

SURVEY

Dental Caries Status of Institutionalized Orphan Children from Jammu and Kashmir, India

¹Aasim F Shah, ²Pradeep Tangade, ³TL Ravishankar, ⁴Amit Tirth, ⁵Sumit Pal, ⁶Manu Batra

ABSTRACT

Introduction: It has been well documented that the absence of family support influences the general and oral health of the children. Factors that lead to the development of disease at a given point in time are likely to have their roots in a complex chain of environmental events that may have begun years before. A number of studies have examined the relationship between dental caries and material deprivation and found a positive association between them. Though orphans contribute to 2% of world's population, literature regarding their oral health status is very scarce. This study was carried out with the aim to assess the dental caries status of institutionalized orphan children from Jammu and Kashmir.

Materials and methods: A total of 1,664 children that included 1,201 boys and 463 girls from registered orphanages in the state of Jammu and Kashmir were included in the study. Written informed consent was obtained prior to the start of the study; decayed, extracted, filled teeth (deft)/ decayed, extracted, filled surface (defs) and decayed, missing, and filled teeth (DMFT)/decayed, missing, and filled surface (DMFS) indices were used to assess the caries status of primary and permanent dentition. Multiple choice, close-ended questionnaires were administered to assess the oral hygiene habits, knowledge, and dietary behavior of orphan children prior to examination. The study subjects were divided into three groups according to the age of ≤ 6 , 7 to 11, and ≥ 12 years.

Results: Results showed that caries prevalence in primary dentition was higher in subjects' ≤ 6 years of age where the prevalence was 50.9%; in subjects 7 to 11 years of age, the prevalence was 25.2%. Caries prevalence in permanent dentition within the age group 7 to 11 was 69.1%, while in subjects' ≥ 12 years, the prevalence was 66.2%. Use of toothbrush was the most prevalent method of cleaning the teeth in both the genders, while toothpaste was reported to be the most prevalent material to be used for tooth cleaning followed by tooth-powder. Highest caries prevalence was seen in the subjects using datun sticks as a method to clean their teeth (80.5%).

Keywords: Dental caries, Jammu and Kashmir, Orphans, Prevalence, Toothbrushing.

How to cite this article: Shah AF, Tangade P, Ravishankar TL, Tirth A, Pal S, Batra M. Dental Caries Status of Institutionalized Orphan Children from Jammu and Kashmir, India. *Int J Clin Pediatr Dent* 2016;9(4):364-371.

Conflict of interest: None

Source of support: Nil

INTRODUCTION

Children need protection from family to build confidence to face the world and care to nurture their childhood.¹ The United Nations Children's Fund (UNICEF), Joint United Nations Programme on HIV and AIDS (UNAIDS), and other groups label any child that has lost one parent as an orphan. By this definition, there are currently 14 million orphans living in the world today, due to poverty, war, human immunodeficiency virus/acquired immunodeficiency syndrome, and other causes, and these contribute to 2% of the world's population. Moreover, in the past 10 years, more than 1 million children have been separated from their families as a result of armed conflict.² Out of the total orphan and street children population worldwide, the total number of socially handicapped children in India was estimated to be 2,32,46,000 in the year 2010, which accounts for 6.8% of the total child population of the country.³

As per the International Institute for Population Sciences and Macro International, 86.6% children in Jammu and Kashmir state live with their parents; 2.4% children have their father dead (paternal orphans); 1.6% do not have their mothers alive (maternal orphans); and 0.3% have both their parents dead (double orphans).⁴ With all these figures, it can be estimated that 4.5% of children in Jammu and Kashmir live with one or both parents dead and can be listed as orphans.⁴ In the year 2012, a "UK-based" child rights organization "Save the Children" revealed that the estimated population of orphans in Jammu and Kashmir was 2,14,000.⁵ At present, there are about 42 orphanages in Jammu and Kashmir for children 5 to 16 years of age.

It has been well documented that the absence of family support influences the general and oral health behavior and knowledge of the children. Factors that lead to the development of disease at a given point in time are likely to have their roots in a complex chain of environmental events that may have begun an year earlier.⁶

¹Registrar, ²Professor and Head, ³Associate Professor, ⁴Reader
⁵Senior Lecturer, ⁶Assistant Professor

¹Department of Public Health Dentistry, Government Dental College and Hospital, Srinagar, Jammu and Kashmir, India

²⁻⁵Department of Public Health Dentistry, Kothiwal Dental College and Research Centre, Moradabad, Uttar Pradesh, India

⁶Department of Community Dentistry and Preventive Dentistry UCMS College of Dental Surgery, Bhairhawa, Nepal

Corresponding Author: Aasim F Shah, Registrar, Department of Public Health Dentistry, Government Dental College and Hospital, Srinagar, Jammu and Kashmir, India, Phone: +919419071099, e-mail: dr_aasimshah@yahoo.com

The children residing in orphanages differ from children living with parents as they are underprivileged and do not receive care as other children receive from their parents. A number of studies have examined the relationship between dental caries and material deprivation and have found a positive association between them.⁷ As known today, tooth decay is the single most common chronic childhood disease – five times more common than asthma.⁸

Though orphans contribute to 2% of the world's population, literature regarding their oral health status is very scarce. To the fullest of our knowledge, there has been no previous study addressing the issue of oral health of orphans in the state of Jammu and Kashmir, and the previous conditions of deteriorated political peace in the region have also been a big roadblock in the path of higher researches. This study was carried out with the aim to assess the dental caries status of institutionalized orphan children from Jammu and Kashmir.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to assess dental caries status of institutionalized orphan children residing in orphanages of Jammu and Kashmir. This study was approved by the ethical committee of Kothiwal Dental College and Research Centre, Moradabad. The present study was planned to survey all the institutionalized orphan children in the state of Jammu and Kashmir. A list of the orphanages in Jammu and Kashmir state was acquired from the Department of Social Welfare, Jammu and Kashmir. A total of 42 orphanages were registered with the Department of Social welfare, out of which 17 orphanages were run by the state government, while 25 were run by private organizations or nongovernment organizations. The study had a total population of 1,664 children, which included 1,201 boys and 463 girls. The age group of the subjects present in the orphanages ranged from 4 to 13 years. The inclusion criteria were that children should be residing in institutionalized settings for minimum 3 years or more and give a positive consent. All those who were physically challenged and medically compromised or who were not willing to participate were excluded. Written informed consent was also obtained from the concerned orphanage directors/chairmen/wardens after explaining the full study protocol to them.

Out of a total of 42 orphanages, 38 gave positive consent, while 2 had no children and thus were excluded. The total population of the orphanages that gave positive consent was 1,522, which included 1,108 boys and 414 girls. Out of these, 1,375 subjects (964 boys and 411 girls) who were present at the time of examination and gave positive consent and satisfied the inclusion

criteria were examined. There were only a small number of children below 6 years of age who satisfied the inclusion criteria and less than 25 children above 13 years of age residing in these orphanages. Most of these were not present at the time of examination.

The examination was carried out over a period of 3 months from August 2012 to October 2012. A single examiner was calibrated at the Department of Public Health Dentistry, Kothiwal Dental College and Research Centre, Moradabad, in order to limit the intraexaminer variability. The agreement for all the assessments was in the range of 85 to 95%. These values reflected high degree of conformity in observations.

Data regarding age, gender, years of institutionalization, level of education of the subjects were obtained. decayed, extracted, filled teeth (deft)/ decayed, extracted, filled surface (defs) and decayed, missing, and filled teeth (DMFT)/ decayed, missing, and filled surface (DMFS) indices were used to assess the caries status of primary and permanent dentition.^{9,10} No. 23 explorer (Shepherd's Crook) and a mouth mirror were used for recording the caries. Multiple choice, close-ended questionnaires were administered to assess the oral hygiene habits, oral health knowledge, and dietary behavior of all orphan children prior to examination. The questions were adopted from Al-Omiri et al¹¹ and were originally designed in English and then translated into the local language. Prior to data collection, the questions were pretested on 50 orphan children in order to assess the validity of the questionnaire.

Type III examination of subjects was conducted at respective orphanages. The data obtained were compiled systematically, transformed from a precoded proforma to a computer, and statistical analysis was done using Statistical Package for the Social Sciences (SPSS) version 15.0 statistical analysis software.

RESULTS

A total of 1,375 subjects with mean age 10.23 ± 1.801 years were examined in the present study, out of which 964 (70%) were boys and 411 (30%) were girls. The study subjects were divided into three groups according to age: ≤ 6 , 7 to 11, and ≥ 12 years. Highest number of subjects (976; 70.8%) were within the age group 7 to 11 years, which comprised of 743 boys (77.0%) and 233 girls (56.5%); 232 subjects (16.9%) were ≥ 12 years, which included 136 boys and 96 girls. The mean for years in institutionalization was 3.89 ± 0.523 , 4.18 ± 0.539 for girls and 3.60 ± 0.513 for boys.

Table 1 presents the number of orphan children according to their age and the mean years of institutionalization with regard to their age and gender. The level of education was divided into three groups. Preschool

Table 1: Detailed frequency distribution of the study subjects in relation to age and years of institutionalization according to gender

Sl. no.	Age in years	Overall (n = 1375)			Male (n = 964)			Female (n = 411)		
		n	Mean years in orphanage	SD	n	Mean years in orphanage	SD	n	Mean years in orphanage	SD
1	6	46	3.23	1.48	23	3.26	1.57	23	3.2	1.41
2	7	123	3.65	1.76	63	3.19	1.48	60	4.13	1.92
3	8	107	3.64	2.05	51	3.10	2.20	56	4.14	1.77
4	9	125	3.45	2.01	85	3.16	1.93	40	4.05	2.05
5	10	464	4.14	2.34	365	4.10	2.29	99	4.27	2.13
6	11	278	4.49	2.31	183	4.17	2.32	95	4.37	2.17
7	12	232	4.67	2.40	194	4.24	2.47	38	5.11	2.58
Mean		3.89±0.523			3.60±0.513			4.18±0.539		

SD: Standard deviation

Table 2: Frequency distribution of subjects, according to prevalence of dental caries in primary dentition (DMFT) in relation to age groups and gender

Age in years	Total (n = 1,143)			Males (n = 828)			Females (n = 315)		
	Total	With caries	% prevalence	Total	With caries	% prevalence	Total	With caries	% prevalence
≤6	167	86	50.9	85	53	61.6	82	33	39.8
7–11	976	246	25.2	743	196	26.3	233	35	15
Total	1143	332	38.5	828	249	43.95	315	68	27.4
χ^2	53.43			62.931			22.198		
p	<0.001			<0.001			<0.001		

Table 3: Frequency distribution of study subjects according to prevalence of dental caries in permanent dentition (DMFT) in relation to age groups and gender

Age in years	Total (n = 1,208)			Males (n = 882)			Females (n = 329)		
	Total	With caries	% prevalence	Total	With caries	% prevalence	Total	With caries	% prevalence
7–11	976	676	69.1	745	520	69.8	233	156	66.7
≥12	232	155	66.2	137	83	60.6	96	72	74.2
Total	1208	831	67.65	882	603	65.2	329	228	70.45
χ^2	1.234			4.624			6.227		
p	0.540			0.099			0.044		

group included study subjects before the start of formal schooling (KG, pre-nursery), which included 79 (5.72%) subjects. Primary level included subjects within 1st to 5th standard and comprised 1,070 subjects (77.64%), and Junior or above included subjects who were in 5th to 8th standard or above and comprised 226 subjects (16.35%).

Table 2 presents the caries prevalence in the primary dentition in the subjects within the age group ≤6 and 7 to 11 years. Caries prevalence was higher in subjects ≤6 years of age, presenting 50.9% caries prevalence, while subjects 7 to 11 years of age presented a much lesser caries prevalence of 25.2% in primary dentition. Male children presented higher caries prevalence in both the age groups in primary dentition. Significant differences were registered in caries prevalence between the age groups ($p < 0.05$).

Table 3 shows the caries prevalence in permanent dentition in the subjects within the age groups 7 to 11, which was 69.1%, while subjects ≥12 years presented 66.2%.

The caries prevalence in these age groups did not show any significant difference ($p = 0.540$). Males presented higher caries prevalence in the age group of 7 to 11 years (69.8%), while females in the age group ≥12 years presented a higher caries prevalence (74.2%). The mean caries prevalence in the permanent dentition was 67.65%.

Table 4 presents the mean deft and defs in subjects ≤6 and 7 to 11 years in the primary dentition. The mean deft in subjects ≤6 years was 1.355 ± 1.79 , while subjects 7 to 11 years presented lower mean deft of 1.03 ± 1.61 in comparison to the subjects of lesser age. The decayed component (dt) was found to be higher than other components in both the age groups. Significant differences were registered in mean dt and deft ($p \leq 0.05$) in both the genders within the age group of ≤6 years, while in the age group of 7 to 11 years, significant difference was registered in all the components in primary dentition ($p \leq 0.05$) within the genders and boys had higher dt than girls. Statistically significant difference was also recorded in between the two genders in defs ($p \leq 0.05$).

Dental Caries Status of Institutionalized Orphan Children from Jammu and Kashmir, India

Table 4: Dental caries experience in primary dentition (deft/ defs) of ≤6 and 7- to 11-year-old study subjects according to gender

Variables	Males (n = 85)		Females (n = 82)		t-value	p-value
	Mean	SD	Mean	SD		
≤6 years old						
I. Teeth wise						
dt	1.63	1.86	0.65	1.25	3.991	<0.001
et	0.20	0.94	0.19	0.63	0.040	0.969
ft	0.01	0.11	0.02	0.15	0.611	0.542
deft	1.84	2.14	0.87	1.44	3.450	0.001
	1.355±1.79					
II. Surface wise						
ds	2.20	2.62	0.86	1.70	3.937	<0.001
es	0.99	4.72	0.94	3.11	0.079	0.937
fs	0.01	0.11	0.05	0.31	1.026	0.307
defs	3.20	5.70	1.84	3.62	1.836	0.068
	2.52±4.66					
7–11 years						
III. Teeth wise						
dt	1.01	1.69	0.46	1.03	2.814	0.005
et	0.45	0.90	0.12	0.53	3.231	0.001
ft	0.1	0.09	0	0	–	–
deft	1.47	2.05	0.59	1.17	3.811	<0.001
	1.03±1.61					
IV. Surface wise						
ds	1.42	2.51	0.56	1.27	3.134	0.002
m/e	2.03	3.99	0.58	2.59	3.142	0.002
fs	0.04	0.38	0	0	–	–
defs	3.50	5.32	1.13	2.95	3.960	<0.001
	2.31±4.13					

SD: Standard deviation

Table 5: Mean dental caries experience in permanent (DMFT/ DMFS) dentitions in study subjects 7 to 11 and ≥12 years of age, according to gender

Variables	Males (n = 743)		Females (n = 233)		t-value	p-value
	Mean	SD	Mean	SD		
7–11 years						
I. Teeth wise						
DT	1.14	1.35	1.33	1.53	–1.007	0.315
MT	0.10	0.41	0.54	1.23	–3.849	0.000
FT	0.01	0.12	0.08	0.42	–1.820	0.070
DMFT	1.30	1.49	1.82	2.22	–2.170	0.031
Mean	1.56±1.85					
II. Surface wise						
DS	1.31	1.71	1.69	1.95	1.563	0.119
MS	0.43	1.86	1.67	5.13	2.600	0.010
FS	0.01	0.12	0.13	0.66	2.085	0.038
DMFS	1.82	2.60	3.49	5.88	2.958	0.003
Mean	2.65±4.24					
≥12 years old						
III. Teeth wise						
DT	1.43	1.85	1.61	1.58	–1.358	0.175
MT	0.15	0.53	0.17	0.78	–0.366	0.715
FT	0.07	0.34	0.06	0.29	0.266	0.790
DMFT	1.64	1.97	1.85	1.88	–1.393	0.164
Mean	1.74±1.92					
IV. Surface wise						
DS	1.58	1.68	1.74	1.86	–1.238	0.216
MS	0.76	2.62	0.63	2.55	0.637	0.524
FS	0.09	0.43	0.08	0.37	0.369	0.712
DMFS	2.41	3.19	2.46	3.24	–0.188	0.851
Mean	2.43±3.21					

SD: Standard deviation

Table 5 presents the mean DEFT and DEFS in subjects 7 to 11 and ≥12 years in the permanent dentition. Mean DMFT for subjects 7 to 11 years was 1.56±1.85, while for subjects ≥12 years it was 1.74±1.92, which was more than the latter age group. In permanent dentition, higher caries experience was seen in girls as compared with the boys, while statistically significant difference in various components was only found in the age group of 7 to 11 years ($p = 0.031$).

Table 6 presents the relation between the reported oral hygiene practices and caries prevalence in orphan children. No significant difference was seen in any of the responses in between the genders. Highest caries prevalence was seen in the subjects using datun sticks as a method to clean their teeth (80.5%), while use of toothbrush was the most prevalent method of cleaning the teeth in both the genders. Toothpaste was the widespread material used followed by toothpowder; caries prevalence in subjects using these was 61.1 and 65.8% respectively. Subjects who reported that they were cleaning their teeth occasionally were having the higher caries prevalence of

88.9%, whereas subjects who reported that they never cleaned their teeth had a caries prevalence of 92.8%. Out of the total population of 880 subjects using toothbrushes, replacement periods of the toothbrush varied, while caries prevalence of the subjects never replacing their teeth and who did not remember was highest with 77.2%. Regarding the visits to dentist, 32.84% had visited a dentist more than a year ago, while 31.57% had never visited a dentist and only 17.42% reported having regular dental checkups (not included in table).

Highest number of subjects, i.e., 689 (50.1%), reported using toothpaste having fluoride incorporated in it, while 447 subjects (32.5%) reported using nonfluoridated toothpaste. In the studied population, 85.79% reported taking sweets occasionally, and only 12.22% subjects specified taking sweets about one to three times per day.

DISCUSSION

In India, many epidemiological studies on oral health in privileged children have been carried out, while such studies in orphan children are scarce and none has been

Table 6: Caries prevalence of DMFT and deft (for ≤6-year-olds only) of the study subjects according to practices, in relation to gender

Practice	Total			Males			Females		
	Total	With caries	% prevalence	Total	With caries	% prevalence	Total	With caries	% prevalence
I. Method of cleaning									
Toothbrush	880	668	75.9	593	462	77.9	287	206	71.7
Finger	59	42	71.1	33	26	78.7	26	16	61.5
Datun stick	416	335	80.5	322	260	80.7	94	75	79.7
None	20	16	80	16	13	81.2	4	4	100
χ^2		5.929			1.579			6.799	
p		0.115			0.664			0.079	
II. Material used for teeth cleaning									
Salt and oil	1	1	100	1	1	100	0	0	0
Toothpaste	1052	643	61.1	724	437	60.3	328	206	62.8
Coal	0	0	0	0	0	0	0	0	0
Toothpowder	322	212	65.8	239	156	65.2	83	56	67.4
χ^2		0.361			1.251			1.03	
p		0.635			0.535			0.31	
III. Frequency of cleaning									
Never	42	39	92.8	37	34	91.8	5	5	100
Once	700	530	75.7	477	368	77.1	223	162	72.6
Twice	377	294	77.9	276	221	80.0	101	73	72.2
More than twice	47	33	70.2	41	29	70.7	6	4	66.6
Occasionally	209	186	88.9	133	123	92.4	76	63	82.8
χ^2		4.693			3.628			3.216	
p		0.320			0.459			0.522	
IV. How often do you replace your toothbrush?									
1–3 months	272	193	70.9	131	93	70.8	141	100	71
4–6 months	127	97	76.5	111	85	76.6	16	12	75
7–12 months	38	27	71.1	25	18	71.7	13	9	70
More than one year	95	70	74.3	78	57	73.6	17	13	78.2
Don't remember	15	12	77.2	15	12	77.2	0	0	0
Never	333	257	77.2	233	181	77.4	100	76	76.6
χ^2		6.212			7.530			18.653	
p		0.286			0.184			0.124	
When did you last visit a dentist?									
One year ago	441	333	75.5	298	224	75.2	143	109	76.2
More than one year	213	174	81.6	109	94	78.8	94	80	85.1
Only when in pain	31	24	77.4	26	20	76.9	5	4	80.0
Regular check-ups	234	190	81.2	201	170	84.6	33	20	60.6
Never	424	320	75.5	302	245	81.1	122	75	61.5
Total	1343	1041	77.5	946	753	79.6	397	299	72.5
χ^2		4.693			1.354			1.003	
p		0.286			0.184			0.002	

done in Jammu and Kashmir state. Thus, the present descriptive study was undertaken to determine the dental caries status of institutionalized orphan children from Jammu and Kashmir, India.

In the present study, subjects were divided into three groups according to age: ≤6, 7 to 11, and ≥12 years. Girls constituted only 30%, which can be due to the fact that given the stigma of orphaned life, girls prefer to live with relatives or work as housemaids for safety and security.¹²

The total caries prevalence in deciduous dentition of study subjects ≤6 years of age in the present study was

51.9%, while higher caries prevalence of 90% has been reported in primary dentition in a similar population.¹³ Previously, Bali et al¹⁴ have reported that caries prevalence of Indian children 5 years of age was 50%, while in Jammu and Kashmir state, it was 50.9%; moreover, similar caries prevalence has been reported earlier in privileged child populations around the world.^{15,16} The mean recorded deft of subjects ≤6 years of age was 1.355 ± 1.79 , while low caries (0.70 deft) was demonstrated by institutionalized street children of Andhra Pradesh¹⁷ and orphans in Mashad, Iran.¹⁸ On the contrary, higher

deft was recorded in orphan children in Pune¹⁹ and Mexico.¹³

The caries prevalence for primary dentition for age group 7 to 11 years was found to be 25.2%, and mean deft was 1.03 ± 1.61 ; these findings are similar to those found in Mexican schoolchildren.²⁰ However, much higher caries prevalence in similar age group has been reported from Maharashtra,²¹ Orissa,²² and other parts of the country in privileged child populations.²³

Moreover, the mean deft recorded was less in girls ≤ 6 years of age (0.87 ± 1.44) as well as 7 to 11 years of age (0.59 ± 1.17), which is similar to the results of the National Oral Health Survey and fluoride mapping in Jammu and Kashmir state during 2002–2003¹⁴ and other previous studies.¹⁷ On the contrary, girls in Mashhad orphanages had higher dmft than boys.²⁴ The results of the present study demonstrate a similar caries prevalence in children ≤ 6 years, as seen in nonorphan population in the same state,¹⁴ which could be explained by their least stay in institutionalized conditions by this age group; thus, a similar oral hygiene attitude as of privileged children can be seen in these children. The decrease in caries prevalence in primary dentition with increasing age, i.e., from ≤ 6 to 7 to 11 years, can be because of the natural exfoliation of deciduous teeth.¹⁸ As the tooth erupts into the oral cavity because of posteruptive maturation, tooth becomes resistant to caries.²¹

The overall caries prevalence for permanent dentition was 67.65% in children aged 7 to 11 years and 66.2% for more than ≥ 12 -year-old subjects. These results are similar to Romanian orphaned and abandoned children²⁵ and caries prevalence in some privileged children population,²² while lower caries prevalence has been reported for 12-year-old children in Jammu and Kashmir state (47.5%) as well as the whole of India (52.5%).^{14,22,26}

Mean DMFT for children 7 to 11 years was similar to subjects from Mashhad²⁴ and child populations in many third world countries.^{16,27} Mean DMFT among ≥ 12 -year-old children is in accordance with caries in 12-year-old children of the whole of India (1.7 DMFT)¹⁴ and other countries.²⁸ However, much higher mean DMFT has been reported in 12-year-olds elsewhere.^{20,27} Furthermore, the results from the present study depict that the caries experience was largely made by decayed (d/D) component in both primary and permanent dentition. These findings suggest lack of dental care in these groups. These findings have been reported earlier also.²⁹

In permanent dentition, orphan girls presented higher caries than orphan boys, which is in contrast to findings in privileged children as reported in the National Oral Health Survey 2002–2003, Jammu and Kashmir.¹⁴ Orphan girls carry bigger burden of dental caries and that could

be explained by their easy access to food supplies and their frequent snacking during food preparation.³⁰ The higher caries in the permanent dentition can also be because 30.23% subjects reported using miswak sticks, as previously reported for children population in the National Oral Health Survey 2002–2003 in Jammu and Kashmir.¹⁴ Previously, it has been reported that in Muslim religious institutions, children are taught to use miswak at about age 6.³¹

The data on oral health behavior collected from all of the subjects were done by questionnaire adopted from Al-Omiri et al,¹¹ which was pretested before the study was conducted, assuring that technical jargon was avoided and the language level was set to allow proper comprehension by the subjects.

The information regarding the usage of oral hygiene aids showed similarity to the results of many previous studies done in institutionalized children who reported regular toothbrushing and use of toothpaste^{12,17,32,33} and is also similar to results from the National Oral Health Survey, Jammu and Kashmir state.¹⁴ The response to the frequency of cleaning the teeth was similar as reported earlier from orphanages in Mexico City¹³ and South Indian children who were staying in ashrams.³³ On the contrary findings from Udaipur orphanage³² institutionalized street children in Jordan¹² and data from the National Oral Health Survey India and Jammu and Kashmir state¹⁴ show lesser frequency of cleaning the teeth than seen in this population.¹⁴ The widespread use of toothbrush in the subjects can be because various charity organizations provide oral education and oral health care products to orphanages. It was also seen that subjects cleaning their teeth twice in a day with toothbrush and toothpaste exhibited more caries prevalence (75%); this can be attributed to the fact that many children lack the knowledge of proper toothbrushing,³⁴ and brushing the teeth very fast and with an improper technique greatly reduces its efficacy in reducing dental disease.³⁵

Regarding the visit to a dentist, 31.57% subjects had never visited a dentist. These findings are similar to the findings of national data for the state.¹⁴ The reason can be limited resources as well as dental health personnel and the attitude of these children toward dental professionals. Furthermore, children might be satisfied with the status of their teeth and thus do not recognize the need for regular dental visits.³⁶

Regarding the replacement of the toothbrushes, 77.2% never replaced their toothbrushes. On the contrary, national data from the same state shows that 67.7% of 5-year-old and 72.7% of 12-year-old privileged children replaced their toothbrushes within 1 to 3 months.¹⁴ This may be explained by the fact that cost of replacing toothbrushes at frequent intervals may be prohibitive in institutions harboring large number of orphan children which may be due to. In the

present study, 59.01% of the subjects reported knowledge of fluoride in the toothpaste; these findings are similar to the findings in Dar-es-Salaam of institutionalized former street children¹² and to many previous studies.^{8,11} The higher use of fluoridated toothpaste could be because of its availability as the World Health Organization (WHO) has recommended to make fluoridated toothpaste affordable and available in developing countries.³⁷

The data collected for habits and practices may have certain limitations. With regard to oral hygiene habits and practices and frequency of dental visits, courtesy bias and overreporting have to be assumed, whereas for the consumption of sugary foods and drinks, we assume a central tendency bias and may have been probably underreported. In addition, recall bias and social desirability bias could be considered with respect to consumption of food items and frequency of toothbrush replacement. Moreover, the data on oral health knowledge, attitudes, and practices of orphan children are very scarce. Due to this fact, comparison with similar population has not been possible, and a comparison with a nonorphan population shall remain a limitation.

CONCLUSION

It can be concluded that conditions and experiences early in life leave an indelible imprint on the individual. The negative impact of institutionalization on a young growing person and nonrecognition of the child as a "person" and "rights holder" have enormous impact on the development of children. The results of the present study show that the caries level in orphan children studied is more than the WHO (Oral Health Goals 2010) target of mean DMFT/dmft of 1.5.³⁸ Also, major difference existed between decayed (dt/DT) and filled (ft/FT) components, which indicate poor practices and professional services to this study group.

RECOMMENDATIONS

These extensive unmet dental needs of this socially disabled strata should be promptly met by the health care providers to facilitate better health in these deprived children. In order to improve the dental health status of this underprivileged orphan population, based on our results, we propose that a preventive program can be planned and implemented on these factors: (A) In general, we should change the perceptions of caregivers and orphaned about oral health. (B) We should provide oral health education. (C) Caries prevention programs as placing sealants and fluoride programs shall be started for such disadvantaged children. (D) School oral health services should be provided.

Clearly, a single individual has least control over such requirements, and these mostly or entirely can be improved at the population or group level.

REFERENCES

1. Agrawal R. Orphans and their life [Internet]. 2010 [updated 2010 Jan 21; cited 2012 Nov12]. Available from: <http://ezinearticles.com/?Orphans-and-Their-Life&id=3617032>.
2. Orphan Issues. Facts, figures, and insights [Internet]. 2013 [updated 2012 June 1; cited 2013 June 22]. Available from: <http://www.soschildrensvillages.ca/news/projects/world-orphan-week/orphan-issues/pages/default.aspx>; Source: http://www.unicef.org/media/media_20941.html,
3. Children of Brink. A joint report on orphan estimates and program strategies. Washington, DC: TvT Associates; 2002.
4. International Institute for Population Sciences (IIPS), Macro International. National Family Health Survey (NFHS-3), 2005–06; 2007. India: Volume I.
5. Maqbool U. Kashmir has 2.14 lakh orphans: Report, Greater Kashmir, 09 May 2012, p. 04.
6. Petersen PE. Sociobehavioral risk factors in dental caries - international perspectives. *Community Dent Oral Epidemiol* 2005 Aug;33(4):274-279.
7. Farooqi YN, Intezar M. Differences in self-esteem of orphan children and children living with their parents. *J Res Soc Pak* 2009;46(2):115-130.
8. Lian CW, Phing TS, Chan CS, Shin BC, Baharuddin LH, Che'Jalil ZB. Oral health knowledge, attitude and practice among secondary school students in Kuching, Sarawak. *Arch Orofac Sci* 2010;5(1):9-16.
9. Gruebbel AO. A measurement of dental caries prevalence and treatment services for deciduous teeth. *J Dent Res* 1944;23(3):163-168.
10. Klein H, Palmer CE. The dental problem of elementary school children. *Milbank Memorial Fund Quart* 1938 Jul;16(3):267-286.
11. Al-Omiri MK, Al-Wahadni AM, Saeed KN. Oral health attitudes, knowledge, and behavior among school children in North Jordan. *J Dent Educ* 2006 Feb;70(2):179-187.
12. Kahabuka FK, Mbawalla HS. Oral health knowledge and practices among Dar-es-Salaam institutionalized Former Street children aged 7-16 years. *Int J Dent Hyg* 2006 Nov;4(4):174-178.
13. Camacho GA, Camacho E, Rodríguez RA, Guillé A, Juárez HM, Pérez MG, Gutiérrez-Salinas J, Cruz-Tovar L, García-de la Puente S, Arredondo-García JL, et al. Predisposing factors for dental caries in girls at an orphanage of Mexico City. *Acta Pediatr Mex* 2009;30(2):71-76.
14. Bali RK, Mathur VB, Talwar PP, Chanana HB. National Oral Health Survey and Fluoride Mapping 2002-2003 India. Dental Council of India and Ministry of Health and Family Welfare (Government of India), 2004.
15. Prasai Dixit L, Shakya A, Shrestha M, Shrestha A. Dental caries prevalence, oral health knowledge and practice among indigenous Chepang school children of Nepal. *BMC Oral Health* 2013 May;13:20.
16. de-Almeida CM, Petersen PE, André SJ, Toscano A. Changing oral health status of 6- and 12-year-old schoolchildren in Portugal. *Community Dent Health* 2003 Dec;20(4):211-216.
17. Srinivas R, Srinivas P, Viswanath V, Suresh S, Devaki T, Narayana V. Oral health status of institutionalized street

- children aged 5-15 years in Guntur city, Andhra Pradesh, India. *Int J Sci Technol Res* 2012 Dec;1(11):19-23.
18. Sweeney P, McCoU D, Nugent Z, Pitts N. Deprivation and dental caries. Dundee: University of Dundee; Dental Health Services Research Unit; 1997. ISBN 189980914.
 19. Dixit S, Chaudhary M, Singh A. Molluscum contagiosum and dental caries: a pertinent combination. *J Indian Soc Pedod Prev Dent* 2009 Oct-Dec;27(4):197-201.
 20. Casanova-Rosado AJ, Medina-Solís CE, Casanova-Rosado JF, Vallejos-Sánchez AA, Maupomé G, Avila-Burgos L. Dental caries and associated factors in Mexican schoolchildren aged 6-13 years. *Acta Odontol Scand* 2005 Aug;63(4):245-251.
 21. Shingare P, Jogani V, Sevekar S, Patil S, Jha M. Dental Caries Prevalence among 3- to 14-Year- Old School Children, Uran, Raigad District, Maharashtra. *J Contemp Dent* 2012;2(2):11-14.
 22. Dash JK, Sahoo PK, Bhuyan SK, Sahoo SK. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). *J Indian Soc Pedod Prev Dent* 2002 Dec;20(4):139-143.
 23. Rai B, Jain R, Kharb S, Anand SC. Dental caries and oral hygiene status of 8 to 12 year school children of Rohtak: a brief report. *Int J Dental Sci* 2007;5(1):1-3.
 24. Mazhari F, Ajami B, Ojrati N. Treatment needs of 6-12 years old children in Mashhad orphanages in 2006. *J Mashhad Dental School* 2008;32(1):81-86.
 25. Chen JW, Flaitz CM, Wullbrandt B, Sexton J. Association of dental health parameters with oral lesion prevalence in human immunodeficiency virus-infected Romanian children. *Pediatr Dent* 2003 Sep-Oct;25(5):479-484.
 26. Robertson JA, Reade PC, Steidler NE, Spencer AJ. A dental survey of Tibetan children in Dharamsala. *Community Dent Oral Epidemiol* 1989 Feb;17(1):44-46.
 27. Yee R, Sheiham A. The burden of restorative dental treatment for children in Third World countries. *Int Dent J* 2002 Feb;52(1):1-9.
 28. Nevitt GA. Dental health in the Middle East: report of an epidemiological study. *Bull World Health Organ* 1961;25(2): 263-267.
 29. Al-Malik MI, Rehbini YA. Prevalence of dental caries, severity, and pattern in age 6 to 7-year-old children in a selected community in Saudi Arabia. *J Contemp Dent Pract* 2006 May;7(2):46-54.
 30. Xiao-hong S, Da-lu L, Yi H, Hui C, Ruo-peng S. Prevalence of dental caries among preschool children in Shanghe County of Shandong Province and relevant prevention and treatment strategies. *Chin Med J* 2008 Nov;121(22):2246-2249.
 31. Khan MA. Prevalence dental caries among 3-12 old children of Swat-Pakistan. *Pak Oral Dent J* 2009 Dec; 29(2):321-326.
 32. Santhosh K, Jyothi A, Prabu D, Suhas K. Oral hygiene and periodontal status among children and adolescents residing at an orphanage in Udaipur city, India. *Nig Dent J* 2008;16(2): 82-86.
 33. Singh A, Sequiera P, Acharya S, Bhat M. Oral health status of two 12-year-old socially disadvantaged groups in South India: a comparative study. *Oral Health Prev Dent* 2011; 9(1):3-7.
 34. Mwakatobe AJ, Mumghamba EGS. Oral health behavior and prevalence of dental caries among 12-year-old schoolchildren in Dar es Salaam, Tanzania. *Tanz Dent J* 2007;14(1):1-7.
 35. Ojofeitimi EO, Hollist NO, Banjo T, Adu TA. Effect of cariogenic food exposure on prevalence of dental caries among fee and non-fee paying Nigerian schoolchildren. *Community Dent Oral Epidemiol* 1984 Aug;12(4):274-277.
 36. Al-Hussaini R, Al-Kandari M, Hamadi T, Al-Mutawa A, Honkala S, Memon A. Dental health knowledge, attitudes and behaviour among students at the Kuwait University Health Sciences Centre. *Med Princ Pract* 2003 Oct-Dec;12(4):260-265.
 37. Petersen PE, Lennon MA. Effective use of fluorides for the prevention of dental caries in the 21st century: the WHO approach. *Community Dent Oral Epidemiol* 2004 Oct;32(5):319-321.
 38. Shingare P, Jogani V, Sevekar S, Patil S, Jha M. Dental caries prevalence among 3- to 14-year- old school children, Uran, Raigad District, Maharashtra. *J Contemp Dent* 2012 May;2(2):11-14.