

Oral health status and oral hygiene behaviour of orphan children: A survey in support centers in Kerman City, Iran, in 2019

Saeedeh Abedassar DDS, PhD¹, Tayebeh Malek-Mohammadi DMD, PhD²,
Tania Dehesh PhD³, Sajad Dahesh⁴

Original Article

Abstract

BACKGROUND AND AIM: Oral health is an integral part of general health. There are many epidemiological studies on oral health of school-aged children; however, orphan oral health has been neglected. This study aimed to evaluate oral health status and oral hygiene behaviour of orphans who are living in care home.

METHODS: All children aged between 6-18 years who were living in 20 orphan care homes participated in the study after acquiring legal permission and signing consent form. Data of dental caries, gingival health, and oral hygiene factors were recorded by a trained dentist using World Health Organization (WHO) oral health basic survey methods. Descriptive analysis was performed to reach the study aim and objectives.

RESULTS: Totally, 356 children participated, with 50.6% of male group. The study subjects were classified in two age groups of 6-12 and 13-18 years old. Mean decayed, missing, and filled teeth (DMFT)/dmft was 1.73 ± 1.84 and 4.13 ± 3.80 in 6-12-year-old group, respectively. Only 39.5% of 13-18-year-old group had healthy gingiva. Mean of plaque index (PLI) was 0.98 ± 0.86 for whole study population. There was a significant relationship between gender and PLI and also tooth brushing behaviour.

CONCLUSION: Oral health of orphan children is not adequate. Therefore, regular dental check-up and oral health education programs are necessary.

KEYWORDS: Oral Health; Orphaned; Home Care Services; Iran

Citation: Abedassar S, Malek-Mohammadi T, Tania Dehesh T, Dahesh S. **Oral health status and oral hygiene behaviour of orphan children: A survey in support centers in Kerman City, Iran, in 2019.** *J Oral Health Oral Epidemiol* 2022; 11(1): 32-9.



Oral health is more than having healthy teeth and is an inseparable part of general health.¹ Despite all the progress made in the field of oral health in children, dental caries still seems to be highly prevalent in childhood and according to statistics provided by the World Health Organization (WHO), it is the second most common infection after the common cold in children.² The consequences of dental caries are not limited to the oral cavity. Tooth caries

can cause pain and compromise the diet, which affects the development and growth of the child and due to the impaired aesthetics and speech caused by this, it can have serious impacts on the quality of life (QOL).^{3,4}

Considering these factors, one of the vulnerable social groups, which are in need for attention, are children living in orphanage. Based on definition, orphans are children under the age of 18 years old who have lost their mother or father or both. The

1- Assistant Professor, Department of Dental Public Health, School of Dentistry AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

2- Associate Professor, Department of Dental Public Health, School of Dentistry AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

3- Assistant Professor, Department of Biostatistics and Epidemiology, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran

4- MSc Student, Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran
Address for correspondence: Tayebeh Malek-Mohammadi DMD, PhD; Associate Professor, Department of Dental Public Health, School of Dentistry AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran; Email: tmalekmohammadi@yahoo.com

pattern of life in hospice environments is different to family life. These support centers may offer physical protection, food, and shelter for orphan children and safeguard them from harmful environments, but in these places, children meet with problematic hygiene behaviours.⁵

Considering that, the most important method of teaching and habitualization of hygiene behaviours such as oral hygiene is education through family and parents, which unfortunately, the children in boarding centers are lacking. Moreover, these children are even more deprived of healthcare services compared to other children due to high ratio of children to be cared by workers and limited financial backing.⁶

The majority of studies carried out on the oral health status of children in various age groups are mainly conducted in schools and children with families. Despite the importance and availability of studies in other countries,⁷⁻¹¹ no study has been carried out specifically to investigate the oral health condition of orphan children in Iran. Bayat et al. carried out a study in 2009, which analysed bodily disorders in orphan children aged between 7-11 years old, living in boarding centers, and the interesting issue they reported was that the most common disorder in these children (90.5%) was dental and oral disorders.⁶

According to the reports of the National Welfare Committee, Kerman Province in southeast of Iran has the most boarding centers for children in the whole country¹² and no study has covered this issue in this province. Due to importance of oral health in these vulanaber children, this study was conducted to determine the oral health condition of 6-18-year-old children living in boarding centers in Kerman City.

Methods

This was a comprehensive cross-sectional study and the study population were all children aged between 6-18 years old living in 20 welfare boarding centers in Kerman City in the year 2019 and they were entered into the

study by the census method.

After acquiring the required permits from the Welfare Committee of Kerman City and obtaining a list of all available centers, the heads of each center were contacted and the method of conduct was explained to them. All managing personnel signed a written consent. Then, a short briefing was given to the children and all of them were included in the study voluntarily and knowingly. The Research Ethical Committee gave the ethical code (IR.KMU.REC.1397.390) required for the study.

Exclusion criteria of the study were undergoing dental treatment or having a predisposing systemic condition that affects dental and oral health. Based on this, two children, one of which had a cleft palate and the other was receiving orthodontic treatment, were removed from the study. In addition, one child refused to receive clinical examination after filling out the questionnaire and was excluded. Participants were categorized in two groups: 6-12 and 13-18 years old on the basis of their habitualization status.

Standardized WHO Oral Health Questionnaire for Children and the WHO oral and dental health clinical examination form were used for data collection.¹³

Before performing examinations, the questions relating to demographic data, cause and length of stay in the center, oral health behaviours, and the children's self-assessment of the condition of their oral health were asked and the questionnaire was filled out. Questions regarding child's parents level of education and also all questions for children under 12, except self-assessment ones was answered by home's staff.

A calibrated dentist carried out the examination in a room with good lighting in the boarding centers. The children would lie on a bed, then the calibrated dentist (kappa coefficient = 0.85) used a headlight, dental mirror, and periodontal probe while abiding by sterile conditions.

Clinical examination included dental status based on the decayed, missing, and filled teeth

(DMFT)/dmft index according to WHO recommendations.¹³

The oral hygiene assessment was based on Silness and Leo's plaque index (PLI), which measures the plaque thickness in the gingival area of teeth. To measure the amount of plaque, a round-ended periodontal probe was used across the surface of the tooth in the gingival third adjacent to the entry of the gingival sulcus.¹⁴

After measuring the PLI, the gingival health was assessed according to Community Periodontal Index (CPI) using a round-ended periodontal probe.¹⁴

The data analysis was done using SPSS software (version 21, IBM Corporation, Armonk, NY, USA) with the help of t-test and Mann-Whitney statistical analysis comparing different variables and between different groups. The significance level was determined at 0.05 for all tests.

Results

A total of 356 individuals took part in the study [176 girls (49.4%) and 180 boys (50.6%)] with an average age of 11.25 ± 3.18 years. The number of children in any one of boarding

centers varied from 12 to 26. All centers had official permits from the National Welfare Committee and operated as charities and were running as 24-hour facilities for all children upon the rules and standards of Welfare Organization. All centers cooperated to conduct this study; however, 5 centers (including 75 people, 21.1%) did not share the information regarding the cause for the children to reside in the center and level of education of their parents. From those who mentioned the cause of residing in centers, 204 (72.6%) had irresponsible caretakers, 67 (23.8%) had no caretakers, and 10 of them (3.6%) were without identity. The remaining 75 people (21%) did not answer and were not included in this data part. The remaining demographic data are shown in table 1.

The average values of DMFT and dmft index in the 6-12-year-old age group were 1.73 ± 1.84 and 4.13 ± 3.80 , respectively, and in the 13-18-year-old age group, the values were 4.98 ± 3.60 and 1.26 ± 1.65 , respectively. A statistically significant relationship was detected between an increase in age and DMFT ($P < 0.001$). Table 2 presents the data regarding dental conditions of participants.

Table 1. The demographic characteristics of the study subjects

Demographic variables		n (%)
Sex	Male	180 (50.6)
	Female	176 (49.4)
	Total	356 (100)
Age (year)	6-12	242 (68.0)
	13-18	114 (32.0)
Mother's education	Illiterate	36 (10.1)
	Under diploma	114 (32.0)
	Diploma	40 (11.2)
	University	2 (0.6)
	Unknown	164 (46.1)
Father's education	Illiterate	42 (11.8)
	Under diploma	116 (32.6)
	Diploma	30 (8.4)
	University	3 (0.8)
	Unknown	165 (46.4)
Cause to be in orphan place	Headless	67 (18.8)
	Poorly supervised	204 (57.3)
	Fameless	10 (2.8)
	No answer	75 (21.1)
Health insurance cover	Yes	317 (89.0)
	No	39 (11.0)

Table 2. Frequency distribution and differences between the study subjects according to decayed, missing, and filled teeth (DMFT)/dmft in relation to age groups and gender

Variable	6-12 (n = 230)		13-18 (n = 111)		P
		Mean ± SD		Mean ± SD	
Age group (year) (n = 341)	DMFT	1.73 ± 1.84	DMFT	4.98 ± 3.60	< 0.001*
	DT	1.54 ± 1.73	DT	3.51 ± 2.77	
	MT	0.40 ± 0.21	MT	0.26 ± 0.59	< 0.001*
	FT	0.16 ± 0.53	FT	1.17 ± 2.07	0.800
	dmft	4.13 ± 3.80	dmft	1.26 ± 1.65	
	dt	2.97 ± 3.04	dt	0.68 ± 1.21	0.960
	mt	0.99 ± 1.78	mt	0.32 ± 0.72	
	ft	0.17 ± 0.53	ft	0.18 ± 0.61	
Gender (n = 341)	Female (n = 169)		Male (n = 172)		
	DMFT	2.93 ± 3.25	DMFT	2.66 ± 2.66	
	DT	2.30 ± 2.55	DT	2.08 ± 2.07	
	MT	0.15 ± 0.45	MT	0.08 ± 0.32	
	FT	0.49 ± 1.50	FT	0.49 ± 1.18	
	dmft	3.89 ± 3.98	dmft	3.78 ± 3.51	
	dt	2.79 ± 3.20	dt	2.66 ± 2.77	
	mt	0.94 ± 1.79	mt	0.90 ± 1.63	
	ft	0.15 ± 0.44	ft	0.20 ± 0.62	

*Significant at 0.05 level

DMFT: Decayed, missing, and filled teeth; DT: Decayed teeth; MT: Missing teeth; FT: Filled teeth; SD: Standard deviation

In analysing the CPI scores, in the 6-12-year-old age group, 150 people (62.0%) and in the 13-18-year-old age group, 45 people (39.5%) had zero score (healthy gingiva). CPI score and age showed a statistically significant relationship. Other data related to CPI are shown in table 3.

The average score for PLI in the population being studied was 0.98 ± 0.86 , out of which 196 people (55.1%) had good oral hygiene (PLI = 0) and 26 (7.3%) had poor oral hygiene (PLI = 2) (Table 4). The PLI had a statistically significant relationship with gender ($P < 0.001$). From the participants, 35 people (9.8%) had teeth with fissure sealants and 35 (9.8%) had failed restorations. Dental trauma was seen in 18 people (5.0%) in the form of

crown fracture in anterior teeth.

In this study, 29 (8.1%) people never brushed, 232 (65.2%) brushed once or more daily, and 9 (2.5%) people did not answer to this question. Overall, 98.0% of girls and 85.0% of boys brushed their teeth, showing a statistically significant relationship between gender and brushing habit ($P < 0.001$). However, there was no significant relationship between age and brushing.

311 participants (87.4%) used toothpastes containing fluoride. In addition, 36 people (10.1%) used dental floss (Table 5).

In the self-assessment, 27.1% rated their oral health as excellent and 1.4% as very poor. In this study, the condition of the permanent molars was specially examined.

Table 3. Frequency distribution and differences between the study subjects according to Community Periodontal Index (CPI) in relation to age groups and gender

Variable		CPI 0 (healthy gingiva)	CPI 1 (bleeding)	CPI 2 (calculus)	P
		[n (%)]	[n (%)]	[n (%)]	
Age group (year)	6-12	150 (62.0)	74 (30.6)	17 (7.0)	< 0.001*
	13-18	45 (39.5)	40 (35.1)	26 (22.8)	
Gender	Female	102 (58.0)	53 (30.1)	20 (11.4)	0.556
	Male	93 (51.7)	61 (33.9)	23 (12.8)	

*Significant at 0.05 level

CPI: Community Periodontal Index

Table 4. Frequency distribution and differences between the study subjects according to plaque index (PLI) in relation to age groups and gender

Variable	PLI 0 (good oral hygiene)	PLI 1 (medium oral hygiene)	PLI 2 (poor oral hygiene)	PLI 3 (very poor oral hygiene)	P
Age group (year) (n = 354)	6-12	133 (55.0)	73 (30.2)	21 (8.7)	0.957
Gender (n = 354)	Female	121 (68.8)	40 (22.7)	10 (5.7)	≠ < 0.001*
	Male	75 (41.7)	59 (32.8)	23 (12.8)	

*Significant at 0.05 level

PLI: Plaque index

The results showed that 207 people (58.0%) had at least one permanent molar with caries and 36 people (10.1%) had all four permanent molars with caries. 23 people (6.5%) had lost one of their permanent molars.

Discussion

There are numerous epidemiologic studies regarding oral health in school children in Iran. Despite importance of oral health in deprived children such as those who were living in the orphan centers, no such study has been conducted in relation to their oral health. Therefore, this is the first study that has tended to the issue of investigation of oral health in orphan children in Iran.

The average DMFT value in children over the age of 12 years old in the current study was 4.98 ± 3.60 which is higher in comparison to other studies carried out on orphan children. Some studies in various areas of India reported average DMFT values as less than two.^{5,15-17} A study carried out in Yemen by AL-Maweri et al. reported a DMFT of two as well.¹⁸

On the other hand, the DMFT value for people above the age of 12 in comparison to other studies carried out in Iran is significantly higher. For example, based on the national

oral health survey, DMFT score for 12 and 15-year-old children in Iran was 2.09 and 3.29, respectively,¹⁹ and in the study carried out on high school students in Qazvin, Iran, in 2010, the score was 2.62.⁴ Unfortunately, a more exact comparison could not be performed due to lack of studies investigating the orphan children groups. The difference in results of this study may be related to different age groups analysed in the mentioned studies (2-15 years old) and in some cases, no grouping was done. Naturally, the younger participants have fewer permanent teeth, which in itself could affect acquired DMFT scores. Another point is that the oldest participant being 15 years old in comparison to 18 years old in the current study means that on top of having more permanent dentition, the length of exposure of teeth in the oral cavity is also longer which can also lead to an increase in DMFT.

The average DMFT score in this study in the 6-12-year-old age group was 1.73 ± 1.84 which is in line with similar studies. In Muralidharan et al. study which was carried out on 5-10-year-old children in the Pradesh region of India, DMFT value was reported at 1.02 ± 1.52 .²⁰

Table 5. Frequency distribution and differences between the study subjects according to oral hygiene behaviours in relation to age groups and gender

		Gender [n (%)]		P	Age group (year) [n (%)]		P
		Female	Male		6-12	13-18	
Frequency of brushing (n = 347)	Never	3 (1.7)	26 (14.4)	< 0.001*	16 (6.6)	13 (11.4)	0.121
	Less than once daily	27 (15.3)	59 (32.8)		54 (22.3)	32 (28.1)	
	Once or more daily	138 (78.4)	94 (52.2)		163 (67.4)	69 (60.5)	
Fluoride toothpaste (n = 350)	Yes	168 (95.5)	143 (79.4)		218 (90.1)	93 (81.6)	
	No	6 (3.4)	33 (18.3)		20 (8.3)	19 (16.7)	
Dental floss (n = 356)	Yes	29 (16.5)	7 (3.9)		18 (7.4)	18 (15.8)	
	No	147 (83.5)	173 (96.1)		224 (92.6)	96 (84.2)	

*Significant at 0.05 level

However, in this study, the decayed or filled primary teeth (dft) value was reported as 2.21 ± 2.82 which is lower than the current study (4.13 ± 3.80), but the missing index (M index) was not integrated into the DMFT score. In the recent study, where data were collected based on WHO questionnaires, the M index was also included.

Nevertheless, more differences than age groups and the range in those age groups such as cultural issues, eating habits and diets prevalent in the society being studied, the children's previous living conditions, the age at which the children entered the orphanages and boarding centers, and the duration of their time there can all influence the final DMFT value outcome.

The rate of dental trauma reported in the current study (5.0%) is lower than similar studies carried out in India (7.4%)²¹ and Yemen (9.9%).¹⁸ However, in Bennadi et al. study, this rate was much higher (22.0%) at approximately four times the current study. This difference might be due to specific social conditions in certain regions of India.⁵

Gingival problems were highly prevalent in the current study, such that a third of children under 12 years old and a third of those over 12 years old had bleeding on probing. Under 12 years old groups had a low prevalence in calculus, but approximately a quarter of the over 12 years old age group were reported to have calculus. Only in Sharma et al. study, the prevalence of gingival bleeding was less than the current study;¹⁶ in all other studies, this number was higher, such as in Thetakala et al. study, which was reported to be more than twice that of our study.¹⁷ The prevalence of calculus was also higher in similar studies compared to the current study. For example, Sharma et al. reported that the most common finding in all age groups was calculus. The prevalence rate in Singh et al. study was reported at around 80%,²² which could be related to lack of availability of hygiene products such as toothbrush and toothpaste, inefficient method of brushing, and lack of supervision on

hygiene habits of children. The results of the current study showed that the participants had an average PLI score of 1, over half of them had a good oral hygiene, and a low percentage had poor oral hygiene.

Gaur et al. study which was carried out on 6-12-year-old children reported a much higher percentage (60%) in the poor oral hygiene category.² This can be due to the age group of the study as children under 12 are not very skilled in terms of oral hygiene behaviours, lack of self-motivation, and a need for more intense external supervision in this age group. Nevertheless, both in Gaur et al. study and in current study, the oral hygiene level was significantly lower in boys compared to girls.

The results of Pakpour et al. study, which was carried out on high school students in Iran, reported the amount of people with poor oral hygiene as three times as much the current study, but the number of those with good oral hygiene was similar to this study.⁴

However, as the current study was conducted in boarding centers, the participants had the chance to brush their teeth against the request of the examiner, whereas the school students did not have this option. This could lead to falsely better results in favour of the boarding centers.

In terms of hygiene behaviour, most of the participants in the current study brushed once or more daily and the majority of them used fluoride-containing toothpastes. The use of dental floss and toothbrush was significantly more prevalent in girls than boys, which reinstates the results relating to PLI.

The acquired results regarding frequency of brushing was correlated with the results of Srinivas et al. study on 5-15-year-old children in India.²³ However, the rate of use of toothbrush and dental floss was much higher in Bennadi et al.⁵ study (96%) and Kahabuka and Mbawalla²¹ study (92%). The authors state that the high frequency of brushing and flossing could be related to the presence of numerous charity organizations before conducting their study and providing health education to the children.^{15,21}

The results of Khare et al.²⁴ study on orphan children in India and Goodarzi et al.²⁵ study on primary school children in Tehran, Iran, showed a lower rate of use of toothbrush compared to the current study. The frequency of brushing in Al-Maweri et al. study¹⁸ was considerably lower than the reported study (17.3%). The interesting point about Al-Maweri et al. study was that fingers were the most commonly-used tool for cleaning the mouth, which was also reported in a third of the participants in Srinivas et al. study.²³

In the current study, a small percentage of participants used dental floss, but in most other studies on orphan children, no statistics has been given in this regard, whereas Goodarzi et al. study reported a 22% population which used dental floss from primary school children in Tehran.²⁵

In more than half of the participants, at least one of their permanent first molars was diagnosed with caries. The disappointing finding was that 10% had caries affecting all four permanent molars.

One positive point about this study is the data collection method, which was a census, and the whole population of orphan children in Kerman City were analysed yielding results that are more precise.

The lack of a control group to compare the oral health conditions of orphan children to children with families is one of the limitations of this study. There were other possible constraints in this study in the field of data collection regarding hygiene behaviours such as social desirability bias. This is due to the participants, specially the older age groups, being more inclined to exaggerate the frequency of brushing and flossing. In addition, the examinations were held in the boarding centers and even though the examiner stated not to brush before examinations, some of the participants did so and this leads to an underestimation of the PLI and a false report on the oral hygiene status. On the other hand, the comparison between

this study and other similar studies is very challenging due to differences such as cultural diversion and dietary variances, difference in age groups in studies, variety in the children's background life, the duration of their stay and time of entry in the boarding centers, and multiple transfers.

Conclusion

According to the results, inadequacy of oral hygiene, high caries level, high prevalence of gingival problem, and many dental health needs in these children were shown. Considering the important effect of oral health on QOL, and also the limited accessibility of these children to dental treatments and financial limitations, preventive measures are of the utmost importance.

As one of the easiest and most important preventive steps is competent cleaning of the oral cavity using toothbrush and dental floss, planning and organizing regular educational programmes regarding oral health, in order to enhance awareness and develop functional skills in relation to oral hygiene in orphan children, is very important.

Introducing an organized screening schedule to evaluate the oral health condition of the children to intervene at the correct time with the necessary preventive procedure in the form of fluoride therapy and fissure sealants considering their low cost and non-invasive nature can prove to be very effective in caries prevention and reducing tooth loss in these children. This, in turn, leads to an increased QOL from the oral health aspect.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

Authors wish sincere thanks to all care home centers for their cooperation during the study and also to Research Vice Chancellor of Kerman University of Medical Sciences, for financial support of the study.

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