

Original Article

Investigating the relationship between DMFT and mothers' knowledge and attitude about oral health and dmft of 6-12-year-old children with attention-deficit/hyperactivity disorder

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ABSTRACT

Background: Children with attention-deficit/hyperactivity disorder (ADHD) are more prone to tooth decay. In this regard, parents, especially their mothers, play a major role in the oral health of their children

Materials and Methods: The present study was a cross-sectional descriptive study. The population of this study was 64 children with ADHD referred to pediatric psychiatric clinics in Isfahan. Inclusion criteria include willingness to participate in research. At least 6 months has passed since their child was diagnosed with the disorder and their child is receiving treatment. Lack of obvious physical disorders, psychotic disorders, mental retardation and chronic diseases in children with attention deficit/hyperactivity disorder with the approval of a psychiatrist. Collaboration for dental examination by a dentist. Exclusion criteria include obvious physical and mental disorders in mothers of children with attention-deficit/ hyperactivity disorder. Simultaneous participation in a study similar to the present study due to the possibility of errors in the results. Dissatisfaction with participating in the study and leaving the study during the study. The data collection tool was interview-questionnaire-examination. Clinical interviews were conducted using the Kiddie Schedule for Affective Disorders and Schizophrenia to confirm ADHD and rule out other psychiatric illnesses. Information on decayed, missing, and filled teeth (DMFT) of permanent teeth and dmft of deciduous teeth is recorded separately. The score of each index (D, M, F), (f, m, d) as well as the total index (DMFT), (dmft) is calculated for each person. Data were entered into SPSS software version 26 by descriptive statistical methods, one-way analysis of variance, t-test, and calculation of Spearman correlation coefficient. P < 0.05 was considered statistically significant.

Results: The oral health status of children with ADHD did not show a significant relationship with the total score of attitude and knowledge of oral health behaviors of mothers (P > 0.05). The results showed a significant positive relationship between the level of knowledge of the participants and their education level (P < 0.05).

Conclusion: The results revealed that mothers' knowledge and attitude about oral health and dental health of children with ADHD were generally at an undesirable level.

Key Words: Attention-deficit/hyperactivity disorder, attitude, child, dental caries

Received: 30-Nov-2021 Revised: 11-Jan-2022 Accepted: 01-Feb-2022 Published: 26-May-2023

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How to cite this article: Tahririan D, Arman S, Maddah F, Jafarzadeh M. Investigating the relationship between DMFT and mothers' knowledge and attitude about oral health and dmft of 6–12-year-old children with attention-deficit/hyperactivity disorder. Dent Res J 2023;20:64.

INTRODUCTION

Oral health involves not only having healthy teeth but also conditions such as no pain in the mouth and face, lack of cancer in the mouth and throat, lack of lesions in the hard and soft tissues of the mouth, and lack of control of other conditions and diseases that cause damage to the mouth.^[1] Dental health plays a major role in maintaining one's health and quality of life.^[1] DMFT, standing for decayed (d), missing (m), and filled (f) teeth, is an important and common indicator for assessing oral health.^[2,3]

Tooth decay in children, like adults, is increasing worldwide and is one of the major health challenges in communities.[2,3] Children with attention-deficit/ hyperactivity disorder (ADHD) are more prone to tooth decay than normal children due to overeating and poor dental care.[4] ADHD is one of the most common neurobehavioral disorders of childhood, which can persist into adolescence and adulthood. The prevalence of ADHD ranges from 2% to 18%,[5] with a prevalence below 5% in Europe. ADHD occurs more often in boys than in girls.[6] The clinical presentation of ADHD varies and can be classified according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision[6] in disturbance of activity and attention, hyperkinetic conduct disorder, and other hyperkinetic disorders. The characteristic features of ADHD include impulsivity, hyperactivity, and a short attention span. Furthermore, difficulties with listening, compliance, and socializing are seen in children with ADHD.[7] This can have consequences for oral health and dental treatment of these children, including therapy after traumatic dental injury.[8] It has been shown that children with ADHD have overall a poorer oral health status[9] and oral hygiene attitudes and higher plaque indices[10] than those without ADHD. Higher caries prevalence in the ADHD group could be caused by their less effective toothbrushing due to their short attention span and difficulties to stay focused.[11] In addition, children with ADHD can have difficulties with performing various motor skills.[12] Xerostomia is mentioned as one of the adverse orofacial side effects of most drugs, which are commonly used for pharmacological treatment of ADHD.[13] Lower unstimulated salivary flow rates were found in participants with ADHD with or without medication.[11] The results of a study conducted in Groenman et al. showed that children

with ADHD had poor oral health behaviors compared to children without ADHD.[14] Furthermore, in a review study, Manoharan et al. contend that children with ADHD compared to children without ADHD are more prone to tooth decay, but if they visit the dentist regularly and receive preventive care, it is possible to reduce tooth decay in these children.[15] In another study, Poutanen et al. reported a significant positive relationship between parents' health behavior and their children's health behavior. [16] Seaid-Moallemi et al. (2007) also showed that children of mothers with better oral health status had fewer tooth decays,[17] parents' good oral health knowledge had a positive effect on their children's oral health, and their knowledge and attitude toward oral health can improve their children's oral health skills.[18]

Based on available information, most studies conducted on the effect of mothers' knowledge about and attitudes toward oral health have focused on children aged 10 years and older, while the highest impact of a mother's knowledge on their children's oral health is shown under the age of 10 years because children are generally more closely monitored and controlled by mothers at this age. [16] Many programs have been provided so far to reduce tooth damages such as public education, recommending proper diet, using fluoridated mouthwashes, adding fluoride to drinking water, and educations in schools, but they have not been implemented ideally in all countries, and thus strong programs are required in this regard.[19] Although children's oral health index is seemingly improving in Iran, there are conflicting reports in this regard indicating a poor level of oral health in children.^[20] This study aimed to investigate the rate of DMFT, knowledge, and attitude of Iranian mothers about oral health and its relationship with DMFT of 6-12-year-old children with ADHD in Isfahan.

MATERIALS AND METHODS

This research was a descriptive cross-sectional study conducted on mothers of 64 children aged 6–12 years with ADHD. They were randomly selected from those who were referred to counseling center. ADHD children who were treated with stimulants were included in the study based on clinical interviews with Schedule for Affective Disorders and Schizophrenia for Kids and after approval by a pediatric psychiatrist. The children were selected from those who were

referred to the centers after obtaining informed consent from their parents or legal guardians. The participants would withdraw from the study if their parents were not willing or if children did not cooperate during the examinations. The questionnaire used in this study was derived from a study conducted by Hidas *et al.*^[21]

The questionnaire was divided into two sections. The first section included Demographic questions such as age, and education level, and economic status. The second section included 23 questions on knowledge, attitude, and practice on oral health and prevention of dental decays. Out of the 23 questions, 9 questions were related to knowledge, 6 to attitude, and 8 to practice. There were three response choices for each question. In questions related to attitude, the "false" answer received a score of 1, "I have no idea" received a score of 2, and the "true" answer received a score of 3. In questions about knowledge and practice, the true answer received a score of 1, and the false answer received a score of 0.

To determine the validity, the questionnaire was given to 5 professors of the pediatric department and their opinions about the face and content validities of each question were obtained and the necessary changes were applied. Then, the questionnaire was completed by the researcher. Mohammadzadeh et al. reported the reliability of the Persian version of the questionnaire as 0.81 and the reliability among observers based on the retest as 0.69.[22] The questionnaire was completed by the dentist, who was the same for all the children, in the form of an interview with parents. Then, the children were clinically examined and information on DMFT of permanent teeth and DMFT of deciduous teeth was recorded separately. The score of each index (D, M, and F and f, m, and d), as well as the total index (DMFT), was calculated for each participant. The children were examined by a dentist with a headlight and a mirror and a dental catheter, and to observe ethical considerations, no graphics were taken. The mothers were also examined by the dentist in the same way as children and the dentist's coworker wrote his reports in the relevant form. The obtained data were imported to the Statistical package of the social analysis (SPSS) program (V.24.0, SPSS Inc. Chicago, IL, USA) software and were analyzed using descriptive statistical methods, one-way analysis of variance (ANOVA), t-test, and calculation of Spearman's correlation coefficient. The significance level was determined by P value. P < 0.05 was considered statistically significant.

RESULTS

The present study was conducted on the mothers of 64 children aged 6-12 years with ADHD who were referred to counseling centers. Table 1 shows that the highest mean DMFT belonged to the age group over 35 years with a mean of 13.08 and the lowest mean belonged to the age group of below 25 years with a mean of 4 years. Furthermore, the maximum score was obtained by the age group of over 35 years. Based on the Spearman correlation coefficient test, there was a statistically significant positive relationship between age and DMFT scores. The higher numbers in the table indicate poorer oral health (r = 0.25, P = 0.01). Table 2 shows that the highest mean score of DMFT (0.14) was for mothers who held a master's degree or higher, and the lowest (10.30) belonged to mothers with a high school diploma. Furthermore, the maximum score belonged to holders of a master's degree or higher. Higher numbers in the table indicate poorer oral health. According to the Spearman correlation coefficient test, there was no statistically significant relationship between education level

Table 1: Mean decayed, missing, and filled teeth of parents by age group

Age group (years)	n	Mean±SD	Minimum score of DMFT	Maximum score of DMFT	
>25	1	4±-	4	4	
26-35	28	10.42±4.48	2	22	
Over 35	35	13.08±5.79	4	28	

SD: Standard deviation: DMFT: Decayed, missing, and filled teeth

Table 2: Mean decayed, missing, and filled teeth of parents by education level

Education level	n	Mean±SD		The maximum score of DMFT
Below diploma	24	13.25±6.75	4	28
Diploma	20	10.30±4.52	2	18
Bachelor	18	11.22±4.25	5	21
Master and higher	2	14.0±1.41	13	15

SD: Standard deviation; DMFT: Decayed, missing, and filled teeth

Table 3: Mean decayed, missing, and filled teeth of children with attention-deficit/hyperactivity disorder

DMFT	Mean±SD	The minimum score of DMFT	The maximum score of DMFT		
Deciduous teeth	0.95±1.66	0	9		
Permanent teeth	3.17±3.17	0	15		
Total teeth	5.03±3.37	0	15		

SD: Standard deviation; DMFT: Decayed, missing, and filled teeth

and DMFT scores (P = 0.49, r = -0.06). Table 3 illustrates DMFT status in terms of deciduous teeth, permanent teeth, and the sum of deciduous teeth and permanent teeth in ADHD children. Based on the results, none of the 64 participants had ideal dental health. Furthermore, the highest score was related to unhealthy permanent teeth with a mean of 15 teeth. Based on Figure 1 and according to the statistical test of one-way ANOVA, a statistically significant difference was obtained between the mean score of mothers' knowledge of oral health and education level (P = 0.02), so that mothers' education level was positively related to their knowledge. Furthermore, based on Spearman's correlation coefficient test, there was a statistically significant relationship between the mean knowledge of oral health and education level (P = 0.008, r = 0.33). According to Figure 2 and the obtained Spearman correlation coefficient, there was a statistically significant relationship between the education level and mothers' attitudes about the oral health of children with ADHD (P = 0.002, r = 0.32). Table 4 shows the attitude of mothers about the oral health of children with ADHD by age group. According to the results, the maximum score obtained by mothers was 18 (6–18).

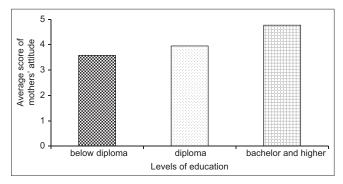


Figure 1: Distribution of mean knowledge of mothers about oral health separately based on levels of education

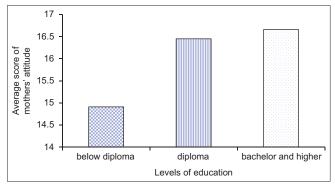


Figure 2: Distribution of mean attitude of mothers about oral health separately based on levels of education

Furthermore, the results of the total number of deciduous and permanent teeth; a minimum of 0 and a maximum of 15 teeth with problems were found in the participants. The results of the Pearson test revealed no statistically significant relationship between the oral health status of the hyperactive children and their mothers and the total score of knowledge of oral health behaviors (P = 0.97 and r = 0.005) and their attitude (P = 0.70 and r = 0.04). The results of Spearman communication test showed that there is a statistically significant positive relationship between the attitude of the participants in the study with the level of education of individuals (P = 0.002) and with increasing education level, the attitude of individuals about oral health behaviors has increased, while there was no significant relationship between age and attitude level.

DISCUSSION

The results of this study revealed no statistically significant relationship between the oral health status of children with hyperactivity and knowledge of mothers from oral health behaviors and their attitudes. Furthermore, a statistically significant positive relationship was found between the level of knowledge of the mothers and their education level; however, there was no significant relationship between age and level of knowledge. Moreover, a statistically significant positive relationship was found between the attitude of the participants and their education level. Nevertheless, no significant relationship was found between age and level of attitude. Despite the scarcity of studies in this regard, the results of the present study are generally in line with those of other studies, though different.

Based on the results, none of the 64 subjects in the study (children with ADHD) were in perfect dental health status and their teeth had a problem. Several similar studies conducted in this area have provided conflicting results. [16,19,23] For example, Blomqvist *et al.* showed that the rate of tooth decay in children with ADHD was not significantly different from that of their healthy peers. [20] Bimstein *et al.* concluded that the rates of toothache, bruxism, bleeding gums, and a history of oral lesions were higher in children with ADHD than those in healthy children (P < 0.05). Differences in other recorded oral characteristics and habits, such as plaque accumulation, gingivitis, oral health, tooth decay, and nonspecialist dental needs,

Table 4: Frequency distribution and mean score of mother's attitudes toward oral health by age group

Age category	Scores obtained from attitude questions								Mean±SD
(years)	11	12	13	14	15	16	17	18	
<25	0	1 (100)	0	0	0	0	0	0	12
26-35	0	1 (3.6)	1 (3.6)	2 (7.1)	2 (7.1)	2 (7.1)	8 (28.6)	12 (42.9)	16.67±1.70
>35	2 (5.7)	3 (8.6)	1 (2.9)	4 (11.4)	2 (5.7)	12 (34.3)	3 (8.6)	8 (22.9)	15.54±2.11

SD: Standard deviation

were not statistically significant.^[24] In a study conducted by Hidas et al., similar results were observed and children with ADHD were not different from healthy ones in terms of DMFT.[21] In contrast, Broadbent et al. found that the risk of DMFT was significantly higher in people with ADHD. Groom et al., studying children aged 6-10 years with ADHD, noticed that they had significantly higher rates of enamel decays in the deciduous and permanent teeth compared to healthy children.[23] Furthermore, Blomqvist et al., studying 17-year-old adolescents with ADHD, showed that the rate of dental decay and gingival diseases in patients with ADHD was significantly higher than those of control group adolescents.[21] The low level of DMFT index in the present study can also be due to the age range of the children (6-12 years), the re-growth of permanent teeth, and the low rate of decay progression in their teeth.

Furthermore, Torabi et al. found that the level of parent's knowledge about the oral health of 7-year-old children was appropriate, but their practice in this area was poor, indicating the poor attitude of mothers (especially mothers of children with ADHD) toward their children's oral health.[25] Based on the results of the present study, oral health behaviors of patients such as brushing every night and every morning, fluoride consumption, and flossing were generally unfavorable. There was a statistically significant difference between male and female patients in terms of brushing teeth and flossing every night, and female patients showed better health behaviors compared to the male ones. Poutanen et al. and Blomqvist et al. showed poorer oral health of children with ADHD than the healthy ones.[16,20] In contrast, Hidas et al. reported no significant difference in oral health behaviors of children with ADHD and healthy children. [21] Children with ADHD were not able to predict the consequences of their high-risk behaviors and solving their complex problems.[17-20] Therefore, more care must be provided for these children and they should be examined more often and at shorter intervals by dentists.

CONCLUSION

Based on the results of the present study, oral health and dental health behaviors of children with ADHD were undesirable. It seems that some steps should be taken to advance global health goals and increase the level of knowledge and attitude of mothers.

Recommendations

It is recommended to conduct other studies in this area with larger samples. Furthermore, parents should be informed to monitor their children's health and the role of parents in children's oral health must be emphasized. Moreover, it is suggested to examine children with other disorders and compare the results with those of the present study.

Limitations

It took much time to obtain the consent of officials of counseling centers to conduct this research. To avoid wasting time and speed up the research, officials are asked to take the necessary measures in advance to perform administrative affairs. Moreover, some parents were not willing to participate in the study for different reasons, and therefore, the time needed to conduct the research increased.

Ethical considerations

- 1. Permission and code of ethics were obtained from Isfahan University of Medical Sciences
- 2. Permission to conduct research was obtained from the management of counseling centers in Isfahan Province
- 3. Informed consent was obtained from the parents of all patients before entering the study
- 4. Patients could leave the plan at any time if they did not wish to
- 5. The information of all patients was kept confidential by the project manager.

This research was approved under the code of 396,451 in the research deputy of Isfahan Dentistry School.

Authors' contributions

F M contributed to the study conception, designing and analysis the data, and writing the manuscript.

D T, S A, and M J contributed to scientific revision of the manuscript. All authors read and approved the final manuscript.

Financial support and sponsorship Nil.

Conflicts of interest

The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or nonfinancial in this article.

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