion.

The finding of the current study revealed that there was a significant relationship between school absenteeism and DMFT score (P = 0.001). This means that teeth problems interfere with children' going to schools due to strong pain. This result is matched with the result of the study conducted by **Guarnizo-Herreno and Wehby, (2012)** about children's dental health, school achievement, and psychosocial wellbeing among US children who aged from 6 to 17 years and found that poor teeth health care was significantly linked with the number of school days the children missed**.** These results were replicated in another study by **Agaku et al., (2015)** about the association between unmet dental needs and school absenteeism because of illness or injury among U.S. school children and adolescents and found the same. Also, this finding is in the line with the study conducted by **Shaikh et al., (2016)** in Saudi Arabia about school absenteeism due to toothache among secondary school students aged 16-18 years in the Ha'il region of Saudi Arabia and reported that children were found to miss school days due to tooth pain.

In contrast, **Krisdapong et al., (2013)** conducted a study about School absence due to toothache associated with sociodemographic factors, dental caries status, and oral health-related quality of life in 12- and 15-year-old Thailand children to analyze the association between DMFT and severe caries and school absenteeism and found that there was no significant association between higher DMFT scores or severe caries and absenteeism among children.

Similarly, the results of a cross-sectional study in Brazil done by **Seirawan et al., (2012) about** the impact of oral health on the academic achievement of disadvantaged children and observed that found no significant relation between measured caries and school absences. Also, a study of 12-year-old Brazilian children conducted by **Piovesan et al., (2012)** about the Influence of children's oral health-related quality of life on school achievement and school absenteeism and found that although children with caries in more teeth had lower test achievement and higher absenteeism; the effects were not statistically significant.

The present study finding reported that there was a significant relation between school academic achievement in academic year

subjects and DMFT score (P = 0.007). From the researchers' point of view, this is related to presence of teeth problems and pain that make children less concentrated than usual in their academic achievement. These results are similar to those of **Seirawan et al. (2012)**, who studied the impact of oral health on the academic achievement of disadvantaged children and found positive correlations between oral health status and school performance. In a similar study, **Paula et al. (2015)** who studied oral disorders, socio-environmental factors, and subjective perception impact on children's school achievement and reported that child's oral health was negatively linked with their school achievement.

Finally, This result is congruent with that of a study performed by **Detty and Oza (2014)** who conducted a cross-sectional study of third-grade students in the United States to assess oral health status and academic achievement among children and reported that clinically evaluated caries prevalence, aggregated at the school level, was associated with lower achievement.

The current study result indicated that there was a significant relationship between homework completion and DMFT score (P = 0.002). This is reflected the negative effects of teeth problems that make children unable to complete their homework due to diseases and pain. This study result is in agreement with that of the study conducted by **Guarnizo-Herreno and Wehby, (2012),** who mentioned that in the representative survey from the United States and reported that children with parent-said that dental problems were more linked with problems in school, more likely to miss school days, and was less likely to complete required homework assessments.

Similarly, **Borenstein et al., (2017)** studied the basics of meta-analysis: I 2 is not an absolute measure of heterogeneity and noticed that poor teeth health is negatively associated with student performance and their school absenteeism. This finding also is consistent with another study conducted by **Ryan et al., (2018)** about oral health, academic performance, and school absenteeism in children and adolescents and reported that poor teeth health may be associated with negative effects on academic performance and school attendance.

Garg et al., (2012) studied is there an association between oral health status and school performance; they concluded that the relation between school achievement and mean decayed and filled teeth was statistically significant. Also**, Piovesan et al. (2012)** conducted a study about the influence of children's oral health-related quality of life on school achievement and school absenteeism and found that children with low oral health-related quality of life had high school days absenteeism and poor school academic achievement

The results of the current study are supported the study aim and research questions and why the researchers owing to conduct this study which highlighted that teeth problems had a significant association with school absenteeism, school achievement, and homework completion. These results were in the same line with **Gopalan et al., (2021)** and found the same results.

Conclusion

Based on the current study results and research questions, it was concluded that teeth problems had a bad effect on school absenteeism and academic achievement among primary school children.

Recommendations

- Establishing health educational programs for parents about their children's teeth problems and how to overcome these problems.
- Educate the children on the ideal steps of good oral hygiene.
- Encourage parents to do periodic teeth checkups regularly for their children.
- Further studies could be conducted to explore the effects of teeth problems on the quality of life of children.

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