NEU PRESS

Diş Hekimliği Dergisi

Vol: 1 No: 1 Year: 2024 | Research Article | e-ISSN: 2687-5535

https://doi.org/10.51122/neudentj.2024.87

An Evaluation of Oral Hygiene Habits of Children in the Post-Earthquake Period in Malatya Province

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Article Info

Article History

Received: 15.08.2023
Accepted: 15.01.2024
Published: 30.04.2024

Keywords:
Children,
Earthquake,
Brushing Teeth,
Oral Hygiene Habits.

ABSTRACT

Aim: This cross-sectional study aimed to evaluate the oral hygiene habits of children in the post-earthquake period in Malatya.

Material and Methods: Three hundred parents presented to Inonu University Department of Pediatric Dentistry for examination/treatment participated in this study. The survey consists of a total of 18 questions. Descriptive statistical methods were used when evaluating the study data. The Chi-square test was used to compare qualitative data. Significance was evaluated at $p<0.05$ level.

Results: 43.3% of the children participating in the study were brushing teeth once a day before the earthquake, 40.3% were brushing teeth rarely, 15% were brushing twice or more a day, and 1.3% were not brushing at all. After the earthquake, the rate of brushing teeth once a day was 31.3%, the rate of brushing teeth twice a day or more was 13%, the rate of rarely brushing teeth was 50%, and the rate of not brushing at all was 5.7%. The decrease in tooth brushing habits of children whose housing changed after the earthquake (30.8%) was statistically significantly higher than that of children whose housing did not change (20%) ($p:0.027$; $p< 0.05$).

Conclusion: As a result of this study, it was observed that children's oral hygiene habits unfortunately decreased or disappeared as their housing conditions changed. Appropriate living conditions should be provided for children as soon as possible after natural disasters, and oral hygiene habits should be restarted.

Malatya İlinde Deprem Sonrası Süreçte Çocukların Oral Hijyen Alışkanlıklarının Değerlendirilmesi

Makale Bilgisi

Makale Geçmişi

Geliş Tarihi: 15.08.2023
Kabul Tarihi: 15.01.2024
Yayın Tarihi: 30.04.2024

Anahtar Kelimeler:
Çocuklar,
Deprem,
Diş Fırçalama,
Oral Hijyen Alışkanlıkları.

ÖZET

Amaç: Bu kesitsel çalışma, Malatya ilinde deprem sonrası süreçte çocukların oral hijyen alışkanlıklarını değerlendirmeyi amaçlamıştır.

Gereç ve Yöntemler: Bu çalışmaya İnönü Üniversitesi Çocuk Diş Hekimliği Anabilim Dalı'na muayene/ tedavi için başvuran 300 ebeveyn katılmıştır. Anket formları ebeveynlere elden verilmiştir. Anket toplam 18 sorudan oluşmaktadır. Çalışma verileri değerlendirilirken tanımlayıcı istatistiksel metodlar kullanılmıştır. Niteliksel verilerin karşılaştırılmasında ise Ki-Kare testi kullanılmıştır. Anlamlılık $p<0,05$ düzeyinde değerlendirilmiştir.

Bulgular: Çalışmaya katılan çocukların deprem öncesi %43,3'ü günde 1 kez, %40,3'ü nadiren, %15'i günde 2 ve üzeri kez dişlerini fırçalıyorken, %1,3'ü hiç fırçalamıyordu. Deprem sonrası günde 1 kez diş fırçalama oranı %31,3, günde 2 ve üzeri kez fırçalama oranı %13, nadiren fırçalama %50 ve hiç fırçalamama oranı %5,7'di. Deprem sonrası yaşam alanı değişen çocukların deprem sonrası diş fırçalama alışkanlığında azalma görülme oranı (%30,8), yaşam alanı değişmeyen çocuklardan (%20) istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. ($p:0,027$; $p<0,05$).

Sonuç: Bu çalışmanın sonucunda çocukların yaşam alanları ve koşulları değiştiği için oral hijyen alışkanlıklarının da maalesef azaldığı yada kaybolduğu görülmüştür. Doğal afetlerden sonra en yakın sürede çocuklar için uygun yaşam koşulları sağlanarak oral hijyen alışkanlıkları oluşturmaya tekrar başlanmalıdır.

To cite this article:
Gümüşboğa ZŞ. An Evaluation of Oral Hygiene Habits of Children in the Post-Earthquake Period in Malatya Province. NEU DENT J. 2024;6:39-47. https://doi.org/10.51122/neudentj.2024.87

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INTRODUCTION

An earthquake is a natural phenomenon causing loss of life and property and cannot be predicted in terms of the area it will affect and the magnitude of its impact.[1] Earthquakes are among the most common natural disasters.[2] The extent of the impact of earthquakes is more than we can imagine. Especially earthquakes experienced during childhood cause physical and psychological changes in children in various ways. Respiratory system problems, skeletal and muscular problems, digestive system disorders, and sleep-related problems have been observed in children affected by the earthquake.[3] In addition, difficulties in accessing sufficient food and clean water, inadequate hygiene conditions, increase in infectious diseases, difficult access to health services, shortage of temporary housing, and overcrowded shelters are among the problems experienced by both adults and children after the earthquake.[4]

On February 6, 2023, two major earthquakes occurred nine hours apart in Türkiye. As a result of these earthquakes, a significant amount of damage and destruction occurred in 11 provinces including Hatay, Gaziantep, Elazığ, Osmaniye, Şanlıurfa, Diyarbakır, Kilis, Kahramanmaraş, Adıyaman, Malatya, and Adana. Due to the severity of the earthquake, these provinces suffered from shelter shortages, inadequate hygiene conditions, difficulties in obtaining food and clean water, and overcrowded shelters for a certain period of time.

Today, all cleaning practices to protect health are called hygiene. The most important hygiene practices are personal hygiene practices.[5] One of the personal hygiene practices is oral hygiene habits.[6] Tooth brushing is one of the oral hygiene habits that significantly reduce the possibility of caries formation. It has been reported that individuals who acquire the habit of brushing teeth twice a day at an early age have fewer dental caries.[7] The adoption of these oral hygiene habits acquired in childhood starts with parents at home and continues for a lifetime.[8] In the literature, it has been observed that earthquakes have a negative effect on oral/dental health due to disruption of oral hygiene habits.[9-12]

Natural disasters cause many changes in the lives of individuals, especially children. Children may have difficulty in maintaining many habits they acquired before the earthquake (reading, tooth brushing, eating habits, change in sleeping hours, etc.), especially hygiene habits, after the earthquake or they may lose these existing habits.[13] Our study aimed to obtain information about the conditions under which children in Malatya province maintain their oral hygiene habits in the post-earthquake period and to evaluate the change in children's oral hygiene habits after the earthquake.

MATERIALS AND METHODS

Ethics committee approval for this study was obtained from Inonu University Non-Interventional Clinical Research Ethics Committee (Ethics number: 2023/4633).

Parents and their children presented to Inonu University Department of Pediatric Dentistry for examination/treatment between 09.05.2023 and 09.07.2023 and declared that they had experienced the earthquake were included in the study. A total of 300 parents participated in the study. With 95% confidence (1-α), 95% test power (1-β), and an effect size of g=-0.093, the minimum sample size was calculated as 153 people. Signed consent forms were obtained from the patients' parents before the study.

Earthquake-affected children and their parents who agreed to fill out the questionnaire and could read and write were included in the study. Earthquake-affected children and their illiterate parents who refused to fill in the questionnaire form, and children who were not affected by the earthquake and their parents were not included in this study.

The questionnaire form, which consisted of 18 questions in total, consisted of two parts. The first part of the questionnaire included 11

questions about the sociodemographic characteristics of the parent and child (gender, age, education level, income level, place of residence (before and after the earthquake), place of living (before and after the earthquake), number of people in the place of residence). The second part of the questionnaire included 7 questions about children's oral hygiene habits (whether they had toothbrush and toothpaste (before and after the earthquake), brushing habits (before and after the earthquake), reason for not brushing in the post-earthquake period). The questions in the questionnaire were prepared to evaluate the oral hygiene habits of children in the post-earthquake period.

The questionnaires were handed to the parents and they filled them in. Considering that the questions in the questionnaire form may remind children of the earthquake, the questionnaires were given to the parents in an environment where their children were not present.

Statistical Analysis

While evaluating the findings obtained in the study, IBM SPSS Statistics 22 program was used for statistical analysis. In addition to descriptive statistical methods (mean, standard deviation, frequency), the Kruskal Wallis test was used for comparisons of quantitative data between groups. The Chi-Square test was used for the comparison of qualitative data. Significance was evaluated at $p<0.05$ level.

RESULTS

The study was conducted in a total of 300 children aged between 2 and 14 years and their parents. The mean age of the children was 8.65±1.57 years.

Of the children, 50.7% were female and 49.3% were male. The majority of the parents were mothers (67.7%) and fathers (25.7%). The income and education levels of the parents are shown in detail in the table below (Table 1).

Table 1. Demographic information

		n	%
Sex	Female	152	50.7
	Male	148	49.3
Parent	Mother	203	67.7
	Father	77	25.7
	Other	20	6.6
Income Level	<8.500 TL	187	62.3
	8.500-17.000 TL	93	31.0
	>17.000 TL	20	6.7
Education Level	Primary School	103	34.3
	Middle School	74	24.7
	High School	76	25.3
	University	42	14
	Postgraduate	5	1.7
Number of people in the place of residence Min-Max. Mean±SD (median)		1-31	5.7±2.8 (5)

The number of people in the residence varied between 1 and 31, with a mean of 5.7±2.8 and a median of 5 (Table 1).

Pre- and post-earthquake housing places of the parents are presented in Table 2. Forty percent of the parents had to change their accommodation after the earthquake. (Table 2)

Information on children's toothbrush and toothpaste ownership and tooth brushing habits before and after the earthquake is shown in Table 3. After the earthquake, tooth brushing habits of 24.3% of the children decreased after the earthquake (Table 3).

Table 2. Information on housing

		n	%
Pre-earthquake housing	Flat	178	59.3
	Detached house/Garden house	122	40.7
Post-earthquake housing	Flat	117	39
	Detached house/Garden house	104	34.7
	Container	30	10
	Tent	33	11
	No permanent place of accommodation	16	5.3
Change of accommodation after the earthquake	Housing changed	120	40
	Housing not changed	180	60
Pre-earthquake residence	City	188	62.7
	Town	64	21.3
	Village	46	15.3
	Another city	2	0.7
Post-earthquake residence	City	155	51.7
	Town	66	22
	Village	77	25.7
	Another city	2	0.7

Table 3. Information on tooth brushing habits

		n	%
Whether the child had their own toothbrush and toothpaste before the earthquake	Yes	290	96.7
	No	10	3.3
Whether the child had their own toothbrush and toothpaste after the earthquake	Yes	274	91.3
	No	26	8.7
Receiving toothbrushes and toothpaste for children from anywhere after the earthquake	Yes	123	41
	No	167	55.7
	Does not think it is necessary	10	3.3
Obtaining a toothbrush and toothpaste for their child with their own means after the earthquake	Yes	240	80
	No	55	18.3
	Does not think it is necessary	5	1.7
Child's tooth brushing habits before the earthquake	Once a day	130	43.3
	Twice a day or more	45	15
	Seldom	121	40.3
	None	4	1.3
Child's tooth brushing habits after the earthquake	Once a day	94	31.3
	Twice a day or more	39	13
	Seldom	150	50
	None	17	5.7
Change in tooth brushing habits after the earthquake	Decreasing	73	24.3
	Already low	181	60.3
	Other	46	15.3
Reason for Change (n=254)	Lack of Access to clean water	55	21.7
	No toothbrush and paste	13	5.1
	The environment is not suitable	29	11.4
	No dental complaints	23	9.1
	Not required	5	2.0
	Couldn't make it a habit	44	17.3
	Other	85	33.5

There was no statistically significant difference between the change in the child's tooth brushing habits after the earthquake according to the type of residence ($p>0.05$). Tooth brushing habits of 21.4% of children living in flats, 19.2% of children living in detached houses, 26.7% of children living in containers, 42.4% of children living in tents, and 37.5% of children living without a permanent shelter decreased after the earthquake (Table 4).

Table 4. The relationship between post-earthquake living space and change in tooth brushing habits for children after the earthquake

		Place of residence after the earthquake					
		Flat	**Detached house/ Garden house**	**Container**	**Tent**	**No permanent accommodation**	
		n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**p**
Change in tooth brushing habits after the earthquake	Declining	25 (%21.4)	20 (%19.2)	8 (%26.7)	14 (%42.4)	6 (%37.5)	
	Already low	70 (%59.8)	67 (%64.4)	17 (%56.7)	17 (%51.5)	10 (%62.5)	0.102
	Other	22 (%18.8)	17 (%16.3)	5 (%16.7)	2 (%6.1)	0 (%0)	

*Chi-square test *p<0.05*

The rate of decrease in tooth brushing habits of children whose living space changed after the earthquake (30.8%) was statistically significantly higher than that of children whose living space did not change (20%) (p:0.027; p<0.05). (Table 5)

Table 5. The relationship between the change in living space after the earthquake and the change in tooth brushing habits for children after the earthquake

		Living space after the earthquake		
		Change in housing	**No change in housing**	
		n (%)	**n (%)**	**p**
Change in tooth brushing habits after the earthquake	Declining	37 (%30.8)	36 (%20.0)	
	Already low	71 (%59.2)	110 (%61.1)	0.027*
	Other	12 (%10.0)	34 (%18.9)	

*Chi-square Test *p<0.05*

The rates of lack of access to clean water (42.5%) and unsuitable environment (21.9%) were significantly higher in children with decreased tooth brushing habits after the earthquake (p:0.001; p<0.05) compared to children with normal tooth brushing habits (Table 6).

There is a statistically significant difference between the type of residence and the reason for not brushing teeth after the earthquake (p:0.001; p<0.05). The rate of change in tooth brushing habits of those living in tents due to lack of access to clean water (32.3%) is significantly higher than those living in detached houses (14.9%). The rate of change in tooth brushing habits due to inappropriate environment among those living without a permanent shelter (31.3%) was significantly higher than those living in flats (3.2%) and detached houses (10.3%) (Table 7).

Table 6. Evaluation of the reasons according to the change in tooth brushing habits after the earthquake

	Tooth brushing habits after the earthquake		
	Declining	**Already low**	
Reason	**n (%)**	**n (%)**	**p**
Lack of access to clean water	31 (%42.5)	24 (%13.3)	
No toothbrush and paste	7 (%9.6)	6 (%3.3)	
The environment is not suitable	16 (%21.9)	13 (%7.2)	
No dental complaints	8 (%11)	15 (%8.3)	0.001*
Not required	2 (%2.7)	3 (%1.7)	
Couldn't make it a habit	6 (%8.2)	38 (%21)	
Other	3 (%4.1)	82 (%45.3)	

*Chi-square test *p<0.05*

Table 7. Evaluation of the causes by living area after the earthquake

REASON	Flat	Detached house/ Garden house	Container	Tent	No permanent housing	
	n (%)	n (%)	n (%)	n (%)	n (%)	p
Lack of access to clean water	23 (%24.2)	13 (%14.9)	5 (%20)	10 (%32.3)	4 (%25)	
No toothbrush and paste	3 (%3.2)	4 (%4.6)	2 (%8)	3 (%9.7)	1 (%6.3)	
The environment is not suitable	3 (%3.2)	9 (%10.3)	6 (%24)	6 (%19.4)	5 (%31.3)	0.001*
No dental complaints	6 (%6.3)	13 (%14.9)	2 (%8)	1 (%3.2)	1 (%6.3)	
Not required	0 (%0)	0 (%0)	1 (%4)	2 (%6.5)	2 (%12.5)	
Couldn't make it a habit	21 (%22.1)	20 (%23)	1 (%4)	2 (%6.5)	0 (%0)	
Other	39 (%41.1)	28 (%32.2)	8 (%32)	7 (%22.6)	3 (%18.8)	

Chi-square test *$p<0.05$

DISCUSSION

Our oral and dental health constitutes an important part of our general health. The importance given by parents to oral hygiene and their attitudes towards oral hygiene play a major role in children having better oral and dental health and acquiring oral hygiene habits. By creating an environment suitable for a healthy life for their children, parents increase the child's self-confidence and help to form oral hygiene habits.[14] The occurrence of unpredictable natural disasters (earthquakes, floods, hurricanes, fires, etc.) may cause people to change their living spaces, and parents may not be able to provide the appropriate environment for their children.[15]

Forty percent of the buildings in the 11 provinces affected by the Kahramanmaraş earthquakes of magnitude 7.8 and 7.5 Mw on February 6 were damaged or destroyed to varying degrees. Due to these damages and destructions, many people had to leave the province for a certain period of time for shelter and had to continue their lives in tents, containers, or dormitories.[15]

In studies examining the impact of natural disasters on oral and dental health, especially the shelter status of individuals after the earthquake has been questioned.[16] In this study, the shelter of the parents participating in the questionnaire was questioned and it was observed that 10% of the parents stayed in containers, 11% in tents, and 5.3% did not have a permanent shelter. It was calculated that the average number of people residing in the same residence was 5.7±2.8 people.

People living in tents, containers, dormitories, and public facilities may suffer from poor oral and dental health due to the change of living environment. Worsening economic conditions as a result of natural disasters, water shortages, lack of clean water, interrupted access to preventive and emergency dental care, increased consumption of high-carbohydrate and processed packaged foods that can lead to caries development in children and adults, periodontitis due to infection, and poor oral hygiene can lead to dental caries, toothache, and even tooth loss. As a result, natural disasters can directly or indirectly affect people's oral and dental health-related quality of life (OHRQoL) by severely damaging their social relationships.[9]

The basic principle of prevention of dental caries and gingival diseases, which are common in children, is regular tooth brushing habits.[17] Tseveenjav et al. reported that adequate tooth brushing habits significantly reduce the formation of new caries and that a daily brushing frequency of less than twice a day is risky for the protection of oral health.[18] In a study examining the oral and dental health of children aged 7-14 years in Malatya province, it was found that children did not comply with the recommended brushing frequency, the rate of those who brushed their teeth twice a day or more was as low as 31%, and the rate of children who reported brushing their teeth once a day was 24.2%. The rate of children who reported never brushing their teeth was 7.9%.[19] In another study conducted in Malatya province, it was found that the frequency of tooth brushing of children was

12.8% who brushed their teeth twice a day or more, 36.8% who brushed their teeth once a day, 40.8% who rarely brushed their teeth, and 9.6% who never brushed their teeth.[20] In this study, it was determined that only 15% of the children brushed their teeth twice a day or more before the earthquake, and the remaining children brushed their teeth once a day (43.3%), rarely (40.3%), or never (1.3%). The results of this study and previous studies conducted in Malatya show that the tooth brushing habits of children in Malatya are inadequate and that parents do not give enough importance to oral and dental health.

Although there is limited evidence in studies examining the impact of natural disasters on oral and dental health, it has been suggested that earthquakes, one of the natural disasters, have a negative impact on oral and dental health.[9-12] In a study conducted 4 months after the 7.8 magnitude earthquake in Nepal in 2015, it was reported that people's tooth decay and gum condition was poor and worsened to varying degrees and that 4% of people never brushed their teeth after the earthquake and 28.4% rarely brushed their teeth.[12] In this study, it was found that 5.7% of the children never brushed their teeth after the earthquake and 50% rarely brushed their teeth. At the same time, 24.3% of the children had a decrease in brushing habits after the earthquake. There is no study in the literature comparing tooth brushing habits of individuals and/or children before and after natural disasters. The rate of decrease in tooth brushing habits of children whose housing state changed after the earthquake was found to be statistically significantly higher than children whose housing state did not change ($p<0.05$). This result showed that oral hygiene habits of children whose housing state changed decreased.

After the October 23, 2011 Van earthquake, Kalanlar (2016) published a study titled "Lessons Learned from the Van Earthquake in the Context of Urban Environment and Health" and stated that the health and hygiene conditions of the Van earthquake disaster victims were not supported very well and this issue was neglected. It was observed that women, the elderly, and children were the groups that suffered the most in this regard. It was stated that disaster managers were insufficient in meeting the needs of women and children.[21] One study reported that after the earthquakes in Haiti in 2010 and Japan in 2011, oral care products such as toothbrushes, toothpaste, denture cleaners, etc. were provided to disaster victims and oral health outcomes were reported in the immediate aftermath.[10] In this study, 41% of the parents reported that toothpaste and toothbrushes were provided for themselves or for their children after the earthquake.

Clean water is one of the most important issues to be addressed immediately after earthquakes. The water source should be thoroughly inspected and treated before supplying water to the network in affected housings. It is especially important to make sure that the water supply is not contaminated with chemical waste. After an earthquake, it is useful to chlorinate the water in the system.[22]

After the 2011 Great East Japan Earthquake, Hosokawa et al. reported that elderly people were reluctant to wash their dentures due to insufficient water supply, but the authors did not report any quantitative data on this issue.[10] In this study, 21.7% of the parents stated that the reason for their children not brushing or hesitating to brush their teeth was lack of access to clean water. It was observed that especially those living in tents had more difficult access to clean water. Twenty-nine (11.4%) parents stated that the place of shelter was not suitable for their children to brush their teeth, and 44 (17.3%) parents stated that their children did not have regular tooth brushing habits before the earthquake.

Due to the unpredictability of the timing and magnitude of earthquakes and limited data on their aftermath, it is difficult to study and analyze their direct impact on oral and dental health. Despite the limited evidence, this study suggests that earthquakes tend to negatively affect oral and dental health.

When the literature on the subject was examined, no study examining oral hygiene habits after the earthquake was found in Türkiye. When the studies conducted outside Türkiye were examined, it was seen that there exist few studies on this subject.[9-12]

In conclusion, in this study, it was determined that the living spaces and oral hygiene habits of most of the children living in Malatya changed after the earthquake.

CONCLUSION

To maintain and improve oral and dental health status after natural disasters, it is important to reintroduce dental clinic visits and for dentists to encourage their patients to re-establish oral hygiene habits after natural disasters. For the health of individuals, access to clean water should be ensured as soon as possible. At the same time, children and adults should be helped to establish oral hygiene habits by creating a healthy living environment. Care should be taken to include materials for oral hygiene (toothbrush, toothpaste, dental floss, denture cleaner, mouthwash, etc.) in aid packages.

There is a need for more research with robust evidence that contributes to the protection and improvement of oral and dental health after disasters in Türkiye as well as the rest of the world.

Acknowledgment

We would like to thank all participants for their contribution to this research.

Ethical Approval

Ethics committee approval for this study was obtained from Inonu University Non-Interventional Clinical Research Ethics Committee (Ethics number: 2023/4633).

Financial Support

No financial support was received from any institution or organization for this study.

Conflict of Interest

There is no conflict of interest in this study.

Author Contributions

Design: ZŞG Data collection and data entry: ZŞG Analysis and interpretation: ZŞG Literature review: ZŞG, Writing: ZŞG

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