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ASSESSING THE EFFECTS OF ORAL HEALTH KNOWLEDGE AND BEHAVIOURS OF MOTHERS ON ORAL HEALTH OF PRESCHOOL 4-6 YEARS OLD CHILDREN

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ABSTRACT

Purpose: Pre-school child health has always been one of the most important milestones for lifelong health research. Also, the knowledge and behaviour of the parents, especially mothers, affects children's health. The variable household-related factors and mothers, in particular, are considered to be the main role models that can improve pre-school children behaviour. To determine the knowledge and behaviours of the mothers and their impact on pre-school 4-6 years old children oral health status.

Material and Methods: A 27 subjects' questionnaire was prepared using previous questionnaires assessing mothers' knowledge and behaviours towards oral health. Children's oral and dental health was examined by the researcher and scores were calculated using dmft (decayed, missing, filled, tooth) index. Accordingly, the effect of knowledge and behaviour of the mothers on their children dmft score was analysed. Chi-Square and logistic regression tests were used in the statistical analysis.

Results: The study population consisted of 261 pre-school children and their mothers. Which included 126 males (48.3%) males and 135 females (51.7%). The mean mothers' oral health knowledge score was found to be 4.24 ± 1.94 . The children oral health examination through dmft scoring showed that 71.3% of children had experienced dental caries. the mean value for dmft score was 2.32 ± 2.39 .

Our study showed that the mother's cumulative oral health knowledge score has a statistically significant relationship to the children oral health status. The higher the mother's oral health knowledge scores the lower their children dmft scores ($p=0.001$).

Conclusion: Mothers oral health knowledge and dental health indices in our study are lagging behind the developed countries and the WHO goal for the 21st century showing an urgent need to improve the effectiveness of preventive care in oral health programmes.

Keywords: preschool children health, oral health knowledge, dental caries.

INTRODUCTION

The WHO defined oral health as "a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that

affect the oral cavity (1). Accordingly, the health word defines more than just the impact of healthy teeth on physical and psychological aspects of people life, it extends involving also the teeth influence on growth, function speech, aesthetics, socializing and social wellbeing (2). Health wellbeing research considers

preschool phase as a lifelong health construction phase guided by the parents. Mothers, in particular, are the main models improving pre-school children behaviour (3). The significance of parental background in children's health is evident in the resultant outcome due to large sociodemographic difference (4). It is extensively essential to initiate good basic oral health habits to create appropriate dental norms and standards that can be preserved in adult life. Add to that, the mothers can have a vital role in promoting their children's dental hygiene and nutritional habits acting as an advisor to improve children oral health (5). Considering health in general and oral health in particular, the role of parents is of massive importance since they are considered as the main caregivers during the first years of life (6).

It was found that the parents have a direct and indirect role in prevention and promotion of their children's oral health. Dental caries, a well-known morbid disease that can be evaded readily through a simple well organised health promotion programmes that can be directed towards the oral health of children through their mother's oral health literacy. Dentists and oral health professionals, in general, are accepting that the role of the caregivers and parents can be a vital one, resulting in a reduction of caries risk among their children (7). Therefore, mothers' oral health status and health literacy are correspondingly related to children's oral health and early childhood behaviours of the children (8).

Dental caries is recognised as one of the major problems in the world. the WHO reports that 60-90% of school children worldwide have experienced dental caries. However, the highest prevalence is in Asian and Latin American countries (9).

Few oral-health-related epidemiological surveys covering children have been done. Most of these were conducted in cities, in dental schools at universities, and included small numbers of participants (10–12). In Turkey, the general information regarding the oral health status of children originates from the two national surveys of 1988 and 2004 (13-15).

Some researchers examined the inter-relationship between the characteristics of caregivers and their children's oral health. While some studies showed that financial status or geographical isolation might affect the preschool children oral health through limiting the necessary social support (e.g., education, information, intervention) required by parents (16). These factors include oral health behaviours and

Table 1. Child and mother's sociodemographic characteristics

Variable	frequency	
	N	%
Sex		
Males	126	48.3
Female	135	51.7
Child Age		
4	89	31.4
5	80	30.7
6	92	35.2
Child order in the Family		
1	183	70.1
2	60	23.0
3	18	6.9
Mother's Age group		
26 years and below	49	18.8
27-37 years	168	64.4
38 and above (recheck)	44	16.9
Marital status		
Married	252	96.6
Others	9	3.4
Family type		
Small Family (Mother, Father and children)	222	85.1
Others (Big family and separated family)	39	14.9
Children number		
1	111	42.5
2	113	43.3
3 and above	37	14.2
Education group		
Primary school	36	13.8
Middle school	66	25.3
High school	97	37.2
Diploma	21	8.0
Graduate and post-graduate	41	15.7
Work status		
Working	86	33.0
Non-working	175	67.0
Total	261	100

demographic factors of the caregivers (7,8,17–19). Adding to the parents' role, some other factors, for instance, maternal education, occupation and their current knowledge also have an essential role in determining the oral health of their children (20). Mother's oral health knowledge and attitudes affect the oral health of children in particular at early ages (21,22). In Turkey, only a few studies have been done to determine the knowledge and attitudes of pre-school children's mothers and their interrelationship to children oral health.

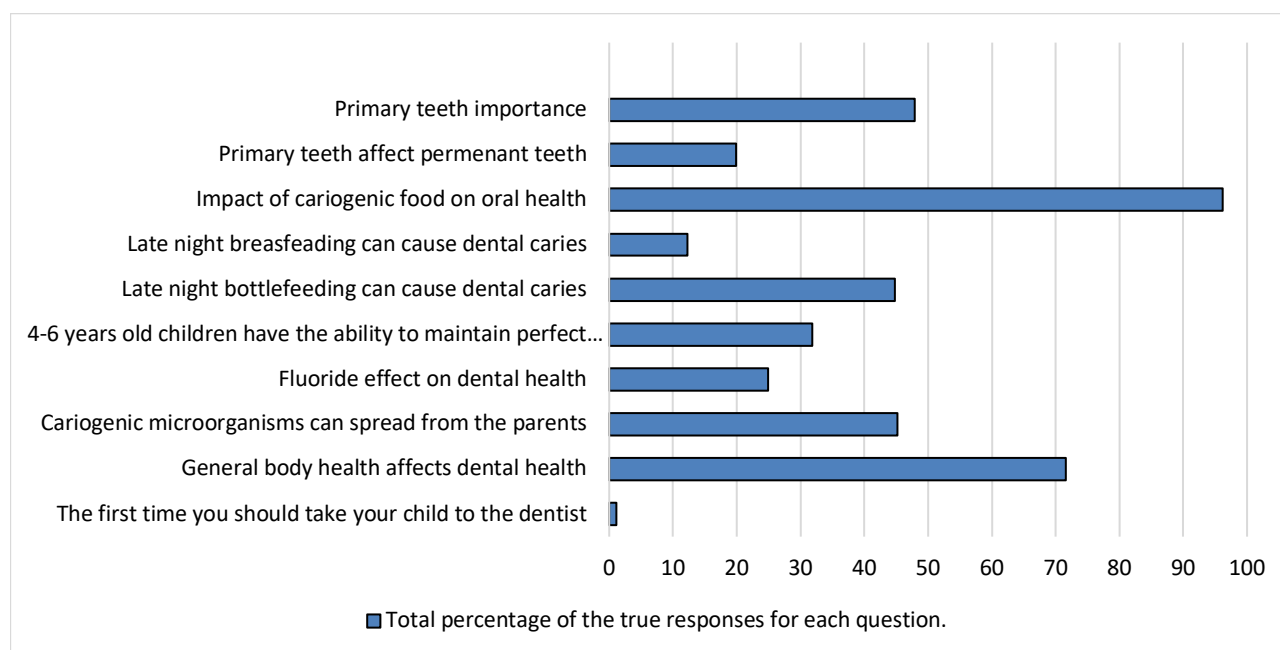


Figure 1. The total percentage of the mothers responded the true answer for each question.

The aim of this study is to determine the mothers' oral health knowledge and the effect of the mothers' oral health knowledge and behaviour on their preschool (4-6 years) old children's dmft score.

MATERIAL AND METHODS

The study is a descriptive cross-sectional study conducted at Dokuz Eylul University, Paediatrics Hospital polyclinic and Dental clinic by examining the children aged 4-6 years old visiting the Paediatrics and dental polyclinics and correspondingly applying the questionnaires to the mothers.

The study was done during the period from February to May 2018.

The study population and sampling

By assuming that the dental caries prevalence was 70% in children aged 5 years old in Turkey which was found in 2004 national survey (14,15), 95% confidence level and 0.05 margin of error, the required sample to perform the study was 245 children and their mothers. The number of people we reached by taking as a reserve of 10% for reasons such as the limitations that may be experienced in reaching or refusal to participate in the survey is 270 children and their mothers. The mothers who accepted to participate in the study was 261, with 135 female and 126 male children.

Data collection and variables

The data was collected through face-to-face interviews with mothers.

Firstly, a questionnaire was used to study the children's sociodemographic variables, behaviour and their dental visit experiences, variables related to the mother's knowledge and behaviour towards oral health with a total of 27 questions. For the questionnaire, Chahbra et al (23) and the Oral health survey developed by the Texas health service department were used and some additional questions were added. Ten questions were prepared to examine the mother's knowledge. Questions were scored according to the true answer choice and counted every true answer as 1 point and the overall score was 10.

Secondly, the patients who accepted to be part of the study were examined according to dmft scoring standards and using examination sheet to record the patient's oral health as the number of decayed, missing and filled teeth number was calculated to obtain the overall dmft score. Children's oral and dental examinations were performed by the investigator and their scores were calculated using the dmft (decayed, missing, filled, tooth-tooth number) form. DMF indexes are used for permanent teeth in practice, primary teeth are explained in small letters as dmfi index.

dmft scores were categorized into 3 categories, no obvious dental caries, low caries, and high caries according to the number of decayed missing and filled teeth.

Data analysis

In the descriptive analysis, continuous variables are given as mean and standard deviation (SD), categorical variables as number and percentage. T-test, chi-square, ANOVA and logistic regression analysis were performed to analyse the associations between dependent variables and independent variables.

Age, gender, sociodemographic characteristics were presented as frequency and percentage. From the questionnaire consisting of 27 subjects, a total of 10 oral health knowledge related subjects were scored and the general knowledge level was calculated (each true answer counted as 1 point) and mean, standard deviation, median and quartile values were reported.

The dmft score was determined by clinical dental examination and the mean, standard deviation, median and quartile values were calculated.

The difference between mean scores according to independent variables were analysed by t-test. Behavioural properties with independent variables were evaluated using the Chi-square test.

Statistical analysis was done using SPSS 20.0.

Logistic regression was performed for the association of independent variables of mother's and child characteristics to oral health, assessed by dmft score. dmft was categorized into two as no obvious dental caries and high caries group.

Ethics committee approval was obtained from Dokuz Eylul University Non-Interventional Research Ethics Committee (Date: 08.02.2018, Decision no: 2018/04-37) and a permission to conduct the research was approved by Dokuz Eylul University, Faculty of Medicine, Department of Child Health and Pediatrics.

RESULTS

Sociodemographic features

The study population consisted of 261 pre-school children and their mothers. Which included 126 males (48.7%) males and 135 females (51.7%). The percentages of 4, 5- and 6-years old children in the time of data collection who were included in the study were 31.4%, 30.7% and 35.2%, respectively.

The mothers' oral health knowledge had been analysed as cumulative score of total true answers.

Table 2. Mean and median values for oral health determinants

Variable	Mean \pm SD	Median	Quartiles	
Mothers' Oral Health knowledge Score	4.24 \pm 1.94	4.00	25	3.00
			50	4.00
			75	6.00
Child's Decayed Teeth	2.08 \pm 2.28	2.00	25	0.00
			50	2.00
			75	3.00
Child missing Teeth	0.04 \pm 0.29	0.00	25	0.00
			50	0.00
			75	0.00
Child's filled teeth	0.19 \pm 0.76	0.00	25	0.00
			50	0.00
			75	0.00
Child's dmft score	2.32 \pm 2.39	2.00	25	0.00
			50	2.00
			75	3.00

Half of the mothers (47.9%) knew that the primary teeth have an important role in the dental health and wellbeing. However, whether the primary teeth diseases have an impact the permanent teeth received less true answers as only one in five mothers (19.9%) considered that as true statement. The mean mothers' oral health knowledge score was found to be 4.24 ± 1.94 . When the mothers' knowledge was categorised into 3 groups poor, fair and good knowledge it was found 37.5%, 33.0% and 29.5%, respectively.

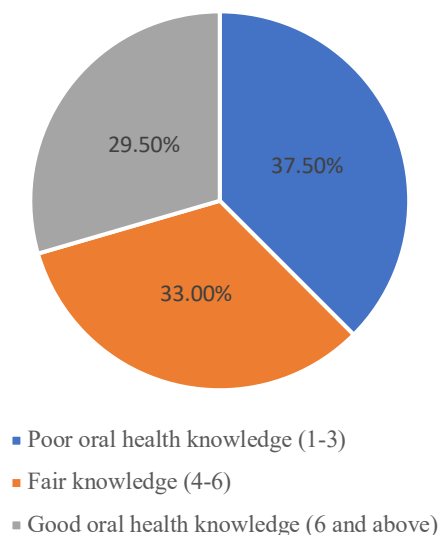
The children dental health examination using dmft scoring system showed that 71.3% of children had experienced dental caries. 47.2% had low caries, 24.1% had high caries and only 28.7 were considered not having obvious caries. the mean value for dmft score was 2.32 ± 2.39 . The number of decayed teeth per child was 2.08 ± 2.28 , 0.04 ± 0.29 for missing teeth and 0.19 ± 0.76 for filled teeth.

Children oral health status

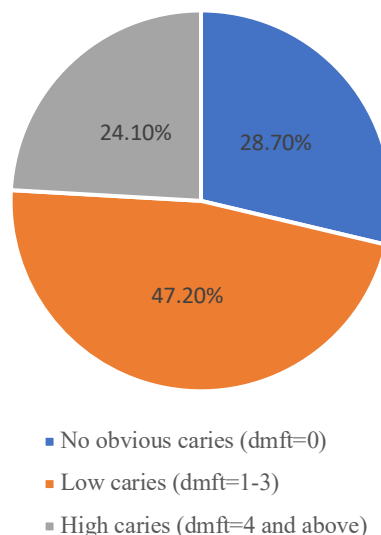
Our main findings showed that the mother's cumulative oral health knowledge score has a statistically significant relationship to the children's dental health status. It was found that mother with higher oral health knowledge score had children having lower dmft scores while the children of the mothers with low oral health knowledge scores had higher dmft scores ($p=0.001$).

Children dmft score is statistically significant to the mother's education and work status. The higher

Mothers' oral health knowledge



Child dmft score

**Figure 2.** Mothers oral health knowledge and children dmft scores classified into groups.

education status of the mothers the better their children dental health status ($p=0.001$). Also, working mother's children have a better dental health in comparison to non-workers. Another determinant factor for the children dental health is the child's oral hygiene behaviour. Lower dmft score is significantly related to the regular brushing behaviour of the child when compared to non-brushers and irregular brushers ($p=0.001$). add to that, the mother's role when their children are brushing their teeth is of significant relationship to the child's dental health. Mothers who observe and correct their children teeth brushing behaviour have children with lower dmft score when compared to the mothers who only give advice ($p=0.001$).

The mothers and their children dental visits frequency exhibited a significant impact on the children oral health status. For instance, children who were regular dental services visitor had a better dental health status in comparison to children who visits only for dental problems. However, children who had never been to the dentist also had a better oral health when compared to children who visit only for dental problems ($p=0.019$). On the other hand, the mothers who were regular visitors have children with better oral health, unlike the mothers who visit only for dental problems ($p=0.002$).

Logistic regression testing clearly revealed that the mothers' education level, work status, dental visits

frequencies and pediatrics medical practitioner advice are the most significant factors affecting the mother's oral health knowledge. It had also showed that the determinant factors affecting the children oral health status (dmft score) were the child age, mothers' education level, brushing frequency and cariogenic food consumption frequency. However, when mothers' education level was excluded from the logistic regression model the mother's oral health knowledge score was the significantly affecting the child dmft score.

DISCUSSION

Our study was conducted in preschool children aged between 4 and 6 years in a university hospital pediatrics and dental clinics. It was significantly found that there's a relationship between the mothers' oral health knowledge and the dmft score of the children. This inverse relationship addresses that the higher the mothers' oral health knowledge scores the lesser their children dmft scores which means the better their dental health status. Moreover, there's a significant relationship between the educational level of mothers, the children's teeth-brushing behaviour as well as children cariogenic food consumption and the dmft score of the children, as well as children cariogenic food consumption and the dmft score of the children.

Table 3. Children's dmft score distribution according to selected characteristics

		Child dmft score								P value
		Caries free		Low caries		High caries		Total		
		N	%	N	%	N	%	N	%	
Child age	4 years	35	39.3	46	51.7	8	9.0	89	100	0.001
	5 years	22	27.5	39	48.8	19	23.8	80	100	
	6 years	18	19.6	38	41.3	36	39.1	92	100	
Number of children in the family	1 child	41	36.9	53	47.7	17	15.3	111	100	0.001
	2 children	29	25.7	56	49.6	28	24.8	113	100	
	3 children and above	5	13.5	14	37.8	18	48.6	37	100	
Mothers education level	Primary school	2	5.6	15	41.7	19	52.8	36	100	0.001
	Under-graduate education	42	25.8	86	52.8	35	21.5	163	100	
	Graduates and post-graduates	31	50.0	22	35.5	9	14.5	62	100	
Mother's working status	Worker	37	43.0	38	44.2	11	12.8	86	100	0.001
	Non-worker	38	21.7	85	48.6	52	29.7	175	100	
Child oral hygiene	Brushers	71	34.6	100	48.8	34	16.6	205	100	0.001
	Non-brushers	4	7.1	23	41.1	29	51.8	56	100	
Mother's role in their children oral hygiene behaviours	Observes and corrects	69	34.5	98	49.0	33	16.5	200	100	0.001
	Advices only	6	9.8	25	41.0	30	49.2	61	100	
Child consumption of cariogenic food	3 times or less	59	43.4	61	44.9	16	11.8	136	100	0.001
	4 times and above	16	12.8	62	49.6	47	37.6	125	100	
Fluoridated tooth paste usage	user	15	38.5	19	48.7	5	12.8	39	100	0.001
	Not-user	33	40.7	35	43.2	13	16.0	81	100	
	Don't know	27	19.1	69	48.9	45	31.9	141	100	
Child Frequency of visiting the oral health practitioner	Never had dental treatment	48	26.2	89	48.6	46	25.1	183	100	0.019
	Only for dental problems	9	20.5	23	52.3	12	27.3	44	100	
	Regular visitor	18	52.9	11	32.4	5	14.7	34	100	
Mothers dental visit frequency	For dental problems only	42	22.7	92	49.7	51	27.6	185	100	0.002
	Regular visitor (6 months or 1 year)	33	43.4	31	40.8	12	15.8	76	100	
Data collection place	Paediatrics policlinic	52	24.8	102	48.6	56	26.7	210	100	0.010
	Dental clinic	23	45.1	21	41.2	7	13.7	51	100	
Mother's oral health knowledge	Poor oral health knowledge	11	11.2	44	44.9	43	43.9	98	100	0.001
	Fair oral health knowledge	25	29.1	50	58.1	11	12.8	86	100	
	Good oral health knowledge	39	50.6	29	37.7	9	11.7	77	100	

Mothers' oral health knowledge status

Mothers cumulative oral and dental health knowledge is 4.24 ± 1.94 . however, according to a study conducted in Kuwait, the mothers oral and dental

health knowledge level was 4.68, while it was found as 7.32 in Taiwan (21,24). When we compared the results of oral and dental health knowledge of the mothers we found with another study conducted in

Table 4. Independent variables to mothers' oral health knowledge level logistic regression analysis*

Variable	β	S.E**	P	OR	%95 CI
Mother's education level					
Diploma, bachelors and above (reference)					
Middle school and high school	0.718	0.559	0.199	2.05	0.69-6.13
Primary school	2.900	0.905	0.001	18.18	3.09-107.09
Mother's work status					
Working (reference)					
Not Working	0.921	0.476	0.053	2.51	0.99-6.39
Visiting to the dentist frequency					
Regular visitor (reference)					
Non regular visitor	1.223	0.407	0.003	3.39	1.53-7.54
General doctors and practitioner advices towards oral health					
Had been advised (reference)					
Never advised	1.177	0.584	0.044	3.25	1.03-10.19
Constant	-3.059	0.694	0.000		

*Variables entered on step 1: Mothers education level, mothers work status, mothers visiting the dentist frequency, family doctors and general health practitioners' advices towards oral health and referral, mothers age group, examination place.

** S.E standard error

Nepal, in ours; 30% of mothers had moderate and 29% had good oral and dental health knowledge, however, 80% of Nepalese mothers had moderate level and 4% had good level of oral and dental health knowledge (25). When the factors affecting the level of oral and dental health knowledge of mothers in other systematic reviews, it showed that mother's education, working status, also, oral and dental health knowledge affects the children oral health status eventually (4,26,27). these results agree with our findings which manifested that the mothers with a high level of education had a significantly better level of oral and dental health knowledge than those with a lower level of education (4).

Preschool children oral health status

Three large studies in children in Turkey evaluated oral health status in 1988 and 2004. In 1988, dental caries was seen in 84% of 6-year-olds the average dmft score was found to be 4.4. These results are slightly higher than the 6 years old children dental caries prevalence (80.4%) with 3.2 mean dmft score we found (13).

In 2004, 70% of 5-year-old children had dental caries and the mean dmft score was 3.7 in comparison to 72.5% of 5-year-old children included in our study having a mean dmft score 2.3 (14).

There is a decrease in the mean dmft score in both age groups. This minor drop in the dmft value of children can be attributed to the increase in development in dental services and the awareness of society on this issue. In Turkey, despite the increased share of the national budget to be allocated to health services and preventive procedures in the past decade towards oral and dental health, the desired decrease in the value of the dmft score couldn't be achieved (15). These findings indicate that Turkey is lagging behind in the oral health target for the 21st century defined by the WHO and inadequate for continuous improvement of oral health (28).

On the other hand, in comparison to the countries in the same region of the world, our findings are relatively more desirable. The study in Kosovo found a dmft value of 5.8 and was twice as high as our findings (29). In a study conducted in Palestine, it was found that 76% of the children in the 4-5 age group had tooth decay and the mean dmft value was 2.46 (31). while in a study included 5 years old children in Athens children in Athens, Greece, the mean dmft value was found to be 1.77, which is considerably lower than our findings for the same age group (30). the oral health parameters in Northern European countries are substantially better when compared.

Table 5. Independent variables in relation to dmft score through logistic regression analysis*

Variable	β	S.E**	P	OR	%95 CI
Child age					
4 years old (reference)					
5 years old	1.551	0.672	0.021	4.72	1.26-17.60
6 years old	2.366	0.671	0.000	10.65	2.06-39.72
Mothers oral health knowledge score					
Good oral health knowledge (reference)					
Fair oral health knowledge	0.285	0.604	0.637	1.33	0.41-4.34
Low oral health knowledge	1.482	0.619	0.017	4.40	1.31-14.80
Teeth brushing frequency					
Regular brusher (reference)					
Non-regular brusher	2.094	0.720	0.004	8.11	1.98-33.28
Cariogenic food consumption frequency					
3 times or less per day (reference)					
4 times and above per day	1.636	0.516	0.002	5.14	1.87-14.11
Constant	-3.456	0.689	0.000		

*Variables entered on step 1: child age, number of children, teeth brushing frequency, bottle feeding usage, mothers oral health knowledge group, cariogenic food consumption frequency.

** S.E standard error

According to a research study investigating the prevalence of dental caries in 6-year-old children in Rotterdam, Netherlands, only 31.7% of children were found to have caries (32). also, in the city of Umea in Sweden, a comparative study of 4-year-old immigrants and indigenous children, concluded that 42% of migrant children had tooth decay, but only 15% of native Swedish children had tooth decay (33).

The impact of the mothers' oral health knowledge on preschool children oral health

Our study signified the mothers' role in their children's oral health and these results were like the reviews. Adding to that, our study stated that the mothers play a vital role in their children's dmft score which is considered in tandem with the finding of a study done in India (35).

Our results showed a significant direct relationship between the mothers' oral health knowledge and the children dmft score, which is also considered similar to the findings concluded in Iran, Tehran which similarly evaluated the influence of the mothers' oral health knowledge and attitude on their children oral health status (26). Likewise, the same was also concluded in another review in the United Kingdom emphasizing the parental knowledge, attitude and beliefs considering as a predictor of the children oral

health status (27). The same study also discloses that the parental attitude and beliefs can have an influential role in the children nutritional and snacking behaviour as well as their oral hygiene behaviour (27). This interrelationship was not examined in detail in this study.

In the Netherlands, parents with low levels of education found to be increasing the dental caries morbidity in their children. Correspondingly in three studies, the level of education of mothers has shown a significant impact on oral health status (32,36,37). Schwendicke et al. stated that there was a relationship between socioeconomic status and tooth decay and attributed this to poor inadequate health information, poor nutrition, inadequate toothbrushing habits, and low health care (36).

Stecksen-Blicks et al.'s comparative study that included Swedish and immigrant children at 4 years of age examining the household influence on children oral health established that migrant families' children have lesser teeth brushing frequency and higher cariogenic foods consumption. (ice cream, sugar, chocolate, etc.). Hence, as a resultant, there was a higher prevalence of tooth decay among the migrants (33). This outcome is similar to our findings showing the effect of brushing habit and the consumption of cariogenic foods showing only that the mean dmft

score of the children who did not brush was 4.16 and the mean dmft of the brushers was 1.81. Add to that, 56.6% of the children consuming 3 times or less of the cryogenic food have tooth decay in comparison to 87.2% dental caries prevalence among children consuming 4 or more times cryogenic foods (33).

Another detailed comparative household research analysing the effect of the parents on pre-school children included Dutch, Turkish and Moroccan families showed that there was a significant difference in the oral health of the children as a reflection of the role of parents which is inter-related to their origin. The parents of the Dutch children had more internal locus of control and higher dental self-efficacy, and more frequent dental visits, which resulted in better oral health (38). This shows that the parents remain the main determinant of the children oral health status similarly to our results.

According to the logistic regression analysis we done two different models including both the mother's oral health knowledge score and their educational degree while in the other model the mother's educational status is not inserted. In the first model, the mothers' oral health knowledge score was excluded while in the second model it wasn't. This can be explained by the interrelationship between the mother's oral health knowledge and education level and showing that education remains of an important significance in oral health promotion.

Limitations and strengths of research

As the study was carried out at Dokuz Eylül University hospital, the results could not be generalized to the population. In addition, a standard method was not used in assessing the knowledge level of the mothers. The questionnaire for behaviour is open to recall and reporting bias.

On the other hand, the strengths of this study lie in assessing the mothers' oral health knowledge in relation to the preschool children oral health status conducted by dental examination that is performed by a single dentist which led to a standard assessment of oral health status. Since most studies in Turkey are conducted in school-aged children, this study also fills an information gap regarding preschool children.

CONCLUSION

The oral and dental health indices of the mothers in the study group are poorer than the developed countries and fall far below the 21st century WHO target. These results suggest that there is a need to

increase the prevention services and oral and dental health promotion programs, especially for Turkish children and Turkish community in general, to raise the oral health standards.

For this purpose, it is necessary to develop policies and publicity programs for oral and dental health primarily in homes, kindergartens, and schools. Because the mothers remain the main influential factor of their children oral and dental health, promoting their oral and dental health information can play a direct role in the oral health prevention cycle. We believe that this study can be an important step and guide in understanding the norms of the Turkish population and in improving the oral and dental health status of the society. Our study was carried out in a hospital in Izmir and there is a need for more studies from different regions of the country, and larger studies are needed at the national level.

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