



## Prevalence of Dental Caries and Treatment Needs among the Orphan Children and Adolescents of Udaipur District, Rajasthan, India

Vikram Khare, Ajit Koshy, PJ Rani, S Srilatha, Sonam C Kapse, Anil Agrawal

### ABSTRACT

**Objective:** The study was to examine the prevalence of dental caries and treatment needs among the orphan children and adolescents of Udaipur district, Rajasthan, India.

**Methods:** A descriptive cross-sectional study was conducted to assess the oral health status and treatment needs of orphan children. The lists obtained comprised of 13 orphanages consisting of 923 inmates including both sexes. The survey proforma was prepared using a self-administered structured questionnaire written in English validated through a pretested survey. The statistical software namely SPSS 15.0 was used for the analysis of the data.

**Results:** The prevalence of dental caries in primary teeth was found to be 49.6% and in permanent teeth was 41%. Most of the children need one surface filling followed by pulp care.

**Conclusion:** The unmet needs for decayed teeth were also found to be high indicating a very poor accessibility and availability of any oral health care. Clearly, it can be concluded that this community has experienced a low utilization of preventive or therapeutic oral health services.

**Clinical significance:** Orphanage children in India are usually taken care by NGOs or social workers who do not realize that dental care and oral health forms an integral part of children well-being. So, this paper enlighten the prevalence of dental caries and treatment needs among the orphan children and adolescents.

**Keywords:** Oral health, Dental caries, Homeless children.

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### INTRODUCTION

Parents are the primary caretakers and saviors of a child but woefully thousands of children have to lead their lives

without parents, the later either being dead or incapable of bringing up their children, such section of the society is called as 'orphans'.<sup>1</sup>

As a whole in the continent of Asia, the total orphan population form a turgid number of 5,72,20,000 accounting to 5.8% of the total child population. India is home to 19% of the world's children. Every year around 26 million children are born in the country. The total number of orphan children in India is estimated to be 2,32,46,000 in the year 2010 which accounts for 6.8% of the total child population.<sup>2</sup>

As orphan children comprise of a deprived and isolated population, deserving special attention to become robust citizens, physically fit, mentally alert and morally healthy, endowed with the skills and motivation needed by society.<sup>3</sup>

Health problems of children living in orphanage can be complex and clearly related to the living conditions in the institution. The depression and withdrawal that sometimes results, leads to immune suppression and puts children at risk for many infectious, communicable diseases and malnutrition, leading to risk of poor health and immunity. Most of the developing countries like India suffer from child mortality because of malnutrition.<sup>3</sup>

Oral and dental health cannot be divorced from the broader context of general health;<sup>4</sup> oral diseases qualify as major public health problems owing to their high prevalence and incidence in all regions of the world. In children, this has been shown by a reduction of dental caries experience and growing numbers of caries-free individuals.<sup>5</sup> The reason for this is complex, but the possible role played by broad socioeconomic factors was highlighted in macroecological studies of caries reductions. Behavior and attitude of children are formed and developed from social, cultural, economic and ethnic factors throughout their lives. This process is also influenced by their knowledge of health and prevention

of disease, including oral diseases.<sup>6</sup> As for all diseases, the greatest burden of oral disease is on disadvantaged and socially marginalized population. However, disadvantaged children are denied access to oral health information due to number of reasons, e.g. inaccessibility, nature of the disadvantage that may necessitate participation of specialized professionals. Dental caries and periodontal diseases are among the most prevalent or widespread conditions in children.<sup>7</sup> Numerous studies have shown a difference in prevalence of dental diseases among underserved and general population.<sup>8</sup>

India, a developing country, faces poor oral health because there are many challenges in rendering oral health needs. It has been clearly indicated that caries is still fairly prevalent and is a major public oral health problem, though it is the responsibility of the community to provide support to orphans.

The World Health Organization (WHO) recommends planning of dental services, based on the information collected through surveys about oral diseases, oral health and treatment needs of a population.<sup>9</sup> Large number of studies have been conducted to evaluate the oral health and treatment needs of mentally challenged, handicapped,<sup>10</sup> institutionalized, psychiatric patients and among lower socioeconomic status groups,<sup>9,11</sup> but the assessment of the same in orphan population is lacking in the literature. Hence, this study was taken up to assess oral health status and treatment needs among orphanage individuals of Udaipur district, Rajasthan, India.

## MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to assess the oral health status and treatment needs of orphan children and adolescents residing in the orphanages of Udaipur district, Rajasthan, India, from November 2009 to April 2010.

### Study Population

Before beginning of the study, the list of the orphanages (government and private) in the Udaipur district, was obtained from District Children Officer, Department of Social Justice and Empowerment, Udaipur, Rajasthan and Indian orphanages network children's helpline. The lists obtained comprised of 13 orphanages consisting of 923 inmates including both sexes. The number of inmates at each orphanage varied from 25 to 150 and the age ranged from 7 to 18 years.

### Sampling Design

All the available children and adolescents residing in the orphanages of Udaipur district formed the study population.

Official permission and ethical clearance were taken and a written permission was obtained from the District Children Officer, Department of Social Justice and Empowerment, Udaipur.

### Inclusion Criteria

All the inmates both boys and girls residing in the orphanages available during the study period.

### Exclusion Criteria

1. Inmates with any handicapping conditions.
2. Inmates with any systemic disease or conditions.

### Sample Size

Out of the 923 available subjects, 883 satisfied the inclusion criteria, which was considered as the final sample size.

### Survey Proforma

The survey proforma was prepared using a self-administered structured questionnaire written in English validated through a pretested survey to assess the demographic details, smoking, alcohol use, chewing and dietary habits and WHO dentition status<sup>12</sup> to assess the dental caries status and treatment needs of the study population.

### Methodology

#### Calibration

Before the start of the study, the examiner was standardized and calibrated in the department of public health dentistry, first by practicing the examination on a group of 10 subjects with a wide range of levels of disease conditions and then on 20 subjects twice on successive days. The intraexaminer reliability was assessed using weighted Kappa statistics, which was 87% for DFT, 90% for DMFT.

### Statistical Analysis

The statistical software namely SPSS 15.0 was used for the analysis of the data. Data comparison was done by applying specific statistical tests (t-test, ANOVA and regression analysis) to find out the statistical significance of the comparisons. Significance level was fixed at  $p \leq 0.05$ .

## RESULTS

A cross-sectional descriptive study consisting of 883 subjects residing in the orphanages of Udaipur district was undertaken to assess their oral health status and treatment needs. The distribution of study population by age and gender according to demographic characteristics is illustrated in Tables 1 and 2.

**Table 1:** Distribution of study population by age and gender

Age	Male		Female		Combined/total	
	No	%	No	%	No	%
7-9 years	162	24	43	20.7	205	23.2
10-12 years	253	37.5	72	34.6	325	36.8
13-15 years	190	28.1	66	31.7	256	29
16-18 years	70	10.4	27	13	97	11
Total	675	100.00	208	100.00	883	100.00
Mean age ± SD	11.19 ± 3.21		11.70 ± 3.20		11.31 ± 3.21	

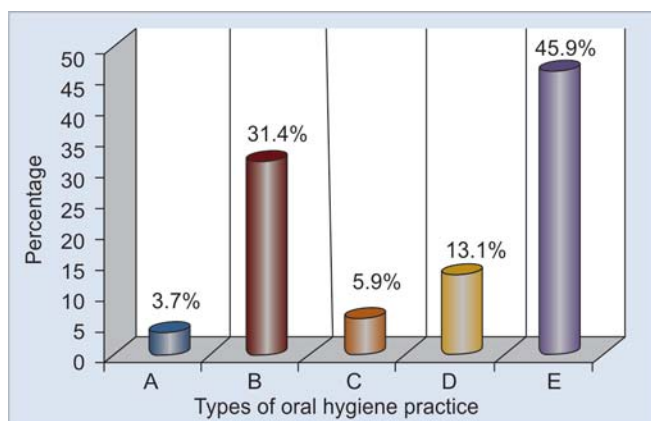
SD: Standard deviation

**Table 2:** Distribution of study population according to demographic characteristics

Characteristics	(n = 883)	100 (%)
<b>Ethnic groups</b>		
Hindu	851	96.4
Muslim	26	2.9
Sikh	0	0
Christian	6	0.7
Others	0	0
<b>Occupation</b>		
Student	851	96.4
Small scale industry worker	32	3.6
Others	0	0
<b>Duration of stay in orphanages</b>		
1-3 years	565	64
4-7 years	270	30.6
≥ 8 years	48	5.4
<b>Type of location of orphanage</b>		
Urban	470	53.2
Periurban	48	5.5
Rural	365	41.3
<b>Educational level</b>		
Up to primary	406	46
Middle	350	39.7
Senior secondary	127	14.3

The information gathered regarding oral hygiene aids showed in Graph 1. Prevalence of dental caries in primary teeth was found to be 49.6% and in permanent teeth was 41%. A total of 2.6% of the subjects had permanent filled teeth. The participants having missing permanent teeth as a result of caries were found to be 4%. Percentage of inmates with fractured crown was 17.5% and 10.9% in primary and permanent teeth respectively.

Regarding permanent teeth, mean number of decayed (DT), filled (FT), missing as a result of caries (MT) and overall DMFT, according to age groups showed that there was significant difference observed for all the component of DMFT namely DT, MT, FT in all four age groups with overall mean number of decayed (DT) to be 1.16 ± 1.14, missing (MT) 0.08 ± 0.42, filled (FT) 0.12 ± 0.39 and mean DMFT was 1.36 ± 1.30. According to gender, it was observed that males had significantly higher values for DT (1.22 ± 1.24), MT (0.11 ± 0.49) and overall DMFT (1.45 ± 1.41).



**Graph 1:** Distribution of study population according to oral hygiene practices (A: No oral hygiene aid used; B: Chew sticks; C: Finger and rangoli powder/charcoal; D: Finger and toothpaste/toothpowder; E: Toothbrush and toothpaste/toothpowder)

Regarding primary teeth, mean number of decayed (dt), filled (ft), overall dft according to age groups showed that there was significant difference observed for all the component of dft in all four age groups with overall mean number of decayed (dt) 0.81 ± 1.13, filled (ft) 0.00 ± 0.00 and mean dft was 0.81 ± 1.13. According to gender, it was observed that males had higher values for dt (0.30 ± 0.92) components of dft, although it was not statistically significant (Tables 3 and 4).

Treatment needs among inmates showed that 16 (1.8%) needed preventive or caries arresting care, eight (0.9%) needed sealant applications, 232 (26.2%) needed one surface filling, 162 (18.3%) needed two or more surface filling, 168 (19%) needed pulp care and restoration, 98 (11.1%) needed

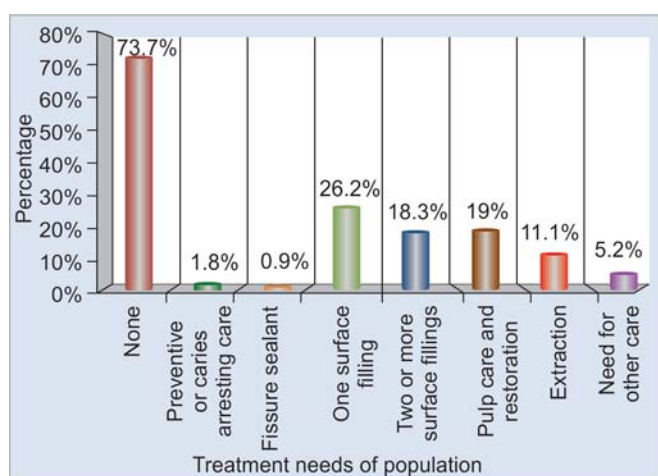
**Table 3:** Prevalence of dental caries among study population

	Primary teeth (n = 530)		Permanent teeth (n = 883)	
	No	%	No	%
DT/dt	263	49.6	350	39.6
FT/ft	0	0.0	23	2.6
MT	-	-	35	4.0
DMFT/dft	263	49.6	362	41.0
Root caries	-	-	0	0.0

**Table 4:** Mean dt/DT, MT, ft/FT and dft/DMFT according to age groups (ANOVA test) and gender (student t-test)

Age groups (year)	dt (mean ± SD)	ft (mean ± SD)	dft (mean ± SD)	DT (mean ± SD)	MT (mean ± SD)	FT (mean ± SD)	DMFT (mean ± SD)
7-9	1.07 ± 1.28	0.00	1.07 ± 1.28	1.14 ± 1.27	0.00 ± 0.00	0.00 ± 0.00	1.14 ± 1.27
10-12	0.66 ± 0.83	0.00	0.66 ± 0.83	1.03 ± 1.17	0.02 ± 0.15	0.03 ± 0.01	1.09 ± 1.18
13-15	0.00	0.00	0.00	1.25 ± 0.96	0.13 ± 0.40	0.08 ± 0.02	1.54 ± 1.15
16-18	0.00	0.00	0.00	1.13 ± 1.52	0.09 ± 0.35	0.00 ± 0.00	1.14 ± 1.54
Total	0.81 ± 1.13	0.00	0.81 ± 1.13	1.16 ± 1.14	0.08 ± 0.42	0.12 ± 0.39	1.36 ± 1.30
F-value	4.136	0.00	3.835	2.892	12.406	5.636	2.628
p-value	0.001*	–	0.001*	0.041*	0.001*	0.001*	0.049*
Gender							
Male	0.30 ± 0.92	0.00	0.30 ± 0.92	1.22 ± 1.24	0.11 ± 0.49	0.11 ± 0.46	1.45 ± 1.41
Female	0.22 ± 0.22	0.00	0.22 ± 0.22	0.99 ± 0.83	0.00 ± 0.00	0.15 ± 0.36	1.14 ± 0.92
t-value	1.081	0.00	0.832	2.033	3.683	0.876	2.376
p-value	0.280	–	0.406	0.043*	0.001*	0.386	0.018*

\*Statistically significant, SD: Standard deviation



**Graph 2:** Distribution of study population according to treatment needs

extraction and 46 (5.2%) needed other treatments, like composite treatments (Graph 2).

## DISCUSSION

An orphan is defined as a ‘child under 18 years who has lost his father, mother or both parents (paternal, maternal or double orphan)’.<sup>1</sup>

Around 405 (45.9%) subjects used toothbrush with either toothpaste or toothpowder to clean their teeth. Around 31% of participants used chewsticks, 5.9% used finger with rangoli powder or charcoal and 13.1% used finger with toothpaste or toothpowder. These findings are in accordance with the studies conducted by Varenne B et al (2004).<sup>13</sup>

However, findings of present study are in contrast to the study conducted by Kahabuka FK and Mbawalla HS (2006)<sup>14</sup> on institutionalized street children in Dar es Salaam, Santhosh K et al (2008).<sup>15</sup>

Percentage of caries prevalence in deciduous teeth was 49.6% (mean dft was  $0.837 \pm 1.038$ ), while in permanent teeth was 41% (mean DMFT was  $1.365 \pm 1.30$ ), which was

in accordance with the findings by Mazhari F et al (2008)<sup>16</sup> among 6 to 12-year-old children in Mashhad orphanage.

While other studies conducted by Bolin K and Daniel J (2006)<sup>17</sup>; Saravanan et al (2009)<sup>18</sup>; Seow WK et al (1994)<sup>19</sup>; Bhat M et al (2007)<sup>20</sup> reported higher prevalence of dental caries with respect to present study 74%, 70%, 83% and 75% respectively.

Regarding gender, males (mean DMFT  $1.45 \pm 1.41$ ) had significantly higher caries prevalence than females ( $1.14 \pm 0.92$ ) which in contrast to the findings reported by Olsson B (1979)<sup>21</sup> among privileged children in which 64% and 86% of 13 to 14-year-old boys (mean DMFT 3) and girls (mean DMFT 3.68) respectively had caries. This could be probably because males are more ignorant about their health, while females are more meticulous about maintaining cleanliness and hygiene. Besides overall, the male population of the study subjects was proportionally higher than females which could be one of the reasons of higher decayed teeth in males.

The need for systematic oral health care has been clearly demonstrated in this study as children and adolescents had a higher decayed component (D) (mean  $1.16 \pm 1.145$  and  $0.818 \pm 1.136$  for permanent and deciduous teeth respectively) constituting major part of dental caries experience, while missing (M) and filled (F) components were too low in percentage. The dental caries pattern highly reflects the fact that population has poor access to restorative dental care and a negligible sign of preventive care.

The prevalence of untreated tooth decay was high in the orphan population, where the average number of teeth requiring one surface filling was 26.2%; followed by two or more surface fillings as 18.3%, 19.03% needed pulp care and restorations, 11.1% required extractions and 0.9% needed pit and fissure sealants. These figures when compared to the study of Naidu R et al (2006)<sup>9</sup> 42% of subjects required one surface filling, 28% required two or

more surface fillings and 13% required extraction of one or more teeth.

The dental caries status of the study population is very well in accordance with WHO goals for the year 2000 of less than 50% of the children shall be caries-free and, for 12-year-old, there should be no more than three DMFTs. The low prevalence of caries can be justified by the fact that there may not be an availability of frequent sticky and sugary snacks in the orphanages which is one of the major causes of tooth decay and can also be attributed to higher fluorosis prevalence found in study subjects.

However, major difference exist between decayed (dt/DT) and filled (ft/FT) components of both primary and permanent teeth which indicate poor oral hygiene practices and professional services to this study group. This emphasizes the fact that orphan children are still receiving less dental care. There may be number of factors contributing to large unmet treatment need among underserved orphan population. Lack of knowledge about good oral hygiene practices among care takers and concerned authorities, lack of motivation, low priority given to dental care in society, lack of facility for early and regular oral health check-up and prompt treatment and finally cost of the treatment may be the reason for accumulated treatment needs.

Considering this distressed state of theirs and absence of a basic oral health care regime among the orphans, a special program should be developed to improve the dental awareness and the oral conditions of this population. It was intended that this study should assist in planning of the oral health care programs and establish a baseline for evaluation.

## CONCLUSION

Death or abandonment of one or both the parents makes child a very poor ward of the community. And thus, orphaned children are especially vulnerable and thus potentially at an increased risk of poor health.

Dental caries experience was low. The unmet needs for decayed teeth were also found to be high indicating a very poor accessibility and availability of any oral health care. Clearly, it can be concluded that this community has experienced a low utilization of preventive or therapeutic oral health services.

Inequalities in oral health are not just an artifact but a real difference does exist. The point is to begin to identify the factors involved in generating and maintaining inequalities and their implications in terms of policy and service delivery.

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**ABOUT THE AUTHORS****Vikram Khare (Corresponding Author)**

Professor and Head, Department of Oral Medicine and Radiology  
Mahatma Gandhi Dental College and Hospital, Jaipur, Rajasthan  
India, Phone: 09418076060, e-mail: kharevikram@yahoo.com

**Ajit Koshy**

Professor and Head, Department of Oral Pathology, MA Rangoonwala  
College of Dental Sciences and Research Centre, Pune, Maharashtra  
India

**PJ Rani**

Professor, Department of Oral Medicine and Radiology, SGT Dental  
College, Gurgaon, Haryana, India

**S Srilatha**

Senior Lecturer, Department of Conservative Dentistry, BVDU Dental  
College and Hospital, Pune, Maharashtra, India

**Sonam C Kapse**

Postgraduate Student (1st year), Department of Oral Pathology and  
Microbiology, MA Rangoonwala College of Dental Sciences and  
Research Centre, Pune, Maharashtra, India

**Anil Agrawal**

Senior Lecturer, Department of Public Health Dentistry, New Horizon  
Dental College and Research Institute, Bilaspur, Chhattisgarh  
India