

## Influence of maternal oral healthcare behavior during childhood on children's oral health care during adolescence

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### Original Article

#### Abstract

**BACKGROUND AND AIM:** This study investigated whether mothers' knowledge about oral health of children during early ages influences the oral health care behavior of their children during adolescence and beyond.

**METHODS:** This descriptive, cross-sectional, analytic study was carried out among 440 12-13-year-old students from 2 schools in Tehran, Iran, and their mothers in 2015. A self-report questionnaire consisting of 4 sections (demographic characteristics, socioeconomic information, oral health knowledge, and oral care behavior) was designed to assess the influence of mothers' oral health care behavior in controlling early childhood caries (ECC) on their children's oral health knowledge and behavior during their adulthood. Pearson's correlation coefficient, chi-square test, and chi-square linear-by-linear association test were conducted to assess the effect of gender, father's education, mother's education, first dental care, first dental check-up, and teacher's advice about oral health in school on oral health knowledge and behavior.

**RESULTS:** A positive relationship was observed between first dental check-up, oral health knowledge ( $P = 0.05$ ;  $CI = 95\%$ ) and flossing ( $P < 0.001$ ;  $CI = 95\%$ ). Surprisingly, no differences were found between first dental check-up and tooth brushing frequency ( $P = 0.26$ ;  $CI = 95\%$ ).

**CONCLUSION:** The current study showed the importance of mothers' knowledge and behavior toward their children's oral health during early ages and its impact on the oral health care behavior of children in adulthood. This indicates that prevention behaviors starting as early as possible in childhood will cause better outcomes in adulthood.

**KEYWORDS:** Mothers; Oral Health; Adolescent; Health Behavior

**Citation:** Khoshnevisan MH, Shariatpanahi SP, Sadeghipour-Roudsari M, Namdari M, Niknejad F, Malek-Mohammadi M. **Influence of maternal oral healthcare behavior during childhood on children's oral health care during adolescence.** *J Oral Health Oral Epidemiol* 2020; 9(1): 45-53.

Dental caries is an infectious disease and is largely considered as a socio-behavioral problem that affects many children worldwide.<sup>1</sup> There are many risk factors which contribute to the prevalence of dental caries such as health literacy, lifestyle, education, diet, fluoride exposure, psychological and socio-economic factors, and medical conditions.

Despite various preventive strategies, this

chronic condition is still a global public health issue the prevalence of which is increasing particularly in many low-income and middle-income countries.<sup>2,3</sup>

Oral health is an essential component of general health,<sup>4</sup> and oral health status plays an important role in children's normal growth and wellbeing. Evidence shows that controlling the common risk factors of dental disorders is not only beneficial to children's

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overall health, but also has an important impact on the quality of life (QOL) of the whole family.<sup>5-8</sup> Despite the numerous oral health-related educational and promotional programs, still no great success has been achieved in controlling dental caries. According to the available literature, preventive approaches are mainly divided into the 3 major categories of social, professional, and home care activities. The major emphasis of these categories is on dietary advice, oral hygiene instructions, and routine dental checkups.<sup>1,9</sup>

Given that children may not be fully aware of correct self-care, parents' knowledge of and attitude towards oral health are extremely important in suitable oral care.<sup>10,11</sup> Within families, like other aspects of health, mothers play a crucial role in oral health promotion.<sup>12</sup> The best example for this is the important role of mothers in controlling early childhood caries (ECC) which is a common chronic disease all around the world and can affect children's QOL.<sup>13,14</sup> However, the majority of unattended children will go through advanced stages of ECC disease and develop pain, infection, eating limitation, and disrupted sleep pattern as a result. By preventing or controlling these problems, we can reduce and remove all those barriers to children's normal growth and development. In this matter, the mother's role is non-negligible. Laniado et al. found that mothers' oral health has a significant impact on children's risk of experiencing dental caries.<sup>15</sup> Moreover, a study on mothers' knowledge about oral health and oral health behaviour in their children indicated that dental caries had a higher prevalence among children of mothers who lacked sufficient oral health knowledge.<sup>16</sup>

However, it needs to be clarified whether a mother's attention to childhood oral health can have an extended influence on her child's oral health during adolescence. Thus, the purpose of this study was to investigate whether mothers' knowledge on the oral health of children during early ages may result in better oral health care behavior amongst their children during adolescence and beyond.

## Methods

This descriptive, cross-sectional, analytic study was conducted on 440 adolescents (48% girls and 52% boys) aged 12-13 years from 2 public schools in Tehran, Iran, and their mothers in 2014-15. One of the aims of this study was to estimate the proportion of mothers with correct oral health care behavior in the mentioned population. Soltani et al. found this rate to be 38% in their study.<sup>17</sup> Considering a difference of up to 5% of the true population parameter ( $d = 0.05$ ) and using the formula  $n = z^2 p(1-p)/d^2$ , the minimal sample size required was calculated to be 362 at a confidence interval of 95%. It was assumed that some questioners may not be filled completely by the participants (at least 15%); therefore, the minimum needed sample size in this study was calculated to be 426 [ $n = 362/(1-0.15) = 426$ ]. The schools were randomly selected from the list of schools registered by the Ministry of Education. We treated all the schools in the same way, each one was given a number using a TI-82 calculator (Texas Instruments Incorporated, Dallas, Texas, USA), in other words, all the schools had the same probability of being selected.

All students and their parents who voluntarily agreed to participate in this study were asked to fill out a self-report questionnaire. The questionnaire was designed to assess the impact of mothers' oral health care behavior in controlling ECC on their children's oral health knowledge and behavior during adulthood. The questionnaire was developed in multiple steps. Using the items extracted from the literature, an item pool was developed for expert evaluation. The questions were designed and evaluated by 10 experts including 5 dental health care professionals, 2 epidemiologists, and 3 social scientists. In order to assess the instrument's face validity, 10 mothers were asked to assess the questionnaire and report if they found any difficulty or ambiguity in the questions. For the quantitative evaluation of the importance of each question, the "impact score"

(frequency  $\times$  importance) was used. The items with an impact score of equal to or greater than 1.5 were considered acceptable. This number corresponds to a mean frequency of 50% and a mean importance of 3 out of 5 points in a Likert scale.

For content validity evaluation, the qualitative and quantitative methods were applied. In the qualitative phase, the invited experts evaluated the grammar and wording and they confirmed the structure of each question. In the quantitative phase, content validity index (CVI) and content validity ratio (CVR) were both measured. Using the CVI, we assessed the clarity, simplicity, and relevancy of each question in the instrument. For CVR calculation, Lawshe's approach was used. Each question was evaluated in terms of being "essential", "useful but not essential", or "non-essential". CVR  $>$  62% was selected as the cut-off point for retaining or removing each question (suggested by Lawshe when employing 10 experts).<sup>18</sup>

To assess the reliability of the questionnaire, test-retest reliability indicator was calculated using kappa and proportion of agreement statistics.<sup>19</sup> Acceptable reliability was considered as the values of kappa coefficient greater than 0.75. Therefore, 18 mothers were asked to fill out the same questionnaire under the supervision of the researcher within the school. After 3 weeks, the mothers were asked to come back and fill out the questionnaire again. All questionnaires were labeled with ID numbers in order to be able to merge them into the test-retest data sets. The final version of the questionnaire consisted of 4 parts, demographic information, socioeconomic status (SES), oral health care behaviors and habits, and oral health knowledge.

The questionnaire starts with questions on demographic characteristics and the next section is related to the primary oral healthcare behavior of mothers towards their children's oral health. This section consists of 10 questions 2 of which are related to the child's first dental visit and the child's age of starting tooth brushing. The next section is

about adolescent oral health knowledge. The children's knowledge is evaluated using the 3 questions "What causes dental caries?", "Why is brushing necessary?", and "Is it necessary to have regular dental visits?"; each answer has a point and the sum of these points constitutes the knowledge score. The knowledge score ranges between 0 and 9. The third section is about adolescents' oral health habits, which contains the frequency of tooth brushing (twice or more per day/ once a day/ sometimes/ never) and flossing (once a day/ sometimes/ never) to assess the child's oral behavior. The last section consists of questions regarding socio-economic status including parents education (university degree, diploma, and pre-diploma), father's occupational status, number of siblings, and whether the family owns a car and the listed household appliances (i.e., refrigerator, laptop, or washing machine; each item had 1 score and the total score ranged between 0 and 6).

The oral examinations of the children were performed by 2 dentists in order to obtain parental consent to participate in the study. After oral examination of the children, referral forms were given to mothers if any dental treatment was required.

The oral health knowledge of children was categorized as  $<$  3, 3-6, and  $>$  6, and their brushing and flossing habits (never, sometimes, once, or more) were reported. The distributions of knowledge, and brushing and flossing habits scores were compared among genders using Mann-Whitney U test.

The association between parental education and mothers' primary health care behaviors was assessed using linear trend test. To assess the difference in the distribution of economic variable scores and number of siblings between categories of knowledge and habits, Kruskal-Wallis test was implemented.

Pearson's correlation coefficient, chi-square test, and linear trend test were conducted to assess the effect of gender, parental education, first dental care, first dental visit, and teacher's advice on oral health knowledge and behavior

in school. Kruskal-Wallis test was performed to compare the relation between the number of siblings and economic status with considered independent variables.

Ordinal logistic regression analysis was used to assess the relationship of the interested independent variables, oral health behaviors, and the categories of knowledge score with independent variables.

## Results

The study population was composed of mothers and their 12-13-year-old children (48.2% girls and 51.8% boys). Little over 20% of children brushed their teeth twice or more per day, while 48% reported brushing once a day and 30% of them reported not brushing their teeth. About 31% of children did not floss at all. More than 50% of children were aware that using fluoride toothpaste was necessary. About 65% of children correctly answered the questions on the reason for tooth brushing. About 62% of the participating children thought that regular dental visits were important and necessary for improving their oral health status. Only 34% of the subjects correctly recognized the causes of tooth decay. Moreover, 21% of the mothers had started their children's oral care before the age of 2 years and only 7% had taken their children for a dental check-up before the age of 2 years.

The most evident finding is that the mothers' behavior on the first dental check-up was significantly related to adolescents' tooth brushing habit and flossing behavior ( $P < 0.001$ ) as well as oral health knowledge ( $P < 0.050$ ). Children who had had their first visit at early ages reported better oral care habits. Results presented in table 1 show that there was a weak relationship between the number of siblings and tooth brushing habit ( $P = 0.060$ ). Furthermore, another important finding was the association between teachers "talking about oral health in the classroom" and students' frequency of tooth brushing ( $P = 0.030$ ); those who received advices in the classroom had better brushing habit.

This study did not find any relation between mothers' and fathers' educational level and their child's oral health knowledge and habits. Significantly better oral health knowledge and brushing frequency were reported among girls compared with boys ( $P < 0.005$ ). This association was poorly significant for dental flossing ( $P = 0.060$ ).

Children whose mothers' paid more attention to the dental referral form showed significantly better oral health habits.

A positive relationship was detected between first dental check-up and oral health knowledge and flossing. No relation was found between the first dental visit and tooth brushing frequency. Moreover, no significant association was observed between economic status and oral care habits and flossing frequency factors.

The results of ordinal logistic regression analysis to assess the relationship between considered independent variables and oral health behaviors, and the quartiles of knowledge score and independent variables are presented in table 2. The first dental check-up variables had significant relationships with brushing and flossing frequency. Children who had their first dental check-up before the age of 2 showed a greater chance of having tooth brushing (OR = 2.32;  $P < 0.001$ ) and dental flossing (OR = 2.03;  $P = 0.030$ ) habits. Similarly, the first dental check-up variable showed a significant positive association with oral health knowledge (OR = 1.70;  $P = 0.020$ ) and flossing (OR = 3.49;  $P < 0.001$ ). After adjusting for all covariates, no significant effect was detectable between oral health knowledge and behaviors with the number of siblings. Furthermore, this analysis showed a positive relationship between economic status and brushing frequency after adjusting for other items. However, the relationship between economic status and flossing behavior was nearly significant ( $P = 0.060$ ). According to the coefficients presented in table 2, the results were similar for bivariate comparisons and regression analysis.

**Table 1.** The association between considered response variables and socio-demographic characteristics

Variable	Category	Knowledge*			P	Brushing*			P	Flossing*			P
		Q1	Q2	Q3		Never	Some times	Once or more		Never	Some times	Once or more	
Gender	Girl	44 (20.9)	93 (44.1)	74 (35.1)	0.020	26 (12.3)	102 (48.1)	84 (39.6)	0.003	58 (27.4)	96 (45.3)	58 (27.4)	0.062
	Boy	73 (32.4)	88 (39.1)	64 (28.4)		69 (30.3)	109 (47.8)	50 (21.9)		80 (35.1)	105 (46.1)	43 (18.9)	
Father's education** [n (%)]	University degree	48 (27.4)	67 (38.3)	60 (34.3)	0.840	37 (20.8)	90 (50.6)	51 (28.7)	0.440	60 (33.7)	85 (47.8)	33 (18.5)	0.360
	Diploma	37 (27.2)	60 (44.1)	39 (28.7)		35 (25.7)	60 (44.1)	41 (30.1)		34 (25)	67 (49.3)	35 (25.7)	
Mother's education [n (%)]	Pre-diploma	32 (25.6)	54 (43.2)	39 (31.2)	0.130	23 (18.3)	61 (48.4)	42 (33.3)	0.150	44 (33.9)	49 (38.9)	33 (26.2)	0.770
	University degree	26 (20.6)	55 (43.7)	45 (35.7)		24 (19.0)	64 (50.8)	38 (30.2)		44 (34.9)	52 (41.3)	30 (23.8)	
	Diploma	46 (27.2)	76 (45.0)	47 (27.8)		35 (20.6)	74 (43.5)	61 (35.9)		53 (31.2)	75 (44.1)	42 (24.7)	
Economic status	Pre-diploma	45 (31.9)	50 (35.5)	46 (32.6)	0.120	36 (25.0)	73 (50.7)	35 (24.3)	0.178	41 (28.5)	74 (51.4)	29 (20.1)	0.600
	Median (IQR)	5 (4,6)	5 (4,6)	4.5 (3,6)		5 (4,6)	4 (3,6)	5 (4,6)		5 (3,6)	5 (4,6)	5 (3,6)	
First check-up (year) [n (%)]	Mean ± SD	4.65 ± 1.45	4.43 ± 1.56	4.25 ± 1.59	0.050	4.50 ± 1.44	4.30 ± 1.58	4.57 ± 1.56	0.260	4.33 ± 1.60	4.48 ± 1.50		< 0.001
	< 2	8 (25.0)	15 (49.6)	9 (28.1)		8 (25.0)	9 (28.1)	15 (46.9)		10 (31.5)	15 (45.5)	7 (22.6)	
First dental care (year) [n (%)]	2-6	74 (24.4)	123 (40.6)	106 (35.0)	0.022	64 (21)	151 (49.5)	90 (29.5)	< 0.001	88 (28.9)	148 (48.5)	69 (22.6)	< 0.001
	Never	34 (34.3)	43 (43.4)	22 (22.2)		23 (22.8)	51 (50.5)	27 (26.7)		44 (43.6)	40 (39.6)	17 (16.8)	
Attention to referral form [n (%)]	< 2	19 (21.3)	36 (40.4)	34 (38.2)	0.632	11 (12.1)	39 (43.8)	39 (43.8)	0.048	20 (22.5)	40 (44.9)	29 (32.6)	0.006
	2-6	72 (26.2)	115 (41.8)	88 (32.0)		62 (22.2)	133 (47.7)	84 (30.1)		83 (29.7)	134 (48.0)	62 (22.2)	
Teacher's advice [n (%)]	Not until	24 (35.8)	27 (40.3)	16 (23.9)	0.488	20 (29.9)	36 (53.7)	11 (16.4)	0.030	32 (47.8)	27 (40.3)	8 (11.9)	0.322
	Yes	82 (26.9)	127 (41.6)	96 (31.5)		21 (17.8)	51 (23.2)	46 (39.0)		24 (20.3)	60 (50.8)	34 (28.8)	
Number of sisters and brothers	No	28 (23.9)	51 (43.6)	38 (32.5)	0.140	69 (24.4)	152 (49.4)	87 (28.2)	0.067	108 (35.1)	133 (43.2)	67 (21.8)	0.690
	Yes	50 (25.4)	82 (41.6)	65 (33.0)		35 (17.8)	94 (47.7)	68 (34.5)		56 (28.4)	94 (47.7)	47 (23.9)	
	Mean ± SD	2.37 ± 0.91	2.50 ± 0.96	2.41 ± 0.87		2.65 ± 1.01	2.38 ± 0.87	2.40 ± 0.93		2.40 ± 0.92	2.50 ± 0.92	2.44 ± 0.94	

SD: Standard deviation, IQR: Interquartile range

\*Dependent variables, \*\*Education categories (Good = University degree, Moderate = Diploma, Poor = Lower than diploma)

**Table 2.** Ordinal regression analysis between tooth brushing habit and considered independent factors

Variable	Tooth brushing			Tooth flossing			Oral health knowledge			
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	
Intercept score	0.26	(0.10, 0.65)	< 0.001	1.28	(0.50, 3.21)	0.600	0.38	(0.15, 0.94)	0.030	
Gender	2.90	(1.15, 7.30)	0.020	10.92	(4.22, 28.27)	< 0.001	2.52	(1.02, 6.24)	0.040	
	Boys	0.23	(0.14, 0.39)	< 0.001	0.53	(0.33, 0.86)	0.010	0.55	(0.34, 0.88)	0.010
	Girls	1			1		1			
First dental care (year)	< 2	2.32	(1.11, 4.54)	0.010	2.03	(1.03, 3.97)	0.030	1.40	(0.72, 2.71)	0.310
	2-6	1.33	(0.76, 2.31)	0.300	1.57	(0.90, 2.74)	0.110	1.19	(0.68, 2.08)	0.520
	Never	1			1		1			
Mother's education	University degree	1.78	(0.72, 4.35)	0.200	1.40	(0.77, 2.56)	0.260	0.77	(0.42, 1.43)	0.420
	Diploma	1.08	(0.67, 1.75)	0.750	1.11	(0.66, 1.85)	0.680	0.72	(0.43, 1.21)	0.220
	Pre-diploma	1			1		1			
Father's education	University degree	0.82	(0.44, 1.52)	0.530	0.67	(0.37, 1.22)	0.190	1.79	(1.00, 3.18)	0.040
	Diploma	1.20	(0.71, 2.03)	0.470	1.10	(0.64, 1.86)	0.720	1.23	(0.73, 2.06)	0.420
	Pre-diploma	1			1		1			
Teacher's brushing advice	No	1.26	(0.69, 2.29)	0.430	0.78	(0.54, 1.13)	0.190	0.81	(0.56, 1.17)	0.280
	Yes	0.64			1		1			
Referral form	Good	1	(0.38, 1.10)	0.100	1.54	(1.02, 2.34)	0.040	1.17	(0.77, 1.78)	0.430
	Bad	0.61	(0.41, 0.89)	0.010	1		1			
Number of siblings		1			1	(0.81, 1.22)	0.990	1.05	(0.86, 1.28)	0.590
Economic status		1.63	(1.05, 2.52)	0.020	1.14	(0.99, 1.32)	0.060	0.93	(0.80, 1.06)	0.300
First dental check-up (year)	< 2	1.23	(1.06, 1.42)	< 0.001	3.49	(1.48, 8.20)	< 0.001	1.49	(0.66, 3.39)	0.330
	2-6	0.88	(0.71, 1.08)	0.220	1.48	(0.92, 2.38)	0.100	1.70	(1.06, 2.72)	0.020
	Never	1			1		1			

OR: Odds ratio; CI: Confidence interval

## Discussion

Among the parental factors that may affect children's experience of oral disease social determinants (i.e., SES) have mostly been assessed in literature, whilst parental behaviors, knowledge, and attitudes have received less attention.<sup>20</sup> The current study showed that mothers' positive behavior toward oral health during early ages had a significant influence on their children's oral health behaviors. This includes mothers' behavior towards their children's first dental check-up and the age of beginning oral health care. This finding is in line with earlier investigations demonstrating that mothers' attitude toward oral health behaviors, like brushing habits or sugar consumption, could be an indicator of these behaviors in children.<sup>20,21</sup>

We asked questions about the oral health knowledge and behaviors of both mothers and their children. As boys and girls may be influenced by maternal care in different ways, children of both genders were included so we could compare the influence of maternal care between them. As the questionnaire was a self-reporting, there was a chance of misreport in the provided information, but due to the number of participants, it was modified. Some parents did not participate in the study, but the response rate (440 out of 450; 97% response rate) was acceptable.

The target group in this study consisted of adolescents aged 12-13 years in 2 schools in Tehran. During these ages, one of the individuals adolescents look up to is their teacher.<sup>22,23</sup> The influence of teacher's advice on tooth brushing behavior among the participants was also reported by Ramroop et al. in their study on knowledge and attitudes of primary school teachers toward their students' oral health.<sup>24</sup> Thus, empowering teachers with correct knowledge about oral health care can play a major role in oral health promotion among young children. Previous studies have indicated that female participants had more positive behavior toward oral health than male

subjects, which was in line with our findings. However, the present study findings do not support the previous research on the relationship between parents' educational level and oral health knowledge and behaviors. Moreover, we did not find any association between oral health behaviors and socioeconomic factors, even though it is known that such factors are of importance in health related issues.<sup>25,26</sup> Our assumption was that students attending any school are more or less homogenous in terms of SES-related factors. The results of this study suggest that mothers can be a valuable predictor of the future oral health status of their children. Assessing the relationship between first oral care and current oral care habit of 12-13-year-old children showed that a caries preventive program in children can be highly effective in oral health knowledge and behaviors in adolescence. We believe that this is a finding of the utmost importance with essential practical application in the oral health promotion of the future generation.

Although maternal oral health training during pregnancy is preferable, previous studies have shown that preventive dental programs for new mothers after the birth of their baby is effective on the prevention of ECC.<sup>27,28</sup> Our findings suggest that the observed positive effect can be extended to adolescence.

Gender differences in oral health behaviors such as brushing and flossing frequency showed a higher prevalence of these behaviors among girls. This finding is in accordance with that of several investigations on the relationship between gender and oral health status.<sup>29-33</sup> Moreover, girls were more knowledgeable on oral care than boys.

Another important observation was that mothers with a higher number of children paid less attention to their oral healthcare. This may be related to the economic status of families as previously reported.<sup>34-35</sup> This study showed a relationship between oral health knowledge and brushing, but not with flossing. This may be due to most families'

lack of attention to flossing.

This study does not support the findings of previous studies on relationship between parental education level and child's oral health status.

Since this was a cross-sectional study, longitudinal studies may provide more detailed information on the mechanisms of impact of parents' behavior on their children and predictive parent-related factors that can enhance children's oral health throughout their lives.

### Conclusion

The current study showed the significant influence of mothers' knowledge about oral health care on oral health care habits and behavior in their children. Preventive programs starting as early as possible in childhood may lead to better outcomes in adulthood. Controlling most factors leading

to ECC depends on mothers. They can eliminate this problem by caring for the sound teeth as soon as they erupt into the oral cavity. Daily brushing since the eruption of teeth with routine dental check-ups had a strong relationship with adolescents' oral health knowledge and better oral habits. Any prevention policy cannot achieve successful results without family support and mothers are the core of the family.

### Conflict of Interests

Authors have no conflict of interest.

### Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors would like to thank all parents and children who participated in the study.

### References

1. Ismail AI. Prevention of early childhood caries. *Community Dent Oral Epidemiol* 1998; 26(S1): 49-61.
2. Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: A global public health challenge. *Lancet* 2019; 394(10194): 249-60.
3. Kassebaum NJ, Smith AGC, Bernabe E, Fleming TD, Reynolds AE, Vos T, et al. Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990-2015: A systematic analysis for the global burden of diseases, injuries, and risk factors. *J Dent Res* 2017; 96(4): 380-7.
4. Sheiham A. Oral health, general health and quality of life. *Bull World Health Organ* 2005; 83(9): 644.
5. Martins-Junior PA, Vieira-Andrade RG, Correa-Faria P, Oliveira-Ferreira F, Marques LS, Ramos-Jorge ML. Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents. *Caries Res* 2013; 47(3): 211-8.
6. Acharya S, Tandon S. The effect of early childhood caries on the quality of life of children and their parents. *Contemp Clin Dent* 2011; 2(2): 98-101.
7. Tinanoff N, Baez RJ, Diaz GC, Donly KJ, Feldens CA, McGrath C, et al. Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: Global perspective. *Int J Paediatr Dent* 2019; 29(3): 238-48.
8. Krisdapong S, Somkotra T, Kueakulpipat W. Disparities in early childhood caries and its impact on oral health-related quality of life of preschool children. *Asia Pac J Public Health* 2014; 26(3): 285-94.
9. Maintaining and improving the oral health of young children. *Pediatrics* 2014; 134(6): 1224-9.
10. Poutanen R, Lahti S, Seppa L, Tolvanen M, Hausen H. Oral health-related knowledge, attitudes, behavior, and family characteristics among Finnish schoolchildren with and without active initial caries lesions. *Acta Odontol Scand* 2007; 65(2): 87-96.
11. Castilho AR, Mialhe FL, Barbosa TS, Puppim-Rontani RM. Influence of family environment on children's oral health: A systematic review. *J Pediatr (Rio J)* 2013; 89(2): 116-23.
12. Saied-Moallemi Z, Vehkalahti MM, Virtanen JI, Tehranchi A, Murtomaa H. Mothers as facilitators of preadolescents' oral self-care and oral health. *Oral Health Prev Dent* 2008; 6(4): 271-7.
13. Singh N, Dubey N, Rathore M, Pandey P. Impact of early childhood caries on quality of life: Child and parent perspectives. *J Oral Biol Craniofac Res* 2020; 10(2): 83-6.
14. Henry JA, Muthu MS, Swaminathan K, Kirubakaran R. Do oral health educational programmes for expectant mothers prevent early childhood caries? - Systematic Review. *Oral Health Prev Dent* 2017; 15(3): 215-21.



15. Laniado N, Shah P, Moss KL, Badner VM. Mother's caries experience as a risk factor for child's oral health: An analysis of a high-risk population in the Bronx, New York. *Pediatr Dent* 2019; 41(4): 279-84.
16. Noaman BR, Khalid RF, Fattah LD. Maternal dental health knowledge and its relation to the dental caries experience of their children in Mamyzawa Camp of Refugees in Erbil, Iraq. *Acta Med Acad* 2019; 48(3): 294-302.
17. Soltani R, Sharifirad G, Mahaki B, Eslami AA. Determinants of oral health behavior among preschool children: Application of the theory of planned behavior. *J Dent (Shiraz)* 2018; 19(4): 273-9.
18. Lawshe CH. A quantitative approach to content validity. *Pers Psychol* 1975; 28(4): 563-75.
19. Fleiss JL, Cohen J, Everitt BS. Large sample standard errors of kappa and weighted kappa. *Psychol Bull* 1969; 72(5): 323-7.
20. Hooley M, Skouteris H, Boganin C, Satur J, Kilpatrick N. Parental influence and the development of dental caries in children aged 0-6 years: A systematic review of the literature. *J Dent* 2012; 40(11): 873-85.
21. Bozorgmehr E, Hajizamani A, Malek MT. Oral health behavior of parents as a predictor of oral health status of their children. *ISRN Dent* 2013; 2013: 741783.
22. Domagala-Zysk E. The significance of adolescents' relationships with significant others and school failure. *Sch Psychol Int* 2006; 27(2): 232-47.
23. Blyth DA, Hill JP, Thiel KS. Early adolescents' significant others: Grade and gender differences in perceived relationships with familial and nonfamilial adults and young people. *J Youth Adolesc* 1982; 11(6): 425-50.
24. Ramroop V, Wright D, Naidu R. Dental health knowledge and attitudes of primary school teachers toward developing dental health education. *West Indian Med J* 2011; 60(5): 576-80.
25. Jung SH, Tsakos G, Sheiham A, Ryu JI, Watt RG. Socio-economic status and oral health-related behaviours in Korean adolescents. *Soc Sci Med* 2010; 70(11): 1780-8.
26. Polk DE, Weyant RJ, Manz MC. Socioeconomic factors in adolescents' oral health: Are they mediated by oral hygiene behaviors or preventive interventions? *Community Dent Oral Epidemiol* 2010; 38(1): 1-9.
27. Twetman S. Prevention of early childhood caries (ECC)-review of literature published 1998-2007. *Eur Arch Paediatr Dent* 2008; 9(1): 12-8.
28. Wagner Y, Greiner S, Heinrich-Weltzien R. Evaluation of an oral health promotion program at the time of birth on dental caries in 5-year-old children in Vorarlberg, Austria. *Community Dent Oral Epidemiol* 2014; 42(2): 160-9.
29. Ostberg AL, Halling A, Lindblad U. Gender differences in knowledge, attitude, behavior and perceived oral health among adolescents. *Acta Odontol Scand* 1999; 57(4): 231-6.
30. Peker I, Alkurt MT. Oral health attitudes and behavior among a group of Turkish dental students. *Eur J Dent* 2009; 3(1): 24-31.
31. Furuta M, Ekuni D, Irie K, Azuma T, Tomofuji T, Ogura T, et al. Sex differences in gingivitis relate to interaction of oral health behaviors in young people. *J Periodontol* 2011; 82(4): 558-65.
32. Lian CW, Phing TS, Chat CS, Shin BC, Baharuddin L, Che'Jalil ZBG. Oral health knowledge, attitude and practice among secondary school students in Kuching, Sarawak. *Arch Orofac Sci* 2010; 5(1): 9-16.
33. Yildiz S, Dogan B. Self-reported dental health attitudes and behaviour of dental students in Turkey. *Eur J Dent* 2011; 5(3): 253-9.
34. Hobdell MH, Oliveira ER, Bautista R, Myburgh NG, Lalloo R, Narendran S, et al. Oral diseases and socio-economic status (SES). *Br Dent J* 2003; 194(2): 91-6.
35. Paula JS, Leite IC, Almeida AB, Ambrosano GM, Pereira AC, Mialhe FL. The influence of oral health conditions, socioeconomic status and home environment factors on schoolchildren's self-perception of quality of life. *Health Qual Life Outcomes* 2012; 10: 6.