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Caries Risk Determination of 5-8 Year Old Children and Their Mothers in Muğla Province

Muğla İlinde 5-8 Yaş Grubu Çocukların ve Annelerinin Çürük Riski Değerlendirilmesi

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Öz

Bu çalışmada Muğla ilinde yaşayan, Muğla Sıtkı Koçman Üniversitesi Diş Hekimliği Fakültesi'ne müracaat etmiş 5-8 yaş arası 204 çocuk ve annesinin dental muayeneleri sonrasında elde edilen dental verilerin, yaşadıkları yer, annenin eğitim düzeyi ve çalışma durumu dikkate alınarak değerlendirilmesi amaçlandı. Çalışma grubu, çalışmanın amacı ve içeriği açıklandıktan sonra gönüllü katılım isteyen anne ve çocuklardan oluşturuldu. Süt dentisyonun çürük profilini belirlemek için dmft, daimi dentisyonunkinde DMFT kullanıldı. Annenin ve çocuğun ait olduğu ailenin yaşam şartlarının, annenin eğitim düzeyinin ve çalışma durumunun belirlenebilmesi için hazırlanan soruları yanıtlamaları istendi. Ağız içi muayene sonrası oluşturulan indeks ve yanıtlarından oluşan sonuçları IBM SPSS v23.0 (IBM Corp. 2015, Armonk, NY, US) kullanılarak istatistiksel olarak değerlendirildi. Değişkenlerin normalliği Kolmogorov-Smirnov testi ile incelendi. Demografik değişkene göre indeks değerleri arasındaki farklar bağımsız gruplar için Mann-Whitney U-testi ve Kruskal-Wallis testi ile değerlendirildi. İkili karşılaştırmada Dunn testi kullanıldı. Ayrıca Spearman korelasyon analizi de uygulandı. Annelerin eğitim düzeyinin, çocukların dmft ve DMFT indeks değerleri üzerinde anlamlı bir etkiye sahip olduğu görüldü($p<0.05$). Annelerin eğitim düzeyi yükseldikçe çocukların çürük profilinde azalma görüldü. Annelerin DMFT indeks değeri ile çocukların dmft indeks değeri arasında istatistiksel olarak anlamlı pozitif korelasyon olduğu tespit edildi ($p<0.05$, $r=0.017$). Ayrıca çalışan annelerin çocuklarının dmft indeks değerlerinin çalışmayan annelerin çocuklarınkinden anlamlı derecede düşük olduğu istatistiksel olarak belirlendi($p<0.05$). Çalışmada annenin çürükten etkilenme düzeyinin, eğitim düzeyinin ve çalışma durumunun çocukların diş çürüğünden etkilenme düzeyi üzerinde etkili olduğu görülmüştür. Ebeveynlerde özellikle annelerde ağız ve diş sağlığına yönelik bilgi ve tutum geliştirme girişimleri, gelecek neslin ağız sağlığının iyileştirilmesinde önemli bir etkiye sahip olacaktır.

Anahtar Kelimeler: Çürük Riski, Dmft/DMFT, 5-8 Yaş Çocuklar Ve Anneleri

Abstract

It was aimed to evaluate dental data obtained after dental examinations of 204 children aged 5-8 years and their mothers who lived in Muğla and applied to Muğla Sıtkı Koçman University Faculty of Dentistry, taking into account their place of residence, mother's education level and working status. To determine caries profile of primary dentition, dmft was used, and for permanent dentition, DMFT was used. They were asked to answer prepared questions. Results, consisting of formed index after intraoral examination and answers to questions, were statistically evaluated using IBM SPSS v23.0 (IBM Corp. 2015, Armonk, NY, US). Normality of variables is examined by Kolmogorov-Smirnov test. Due to variables do not follow a normal distribution, differences between index values per demographic variable were tested with Mann-Whitney U-test and Kruskal-Wallis test for independent groups. To make pairwise (multiple) comparison, we used Dunn's test. Spearman correlation analysis was also applied. According to results obtained, it was observed that mother's education level had a significant effect on children's dmft and DMFT index values ($p<0.05$). As education level of mothers increased, caries profile of children decreased. A statistically significant positive correlation was found between mother's DMFT index value and child's dmft index value($p<0.05$, $r=0.017$). Additionally, it was statistically determined that dmft index values of children with employed mothers significantly lower than those of children whose mothers unemployed($p<0.05$). The study showed that mother's level of being affected by decay, education level, and employment status were effective on the level of children being affected by tooth decay.

Keywords: Caries Risk, Dmft/DMFT, Children Aged 5-8 Years And Their Mothers

Introduction

Dental caries is one of the most common bio-film mediated, sugar-based, multifactorial chronic childhood diseases affecting both growth and quality of life, and resulting in phasic demineralization of the hard tissue of the tooth (1). Dental caries continues to be a significant public health problem, with negative effects on the nutrition, growth and general health status of children (2). The discomfort associated with dental caries in children, pain, sleep problems, absenteeism from school, learning disorders, and communication and psychosocial problems all affect the quality of life of the child (3). Consumption of sugar in the diet, saliva flow and composition, oral hygiene and fluoride exposure have an impact on dental caries (4). Current evidence indicates that non-biological markers associated with the social structure, economy, environment and healthcare system play an important role in the etiology of dental caries (5). Many social, behavioral and demographic factors, such family income, oral hygiene, parental knowledge of oral hygiene and the level of education of the mother all influence the

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production of dental caries (6). Behaviors of parents, especially the mothers, are deemed to have a considerable impact on the oral health of the children (7). Maternal oral hygiene is thought to be directly linked with the development of dental caries in children; accordingly, improving the oral health of parents is considered to be an effective approach to decrease the risk of dental caries in children (8).

The DMFT (Decay, Missing, and Filled Tooth) index has become a vital tool for the monitoring of trends in the distribution of dental decay, and is applied by WHO (World Health Organization) in oral health evaluations that reflect the intensity or frequency of tooth decay (9). The DMFT index is one of the most frequently and easy-to-use index values aiding the epidemiological research of dental caries (10). The DMFT index of permanent teeth and the dmft index of the primary teeth are important indicators of the oral health of children in society (11).

Demography involves the place of residence as well (12). However, international pediatric dental health studies comparing urban and rural areas have yielded controversial results. In some studies, the dental health of children living in rural areas was found to be better than their counterparts residing in urban areas, although some studies report similar levels and others found out that country-dwellers enjoy better oral health (13-15).

Similar to the Mediterranean diet, the general structure of the nutritional habits in Muğla consists of vegetables, fruits, wild herbs, cereal products, seafood, olives and olive oil (16,17). There is evidence to support the relationship between eating habits and dental caries (18). In the literature, the greater the adherence to the Mediterranean diet, the lower the amount of caries. It has been reported that the less adherence to the Mediterranean diet, the greater the amount of caries (17). In this study, it was aimed to determine the degree of caries exposure of children and their mothers living in Muğla province and therefore fed similarly to the Mediterranean diet, and to compare them with the average of Türkiye and the Aegean region. There is no study investigating the oral health of children and mothers in Muğla. The present study evaluates the dmft/DMFT index values of a group of randomly selected children aged 5–8 years residing in the city of Muğla to determine the associations between the index and the place of residence, the level of education of the mother, the maternal DMFT index value and the maternal employment status.

Material and Method

The study began upon obtaining approval from the Health Sciences Ethics Board of Muğla Sıtkı Koçman University. (2020-5/200004) The study population included subjects randomly selected from among the patients who applied to the Department of Pediatric Dentistry of the Faculty of Dentistry of Muğla Sıtkı Koçman University, and who matched the inclusion criteria of the study. Written informed consent prepared in accordance with the Declaration of Helsinki was obtained from the families of the children who met the inclusion criteria.

While determining the sample size, the statistical tests used in the study were taken into consideration, and the total sample size was determined as n=202, with a Type I error $\alpha=0.05$, a power of the test $1-\beta=0.95$ and a medium effect size d=0.5, using the G*Power program. The desired sample size determined for the study was achieved, and the analysis results are presented for n=204 subjects.

Inclusion criteria

-Participants who agreed to participate in the study with their mothers

-Residing in the city of Muğla

-Aged 5–8 years

-Children rated positive or definitely positive according to the Frankl behavior rating scale.

Exclusion Criteria

-Declined participation in the study

-Not residing in the city of Muğla

-Not aged between 5 and 8 years

-Children rated negative or definitely negative according to the Frankl behavior rating scale

Oral examination

The clinical oral examination and diagnosis of dental caries in the children and their mothers were carried out by the single calibrated dentist using the criteria defined by the World Health Organization (19). The dmft and DMFT index values were used for the determination of the degree of affection of primary dentition from dental caries, and the degree of affection of permanent dentition from dental caries, respectively. The DMFT index was used for the determination of the mothers' affection from dental caries.

Each child was examined on dental chair under light illumination using an oral mirror and a sond for communal periodontal indexing (WHO sond). Prior to the examination, all surfaces of the teeth were dried, and cavitations and lesions in the initial phase in which the cavitation had not yet formed in the pits, fissura or smooth surfaces were classified as decay (d/D). Any tooth with one or more restoration was accepted as having a filling (f/F). Teeth extracted due to caries were accepted as missing (m/M), while primary teeth that had exfoliated spontaneously due to the underlying tooth eruption and teeth that have not yet erupted were ignored. The DMFT index values, education level, employment status and location of residence of the mothers of the children (rural/urban areas) were recorded.

Statistical Analysis

All analyzes were performed with IBM SPSS v23.0 (IBM Corp. 2015, Armonk, NY, US). For descriptive purposes, minimum, maximum, mean, standard deviation, median and interquartile range are provided in the tables. The normality of the variables is examined by Kolmogorov-Smirnov test. Due to variables do not follow a normal distribution, the differences between the index values per demographic variable were tested with the Mann-Whitney U-test and Kruskal-Wallis test for independent groups. To make pairwise (multiple) comparison, we used Dunn's test. The Spearman correlations are obtained, and p-values are presented in the related table. A $p<0.05$ value was taken into account to determine whether there was a statistically significant difference in all tests.

Results

A total of 204 patients, including 110 girls and 94 boys, were included in the study. The mothers of the patients are between the ages of 28-42. The distribution of patients according to demographic data is given in Table 1. Minimum, maximum and mean dmft and DMFT index values of the children and the DMFT index values of their mothers are given in Table 2. The analysis of the dmft index value of the primary teeth and DMFT index of the permanent teeth of children according to their demographic characteristics is given in Table 3. According to the results obtained, there is no statistically significant difference between the genders in terms of dmft index value ($p>0.05$). However, it was determined that the dmft index value of boys was relatively higher than that of girls. There is no statistically significant difference in terms of place of residence ($p>0.05$). The dmft index values of the children of employed mothers were statistically significantly lower than those of the children of unemployed mothers ($p<0.05$). There was no statistically significant relationship between the DMFT index value of the permanent teeth of the children and the gender, place of residence and employment status of the mothers ($p>0.05$) (Table 3).

It was determined that the education level of the mothers had a statistically significant effect on the dmft index of the children's primary teeth and the DMFT index value of the permanent teeth of the children . As the education level increased, the dmft index value and the DMFT index value of the children decreased shown in Table 4 ($p<0.05$).

In Table 5, correlation coefficients are provided. The positive correlation between the child's dmft index and the mother's DMFT index values is statistically significant (p=0.015<0.05) with a coefficient of r=0.170 and this value can be interpreted as a weak level of correlation. On the other hand, there is no significant correlation between the child's DMFT index values and the mother's DMFT index values.

Table 1. Frequencies of demographic variables

	n	%
Gender		
Boy	94	%46.07
Girl	110	%53.93
Location of residence		
Rural	99	%48.52
Urban	105	%51.48
The employment status of the mother		
Employed	106	%51.96
Unemployed	98	%48.04
Education level of the mothers		
Primary	23	%11.27
Middle	30	%14.07
High	59	%28.92
University	92	%45.09
Age		
5 years old	47	%23.03
6 years old	49	%24.01
7 years old	53	%25.98
8 years old	55	%26.96

Table 2. The caries status of children and their mothers

	Min-Max	Mean± Std. Dev.
Child's dmft index value	0-16	4.63±3.01
Child's DMFT index value	0-3	1.56±0.72
Mother's DMFT index value	0-16	5.63±3.71

Discussion

In the present study, the dmft/DMFT index values of a randomly selected group of children aged 5–8 years living in the city of Muğla, as well as the DMFT index values of their mothers, were assessed, along with the association with the education level, employment status and location of residence of the mothers.

The significance of oral health in evaluations of the general health of an individual is well known (20). The most frequently used epidemiologic scale for the determination of oral health is the DMFT index for permanent teeth, and the dmft index for primary teeth (11). Accordingly, dmft and DMFT values pertaining to different age groups and regions are required to be investigated at times to check the trends of change in those indexes and to evaluate the measures taken in the country. Besides, periodic studies are needed to evaluate oral health status, and to provide statistical and supportive documents with the aim of preparing and applying required protective practices and treatment programs (11).

When the oral and dental health profile in Türkiye is examined, it has been reported that the dmft index value of 5-year-old individuals is 3.64, while the dmft value is 2.78 in the Aegean Region (21). The average dmft index value in this study was

4.63. Although individuals living in the province of Muğla are fed similarly to the Mediterranean diet, which is less affected by caries, the degree of exposure to caries is above the average of both Türkiye and the Aegean region. Nutrition alone is not a determinant in the degree of exposure to caries. In addition to following the Mediterranean diet and promoting healthy eating habits, it requires the implementation of more strategies to stop the appearance of dental caries. Elements necessary to improve children's oral health include adequate fluoride content, proper toothbrushing flossing, use of chemical agents such as chlorhexidine, and administration of probiotics that compete with cariogenic bacteria by inhibiting the fermentation of sugar (22).

Table 3. Evaluation of children's dmft and DMFT index value according to demographic characteristics

	n	%	dmft Mean± Std. Dev.	Median (IQR)	Normality test (p-val)	Mann-Whitney U-Statistic*	p
Gender							
Girl	110	53.93%	4.36±2.74	4.00 (5.00)	<0.001	5.308	0.884
Boy	94	46.07%	4.95±3.29	4.00 (5.00)	0.001		
Location of Residence							
Urban	105	51.50%	4.28±2.83	4.00 (4.00)	<0.001	4.550	0.122
Rural	99	48.50%	5.01±3.16	5.00 (5.00)	0.004		
The employment status of the mother							
Employed	106	51.96%	4.01±2.84	3.00 (4.00)	<0.001	6.440	0.003
Unemployed	98	48.04%	5.29±3.06	5.00 (4.00)	0.023		
	n	**%**	**DMFT Mean± Std. Dev.**	**DMFT Median (IQR)**	**Normality test (p-val)**	**Mann-Whitney U-Statistic***	**p**
Gender							
Girl	59	54.62%	1.75±0.71	2.00 (1.00)	<0.001	17.00	0.267
Boy	49	45.38%	1.37±0.74	1.00 (0.75)	<0.001		
Location of Residence							
Urban	55	50.90%	1.25±0.46	1.00 (0.75)	<0.001	18.00	0.161
Rural	53	49.10%	1.87±0.83	2.00 (1.75)	<0.001		
The employment status of the mother							
Employed	59	54.62%	1.60±0.84	1.00 (1.25)	<0.001	30.00	0.999
Unemployed	49	45.38%	1.50±0.54	1.50 (1.00)	<0.001		

*: Scaled test statistic

Table 4. The effect education level of mother's on children's dmft and DMFT index value

	n	%	dmft Median (IQR)	Normality test (p-val)	Statistic	p	Group comparisons	Dunn's Statistic	p
Education level of the mothers									
Primary	23	11.3%	5.00 (5.00)	0.096	15.117	0.002	University< Primary	30.76	0.025
Middle	30	14.7%	5.50 (3.50)	0.194			University< Middle	42.84	0.001
High	59	28.9%	1.00 (0.00)	0.091			University< High	21.63	0.027
University	92	45.1%	1.50 (7.75)	0.000			-	-	-
	n	**%**	**DMFT Median (IQR)**	**Normality test (p-val)**	**Statistic**	**p**	**Group comparisons**	**Dunn's Statistic**	**p**
Education level of the mothers									
Primary	15	13.8%	-	<0.001	8.409	0.038	-	-	-
Middle	15	13.8%	1.00 (0.75)	0.002			Middle< High	-7.583	0.019
High	31	28.7%	3.00 (0.00)	<0.001			University< High	7.583	0.008
University	47	43.5%	1.00 (0.75)	<0.001			-	-	

The 2018 oral and dental health profile report for Türkiye lists a university graduate rate of 9.3% for the female guardians of the 5-year-old participants (21), while university graduates accounted for 45.09% of the participating mothers in the present study conducted in Muğla. Turkish Statistical Institute (TUIK) data for 2020, on the other hand, reports an employment rate of 26.3% for women (23), while 51.96% of the participating mothers in the present study were in gainful employment. Based on these data, it can be said that women in Muğla are above average of Türkiye in terms of both education level and employment status.

Table 5. Correlation between mothers DMFT index value and their children's dmft and DMFT index value.

	Mother DMFT index value	
	r	**p**
Child dmft index value	0.170	0.015
Child DMFT index value	-0.349	0.186

The adoption of good oral hygiene habits in childhood is generally possible if education is started in childhood in the home with the parents, and especially the mother, as the primary role model in the development of child behaviors (24). Previous studies have focused on the effects of the oral health, habits, attitude and knowledge of mothers on the oral health of children, and their association and correlation with each other, since mothers are traditionally accepted as the main caregiver. Mothers thus play an important role in the adoption of oral health practices, and the attitudes and behavior of their children related to oral health (24). Studies conducted to date have shown that the mother continues to play a very important role in the lifestyles of children related to oral health, despite the changing roles and responsibility areas within families (25,26). The level of education of a mother is known to raise awareness in subjects related to health. The children of mothers with a high level of education have been shown to have better dental health in previous studies (27,28). Szatko et al. reported that the attitudes and general knowledge of mothers related to oral health were influential on the oral health behaviors and statuses of their children (29). Similarly, Hallet et al. identified a strong association between the dmft index values of children and the education level of their mothers (30). Similar to the findings of earlier studies, the dmft and DMFT index values of the children of mothers with a higher level of education in the present study were found to be lower than those with a low level of education. This was attributed to the increased awareness of oral hygiene, dental health and preventive dentistry associated with an increased level of education.

A positive and significant correlation was found between the DMFT index values of the mothers and the dmft index values of the children in the present study, although no statistically significant correlation could be identified between the DMFT index values of the mothers and DMFT index values of the children. The results of the present study are similar to those of the study by Oter et al., who reported a positive correlation between the dmft index values of children with the DMFT index values of mothers (31). We consider this to be associated with the presence of the primary teeth in the oral medium for a long time in the age group evaluated in the present study, and that the permanent teeth continued to erupt.

The employment status of the mother is an indicator of the socioeconomic status of the individual. High rates of dental caries continue to be prevalent in socioeconomically disadvantaged children, in spite of the development of oral health in children (32,33). The present study found that the dmft index values of the children of employed mothers were statistically significantly lower than those of the children of unemployed mothers. This finding concurred with the results of the study by Marcia et al., in which a higher dmft index value was determined in the children of unemployed mothers (34). Ghandehari Matlagh et al. also reported a higher dmft index value among the children of mothers who were housewives than those of the children of employed mothers (35). It can be attributed to the fact that employed mothers have a higher level of education than those who are unemployed, they are more efficient in terms of the utilization of social oral and dental health education, and are more likely to seek better dental conditions for both themselves and their children. Furthermore, employed mothers may enjoy a greater economic purchasing power, and so have easier access to hygiene products for the benefit of both themselves and their children. The fact that the employment status of the mothers was questioned but not their ages or occupation can be considered a limitation of the study. The age and occupational status of mothers are significant factors affecting the oral hygiene of their children, the provision of nutrition, and access to oral care products and dental health services.

Location of residence affects greatly the nutritional habits of children and their access to dental hygiene products, affecting also the presence of oral healthcare facilities and the level of access to such facilities, all of which have an accumulative effect on the oral health of children. The prevalence of dental caries varies based on sociodemographic and geographic qualities (13). Studies investigating the dental health of children in rural and urban areas have produced inconsistent results. Assessing Türkiye's oral and dental health profile, the study by Gökalp et al. reported a high prevalence of dental caries in 5-year-old and 12-year-old children in rural areas, while the prevalence was similar for 15-year-olds in rural and urban areas (36). A study by

Masereijan et al. reported a higher frequency of dental caries in urban areas than in rural areas (14). Similarly, the study by Levin et al. involving a Scottish sample reported better oral health among children living in rural areas (37). In this study, although statistically insignificant, the dmft and DMFT index values of children living in rural areas were found to be higher than children living in urban areas. The findings of the present study concur with those of the study by Vargas et al. carried out in Maryland, who reported that children in rural areas experienced more caries than their counterparts in the urban setting (38). Furthermore, Matilla et al. and Paunio et al. reported in their studies that the children living in rural areas had a higher level of dental caries, which is similar to the results of the present study (39,40).

Efforts to encourage good oral health behaviors in children may affect the general welfare of future generations, considering the important role of oral health in general health. The level of affection of the mother from dental caries, their education level and employment status, and their location of residence have all been found to affect the degree of affection in the children from dental caries. Accordingly, dentistry awareness-raising programs that focus especially on oral and dental health in mothers is required, as it is believed that this will lead to the raising of a generation with healthier teeth in the future, contributing to the provision of protective, simple and low cost treatment methods rather than difficult, long-lasting, challenging and expensive dental treatment processes. The results of the present study reveal more areas for research, and the need for more extensive studies in the city of Muğla to ascertain the level of oral health of children, and the factors that are influential in this regard. In the present study, no data were collected on the oral hygiene practices, diet, individual socioeconomic conditions, access to dental services, or attitudes towards oral health of the surveyed children. More extensive multi-regional studies are recommended for the evaluation of dental data alongside the demographic, attitudinal and behavioral survey data of children.

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References

1. Pitts NB, Zero DT, Marsh PD, et al. Dental caries. Nat Rev Dis Primers. 2017;3(1):1-16.
2. Heinrich-Weltzien R, Monse B, Benzian H, et al. Association of dental caries and weight status in 6-to 7-year-old Filipino children. Clin Oral Invest. 2013;17(6):1515-23.
3. Leal S, Bronkhorst E, Fan M, et al. Untreated cavitated dentine lesions: impact on children's quality of life. Caries Res. 2012;46(2):102-6.
4. Robert SH, Amid I, Nigel PB. Dental caries. Lancet. 2007;369(9555):51-9.
5. Congiu G, Campus G, Lugliè PF. Early childhood caries (ECC) prevalence and background factors: a review. Oral Health Prev Dent. 2014;12(1):71-6.
6. Begzati A, Bytyci A, Meqa K, et al. Mothers' behaviours and knowledge related to caries experience of their children. Oral Health Prev Dent. 2014;12(2):133-40.
7. Case A, Paxson C. Parental behavior and child health. Health Aff. 2002;21(2):164-78.
8. Bozorgmehr E, Hajizamani A, Malek Mohammadi T. Oral health behavior of parents as a predictor of oral health status of their children. Int Sch Res Notices. 2013;2013:741783.
9. Klein H, Palmer CE. Studies on dental caries: V. Familial resemblance in the caries experience of siblings. Public Health Rep (1896-1970). 1938;53(31):1353-64.
10. Anaise JZ. Measurement of dental caries experience-modification of the DMFT index. Community Dent Oral Epidemiol. 1984;12(1):43-6.
11. Kamiab N, Kamalabadi YM, Fathollahi MS. DMFT of the first permanent molars, dmft and related factors among all first-grade primary school students in Rafsanjan Urban Area. J Dent. 2021;22(2):109.
12. Kramer A-CA, Hakeberg M, Petzold M, et al. Demographic factors and dental health of Swedish children and adolescents. Acta Odontol Scand. 2016;74(3):178-85.
13. Antunes JLF, Peres MA, Mello TRdC, et al. Multilevel assessment of determinants of dental caries experience in Brazil. Community Dent Oral Epidemiol. 2006;34(2):146-52.
14. Maserejian NN, Tavares MA, Hayes C, et al. Rural and urban disparities in caries prevalence in children with unmet dental needs: the New England Children's Amalgam Trial. J Public Health Dent. 2008;68(1):7-13.
15. Vargas CM, Ronzio CR, Hayes KL. Oral health status of children and adolescents by rural residence, United States. J Rural Health. 2003;19(3):260-8.
16. Yiğit Y, Yiğit EA. Muğla local food. TURAN-CSR Intern Sci. 2019;11(44):517-23.
17. Marqués-Martínez L, Pérez-Bermejo M, Lairón-Peris AR, et al. Association between the severity of dental caries and the degree of adherence to the mediterranean diet in the pediatric population. Nutrients. 2022;14(17):3622.
18. Kabil NS, Eltawil S. Prioritizing the risk factors of severe early childhood caries. Dent J. 2017;5(1):4.
19. Organization WH. Oral health surveys: basic methods: World Health Organization. 2013.
20. Abiola Adeniyi A, Eyitope Ogunbodede O, Sonny Jeboda O, et al. Do maternal factors influence the dental health status of Nigerian pre-school children? Int J Paediatr Dent. 2009;19(6):448-54.
21. Türkiye Ağız ve Diş Sağlığı Profili. Sağlik Hizmetleri Genel Müdürlüğü Ağiz ve Diş Sağliği Dairesi Başkanliği. Erişim tarihi 04.02.2022, https://shgmadsdb.saglik.gov.tr/TR-87363/turkiye-agiz-ve-dis-sagligi-profili-raporu-yayimlandi.html.
22. Lin T-H, Lin C-H, Pan T-M. The implication of probiotics in the prevention of dental caries. Appl Microbiol Biotechnol. 2018;102:577-86.
23. İşgücü İstatistikleri, 2019 2020. TUIK. https://tuikweb.tuik.gov.tr/HbPrint.do?id=33784.
24. Okada M, Kawamura M, Kaihara Y, et al. Influence of parents' oral health behaviour on oral health status of their school children: an exploratory study employing a causal modelling technique. Int J Paediatr Dent. 2002;12(2):101-8.
25. Okada M, Kawamura M, Miura K. Influence of oral health attitude of mothers on the gingival health of their school age children. ASDC J Dent Child. 2001;68(5-6):379-83.
26. Poutanen R, Lahti S, Seppä L, et al. 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.
27. Mattila ML, Paunio P, Rautava P, et al. Changes in dental health and dental health habits from 3 to 5 years of age. J Public Health Dent. 1998;58(4):270-4.
28. Mascarenhas AK. Oral hygiene as a risk indicator of enamel and dentin caries. Community Dent Oral Epidemioly. 1998;26(5):331-9.

29. Szatko F, Wierzbicka M, Dybizbanska E, et al. Oral health of Polish three-year-olds and mothers' oral health-related knowledge. Community Dent Health. 2004;21(2):175-80.
30. Hallett K, O'Rourke P. Dental caries experience of preschool children from the north Brisbane region. Aust Dent J. 2002;47(4):331-8.
31. Banu Ö, Tuğba K, Tirali E, et al. The association between mode of delivery and maternal factors and dental caries in children. ADO J Clin Sci. 2021;10(2):92-8.
32. Shackleton N, Broadbent JM, Thornley S, et al. Inequalities in dental caries experience among 4-year-old New Zealand children. Community Dent Oral Epidemiol. 2018;46(3):288-96.
33. El Tantawi M, Folayan MO, Mehaina M, et al. Prevalence and data availability of early childhood caries in 193 United Nations Countries, 2007–2017. Am J Public Health. 2018;108(8):1066-72.
34. de Melo MMDC, de Souza WV, de Goes PSA. Increase in dental caries and change in the socioeconomic profile of families in a child cohort of the primary health care in Northeast Brazil. BMC oral health. 2019;19(1):1-10.
35. Ghandeharı MM, Zeraati H, Jamshıdı SA. An epidemiologic survey on dmft amony 4-5 year old children of kindergartens under the supervision of behzisti organization in tehran (2003). J Islam Dent Assoc. 2004;16:15-21.
36. Gökalp S, Doğan GB, Tekçiçek M, et al. Beş, on iki ve on beş yaş çocukların ağız diş sağlığı profili, Türkiye-2004. Hacettepe Dişhekimliği Fakültesi Derg. 2007;31(4):3-10.
37. Levin KA, Davies CA, Douglas GV, et al. Urban-rural differences in dental caries of 5-year old children in Scotland. Soc Sci Med. 2010;71(11):2020-7.
38. Vargas CM, Monajemy N, Khurana P, et al. Oral health status of preschool children attending Head Start in Maryland, 2000. Pediatr Dent. 2002;24(3):257-63.
39. Mattila M-L, Rautava P, Sillanpää M, et al. Caries in five-year-old children and associations with family-related factors. J Dent Res. 2000;79(3):875-81.
40. Paunio P, Rautava P, Sillanpää M, et al. Dental health habits of 3-year-old Finnish children. Community Dent Oral Epidemiol. 1993;21(1):4-7.