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# Knowledge, attitudes, and practices regarding the oral health of children: a cross-sectional study among iranian parents

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Parents are responsible for their children's health care, and their oral health-related knowledge, attitude, and habits can affect their children's oral health. **Aim:** The objective of this study was to evaluate parents' knowledge, attitudes, and practices regarding their children's oral health. **Methods:** In this study, a sample of 398 parents of 4- to 6-year-old children completed a self-designed questionnaire. The parents' oral health-related knowledge, attitudes, and practices were assessed. Children's oral health was evaluated using decayed, missing, and filled tooth index (dmft). Data were analyzed using the SPSS version 23.0 with a $p < 0.05$ as statistically significant. Categorical data were reported as frequency (%), and continuous data were reported as mean ± SD. Moreover, Spearman's correlation, multiple regression, Mann-Whitney test, Kruskal Wallis test, and Kolmogorov-Smirnov test were used. **Results:** Most of the parents had a satisfactory level of knowledge and positive attitudes regarding their children's oral health. The knowledge and attitude scores were higher among parents with higher education ($p<0.001$), and the knowledge score was higher among mothers ($p=0.004$). Also, the attitude score was correlated with the number of decayed, missed, and filled teeth of children ($p=0.01$, $p=0.04$, and $p=0.007$, respectively). However, there was no significant relationship between dmft and the parents' knowledge, attitudes, and practices using multiple regression. The mean dmft of children was 6.86 ± 3.56, and most of the parents had poor oral health-related practices. **Conclusion:** The parents' level of knowledge and attitudes were satisfactory, but they had poor oral health practices. Moreover, there was no significant relationship between children's oral health and their parents' level of knowledge, attitudes, and practices. Educating programs and strategies are needed to enhance parents' oral health-related attitudes and knowledge and, more importantly, change their oral health practices.

**Keywords:** Knowledge. Habits. Health behavior. Dental caries. Tooth, deciduous.

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## Introduction

Oral health as an essential part of overall health[1] has been the center of attention of researchers for many years. However, compared to general health, little significance is given to it[2]. In young children, dental caries is an essential facet of oral health[3], related to many risk factors such as poor oral hygiene and a highly cariogenic diet[4].

Regardless of numerous strategies and interventions to promote oral health and prevent dental caries, evidence shows that the prevalence of dental caries has increased among children in Middle Eastern countries[5]. According to a recent meta-analysis, the mean dmft of children in Iran was 3.86[6].

Parents play a crucial part in maintaining good oral health in preschool children. Due to manual incompetency, preschoolers cannot clean their teeth, and due to mental immaturity, they are ignorant of the importance of preserving their teeth[7]. Moreover, children under six spend most of their time with their parents, and through a period that is called "primary socialization," they acquire their parents' everyday routines (including health behaviors)[8,9].

It has been reported that parents' oral health-related knowledge, attitudes, and practices can affect their children's oral health[3,10,11]. Therefore, parents must have favorable oral health behaviors and satisfactory knowledge and attitude to inculcate necessary oral health habits in their children[12].

Since the prevalence of dental caries in children has increased over the last 15 years in Iran[5], it is important to assess parents' knowledge and attitudes to discover which aspects need improvement to enhance children's oral health[11]. Therefore, in this study, we intended to evaluate parents' knowledge, attitudes, and practices regarding their 4- to 6-year-old children's oral health. Our null hypothesis was that Iranian parents had low-to-moderate levels of knowledge, attitudes, and practices.

## Methods

This study was conducted under the STROBE guidelines[13].

### Ethical approval

The Ethic Committee of the Ahvaz Jundishapur University of Medical Sciences approved this study (IR.AJUMS.REC.1397.559). Additionally, after explaining the purpose of the study, written informed consent was obtained from the parents.

### Study sample and design

This was an analytical, cross-sectional study conducted on an initial sample of 414 subjects (using Cochran formula, $\alpha$=0.05, $\beta$=0.2, pilot sampling variance=0.52, and minimum effect size=0.1) selected using the convenience sampling method. The inclusion criteria were parents of 4- to 6-year-old healthy children presenting to the department of pediatric dentistry, school of dentistry, the Ahvaz Jundishapur University of Medical Sciences. The exclusion criteria were the presence of any disease

and the usage of orthodontic appliances. The sample was recruited in the fall of 2019, from October 9th to December 15th.

## Data collection

Parents' knowledge, attitudes, and practices regarding their children's oral health were assessed using a self-designed questionnaire based on previous studies[14]. Before the study, ten pediatric dentists and health education specialists validated the questionnaire, and based on their review, modifications were made. The test-retest method was used to evaluate the reliability of the questionnaire. For this purpose, the questions were given to the parents (not included in the main study) in two terms with a two-week interval. Cronbach's α (0.81) confirmed the questionnaire's reliability[15,16].

The questionnaire consisted of four sections: 1) demographic data of parents and their children (age and gender of the accompanying parent, their level of education, their occupation, their source of acquiring oral health-related information, and age and gender of the child), 2) knowledge section (10 questions), 3) attitude section (ten statements), and 4) oral health-related practices (three statements). The knowledge section included ten multiple-choice questions regarding the etiology of dental caries, the importance of primary teeth, fluoride, oral health, oral health-related practices, and the time of the permanent teeth eruption. Each correct answer scored a point. The maximum score for this section was 10 points. It was further categorized as unsatisfactory, less than 6 points (the median), and satisfactory, 6 points and above. The attitude section was a five-point Likert scale that included ten statements from "strongly agree" to "strongly disagree" regarding primary teeth eruption and caries, oral health-related practices, and nutrition of children under six. The response of each statement was given a value from 1 to 5, with the response anchors having 1 or 5 points. The maximum score of the attitude section was 50, and the minimum was 10 points. This score was also categorized as negative, less than 36 points (the median), and positive, 36 points and above. The practices section included four binary-option questions on the frequency of children's tooth brushing, flossing, dental visits, and whether they ever had a fluoride varnish. The questions were rated using "yes," "no," and "don't know" on a modified Likert scale. Approximately 10 min was required to fill out the questionnaire.

A calibrated pediatric dentist examined the children's oral health status to evaluate the children's oral health status. According to the WHO standard diagnostic criteria, the dmft index was obtained by calculating the number of decayed, missing, and filled primary teeth[17].

## Data analysis

Data were analyzed using the SPSS statistical software (version 23.0, IBM Corporation, Armonk, NY, USA) with a $p < 0.05$ as statistically significant. Categorical data were reported as frequency (%), and continuous data were reported as mean ± SD. Kolmogorov-Smirnov statistic tested the normal distribution of variables. Spearman's correlation coefficient was used to discover possible correlations between variables. Mann-Whitney U (two-category variables) and Kruskal Wallis (more than

two-category variables) evaluated the mean differences in knowledge, attitude, and dmft scores between different groups. Multiple regression was used to indicate whether there was a relationship between dmft and parents' knowledge, attitudes, and practices.

## Results

Questionnaires with unanswered questions were excluded to secure authentic results, and the final sample size included 398 completed questionnaires (the response rate was 96.13%). In total, 207 mothers (52.0%) and 191 fathers (48.0%) participated in the study. Of the children, 200 (50.3%) were girls and 198 (49.7%) were boys, and their mean age was 5.16 ± 0.77. Of the mothers, 83 (40%) were unemployed. Other demographic data are presented in Table 1.

**Table 1.** Frequency distribution of the demographic data of the participating parents

| Demographic data | n (%) |
|---|---|
| Age (years) | |
| 20-29 | 65 (16.3) |
| 30-39 | 259 (65.1) |
| 40-49 | 74 (18.6) |
| Occupation | |
| employed | 197 (49.5) |
| self-employed | 83 (20.9) |
| Laborer | 29 (7.3) |
| unemployed | 89 (22.4) |
| Education | |
| Higher education | 254 (63.8) |
| High school diploma or less | 144 (36.2) |
| Source of oral health-related information* | |
| Dentist | 222 (55.7) |
| Magazines | 1 (0.2) |
| Personal experience | 40 (10.0) |
| TV | 50 (12.5) |
| Family & friends | 57 (14.3) |
| Internet | 84 (21.1) |

* 46 participants chose more than one source of oral health-related knowledge

The mean knowledge score of the parents was 5.81 ± 1.62 (females: 6.009 ± 1.59, males: 5.602 ± 1.63), and 57% of them had a satisfactory level of knowledge. The mothers had a significantly higher knowledge score (Mann-Whitney U; $p$ = 0.004). There was a statistically significant difference between the mean knowledge scores

of parents from different age groups. It was higher among parents aged 30-39 years (Kruskal Wallis; $p$= 0.007). The mean knowledge score was also higher among parents with higher education (Mann-Whitney U; $p$< 0.001) and correlated with the mean attitude score (Spearman's correlation; $p$< 0.001). However, there was no significant relationship between dmft and the parents' knowledge, attitudes, and practices using multiple regression (p>0.05) and (Table 2). Table 3 shows the knowledge questions and the frequency of the parents' true or false answers.

**Table 2.** Multiple regression between the dmft index and the parents' knowledge, attitudes, and practices

| Variable | Coefficient (β) | p-value |
|---|---|---|
| constant | 8.230 | <0.001 |
| knowledge | 0.002 | 0.984 |
| attitude | -0.037 | 0.331 |
| practice | -0.061 | 0.743 |

**Table 3.** Frequency distribution of the parents' knowledge regarding their children's oral health

| Questions | True (%) | False (%) |
|---|---|---|
| 1- What causes dental caries? | 193 (48.5) | 205 (51.5) |
| 2- What is the importance of primary teeth? | 253 (63.9) | 145 (36.4) |
| 3- Which one is more effective in the incidence of dental caries? | 369 (92.7) | 29 (7.3) |
| 4- Which one is more effective in preventing dental caries? | 178 (44.7) | 220 (55.3) |
| 5- What is the color of healthy gums? | 348 (87.4) | 50 (12.6) |
| 6- What is the best instrument to clean the interdental surfaces? | 314 (78.9) | 84 (21.1) |
| 7- From what age can we use fluoride-containing toothpaste for children? | 68 (17.1) | 330 (82.9) |
| 8- From what age can we use fluoride-containing mouthwashes for children? | 186 (46.7) | 212 (53.3) |
| 9- How many times a day should children brush their teeth? | 119 (29.9) | 279 (70.1) |
| 10- At what age does the first permanent tooth erupt? | 286 (71.9) | 112 (28.1) |

The mean attitude score of the parents was 35.60 ± 4.97 (females: 35.97 ± 4.86, males: 35.21 ± 5.07), and 54.3% of them had positive attitudes regarding their children's oral health. This score was significantly higher among parents with higher education (Mann-Whitney U; $p$< 0.001). In addition, it was correlated with the number of decayed, missing, and filled teeth of the children (Spearman's correlation; $p$= 0.01, $p$= 0.04, and $p$= 0.007, respectively). Table 4 shows the questionnaire's statements regarding the parents' attitudes and the frequency of their answers.

Table 5 shows Spearman's correlation between the parents' knowledge and attitude scores and the children's dmft score, and the parents' practices regarding their children's oral health are presented in Table 6.

**Table 4.** Frequency distribution of the parents' attitudes regarding their children's oral health

| Statement | Strongly disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly agree (%) |
|---|---|---|---|---|---|
| 1- Going to the dentist for children under 6 is a waste of time. | 214 (53.8) | 118 (29.6) | 26 (6.5) | 16 (4.1) | 24 (6.0) |
| 2- Gargling with salt water is a good alternative for children who do not brush their teeth. | 41 (10.3) | 85 (21.4) | 107 (26.9) | 132 (33.1) | 33 (8.3) |
| 3- Experience has shown that infants who use breast milk are less likely to develop caries. | 33 (8.3) | 71 (17.8) | 85 (21.4) | 92 (23.1) | 117 (29.4) |
| 4- Mouthwashes have no protective effect on primary teeth. | 53 (13.3) | 122 (30.7) | 154 (38.7) | 47 (11.8) | 22 (5.5) |
| 5- It is not necessary to visit a dentist for check-ups for a child who is brushing. | 99 (24.9) | 205 (51.5) | 41 (10.3) | 34 (8.5) | 19 (4.8) |
| 6- The cause of early dental caries in children is neglecting tooth brushing and using floss. | 7 (1.8) | 48 (12.0) | 31 (7.8) | 148 (37.2) | 164 (41.2) |
| 7- All permanent teeth erupt as a substitute for primary teeth. | 20 (5.1) | 36 (9.0) | 79 (19.8) | 164 (41.2) | 99 (24.9) |
| 8- Only in case of pain should children be referred to a dentist. | 111 (27.9) | 207 (25.1) | 17 (4.3) | 41 (10.2) | 22 (5.5) |
| 9- If the child has a decayed tooth, I prefer for the tooth to be extracted. | 144 (36.2) | 174 (43.7) | 42 (10.6) | 24 (6.0) | 4 (3.5) |
| 10- Proper nutrition in children is very effective in maintaining healthy teeth. | 2 (0.5) | 4 (1.0) | 10 (2.5) | 136 (34.2) | 246 (61.8) |

**Table 5.** Spearman's correlation between the parents' knowledge and attitude scores and children's dmft score

| Variable | Knowledge score | Attitude score | dmft | d | m | f |
|---|---|---|---|---|---|---|
| Knowledge score | 1 | 0.315** | -0.309 | -0.074 | -0.032 | 0.094 |
| Attitude score | | 1 | -0.079 | -0.121* | -0.100* | 0.134** |
| dmft | | | 1 | 0.836** | 0.172** | 0.085 |
| d | | | | 1 | -0.175** | -0.325** |
| m | | | | | 1 | 0.205** |
| f | | | | | | 1 |

* $p < 0.05$
** $p < 0.01$

**Table 6.** Frequency distribution of the parents' practices regarding their children's oral health

| Questions | Yes (%) | No (%) | Don't know (%) |
|---|---|---|---|
| Do you brush your child's teeth twice a day? | 98 (24.6) | 288 (72.4) | 12 (3) |
| Do you floss your child's teeth daily? | 56 (14.1) | 326 (81.9) | 16 (4) |
| Do you take your child to dental check-ups every six m.? | 84 (21.1) | 288 (72.4) | 26 (6.5) |
| Has your child ever had a fluoride varnish? | 109 (27.4) | 255 (64.1) | 34 (8.5) |

The mean dmft of the children was calculated 6.86 ± 3.56 (d = 6.01 ± 3.69, m = 0.38 ± 0.97, f = 0.46 ± 1.26). As demonstrated in Table 7, the dmft mean was higher among boys ($p$ = 0.80). Also, the number of filled teeth increased with the child's age (Kruskal Wallis; $p$ = 0.009). Only 3.5% (n = 14) of the children were caries-free.

**Table 7.** Descriptive statistics of the dmft index among girls and boys of the study sample

| Variable | mean + SD | | *p** |
|---|---|---|---|
| | Girls | Boys | |
| dmft | 6.82 ± 3.46 | 6.91 ± 3.67 | 0.80 |
| d | 5.96 ± 3.59 | 6.07 ± 3.79 | 0.96 |
| m | 0.32 ± 0.90 | 0.45 ± 1.04 | 0.13 |
| f | 0.54 ± 1.43 | 0.38 ± 1.06 | 0.30 |

* Mann-Whitney U

## Discussion

Through this study, which intended to evaluate parents' knowledge, attitudes, and practices regarding their children's oral health, we discovered that the majority of parents of 4- to 6-year-old children had a satisfactory level of knowledge and positive attitudes but poor practices in this regard.

In the present study, more than half of the parents had a satisfactory level of knowledge. The knowledge score was higher among the mothers, as stated by previous studies[7,18]. A conflicting study by Mehdipour et al. reported that 51.1% of the Iranian parents had poor knowledge about the care of primary teeth[13]. This difference can be due to the level of education of the participants in that study, of which only 38.2% had higher education. In our study, more than 60% of the parents were university educated. Similar to our results, it is generally accepted that individuals with higher levels of education have a higher oral health knowledge and a better understanding of their overall health[8,17] (Appendix 1).

Regarding attitude in the present study, most of the parents had positive attitudes about their children's oral health. In a study conducted by Dhull et al., the overall attitude of Indian mothers regarding the oral health care of their children was poor, which may be a result of their low education[19]. Consistent with our result, it has been reported that the attitude of individuals is related to their education level[1,12]. Moreover, similar to the study by Mehdipour et al.[14], in our study, parents with a higher knowledge score had a higher attitude score. Additionally, children whose parents had a higher attitude score had better oral health. That is, they had fewer decayed and missed teeth and more filled teeth. This is mainly important because children with less caries experience have a higher oral health-related quality of life. Furthermore, untreated caries affects children's oral and general health[20] (Appendix 2).

In the present study, 29.9% of the parents knew that children should brush their teeth twice a day, and about a quarter of the children did so. Complementary results

have been found in a study in Saudi Arabia[3]. Contrary to a study by Kameli et al.[21], our result showed that about three-fourths of the parents knew flossing was the best way to clean the interdental surfaces, but less than 15% of the children used dental floss daily. Since parents in the mentioned study were mostly housewife mothers, it can be reasoned that they had more free time to spend caring for their children. However, more than half of the mothers in our study were either employed or self-employed. We found that only about 27% of the children have had a fluoride varnish application. As reported by a study, less than 10% of the children in Trinidad have had fluoride varnish applied to their teeth[9]. Moreover, only about 15% of the parents in this study believed that children should visit dentists only in case of pain. Nevertheless, only about 20% took their children for a dental visit every six months. Similarly, Ramakrishnan et al. stated that 18% of Indian parents took their children for regular dental check-ups. At the same time, the majority of them preferred taking their children to the dentist only if they were in pain[10].

Given the evidence, even though most of the parents had a satisfactory level of knowledge and positive attitudes toward their children's oral health, most of them could not translate this knowledge and attitudes into good oral practices to maintain their children's oral health. As a result, dental caries had a 96.5% prevalence in children in this study. This neglect toward children's oral health can be the result of daily workload, expenses of dental care, fear of dental treatments, and past painful experiences [8,22].

For interested readers, a detailed description of each question and statement of the questionnaire is presented in the Appendix.

This was a cross-sectional study, and all the limitations of this type of study should be considered. Also, regarding oral health practices, since our data were collected through a questionnaire, parents may have given socially desired answers rather than describing their real habits.

In conclusion, the parents' level of knowledge and attitudes were satisfactory, but they had poor oral health practices. Moreover, we found no significant relationship between the children's oral health and their parents' level of knowledge, attitudes, and practices. Our findings give an insight into parents' knowledge, attitudes, and practices and can be of great importance to policymakers to develop strategies that can improve oral health-related behaviors of the population. Future research can focus not only on education programs and strategies needed to improve parents' attitudes and increase their knowledge but also on changing their oral health practices.

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## Author Contribution

Study concept and design: L.B. and M.Kh.; acquisition of data: L.B.; analysis and interpretation of data: L.B. and M.Kh.; drafting of the manuscript: S.Kh.; critical revision of

the manuscript for important intellectual content: L.B. and M.Kh.; statistical analysis: S.Kh. All authors actively participated in the discussion of the manuscript's findings, and have revised and approved the final version of the manuscript.

## Conflicts of interest

The authors declare no conflicts of interest. However, they state that they have a familial connection; that is, S.Kh. is L.B. and M.Kh.'s daughter.

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