

An Assessment of Oral Health Status and Treatment Needs of Individuals Aged 3 to 18 Years Living in Orphanages in Bengaluru City

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ABSTRACT

Background: Parents are the primary caretakers and saviours 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 children form a unique section of the society called as orphans.

Objectives of the study: To assess the oral health status and treatment needs of all the children and adolescents residing in the orphanages at Bengaluru city.

Methods: A total of 44 centres were included in the study consisting of a population of 2477 inmates. All the inmates aged 3 to 18 years residing in the orphanages, available during the study period. WHO oral health assessment form 1997 was used to record the following clinical parameters: Extra-oral examination, Temperomandibular joint assessment, Oral mucosal lesions, Enamel Opacities/Hypoplasia, Dental Fluorosis, Community periodontal index, Loss of attachment, Dentition status and Treatment needs, Prosthetic status and needs, Dentofacial anomalies and need for care and referral.

Results: The total study population was 2477, comprising of 959 (38.31 %) male and 1518 (61.38%) females. In intra-oral examination, subjects with ulceration were 102 (4.1 %), Candidiasis were 3 (0.1 %), abscess 12 (0.48 %). The most commonly seen enamel opacity/hypoplasia by condition was diffuse opacity affecting 325 (13.1 %) subjects. Gingival bleeding and calculus were the most frequent with a prevalence of 22.2 % and 56.4 % respectively. The prevalence of dental caries in primary teeth was found to be 37.5 % and in permanent teeth was 26.7 %. A total of 8.9 % of inmates had definite malocclusion and 2.3 % had severe malocclusion.

Conclusion: The overall results showed that dental caries experience was low but the prevalence of gingivitis and fractured teeth was high. The unmet needs for the decayed teeth were also found to be high.

Keywords: Oral health status, Treatment needs, Inmates, Orphanages, Bengaluru.

INTRODUCTION

India is home to 19% of the world's children. Every year around 26 million children are born in India, many more than in any other country.

More than one third of country's population is below 18 years, which is approximately 40% of the total population. The Nation's children are a supremely important asset. Their nurture and solicitude are our responsibility. Parents are the

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primary caretakers and saviours 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 children form a unique section of the society called as orphans. Orphan children are comprised of an isolated population deserving special attention.

An orphanage (historically an orphan's asylum before the latter word took on its modern insane asylum connotation) is an institution dedicated to caring for orphans (children who have lost their parents) and abused, abandoned, and neglected children. Today the orphanage remains common and necessary in most parts of the world, even if the term has given its way to such softer languages as "group home", "children's home" or "rehabilitation center".¹

The health problems of children living in orphanages can be complex and clearly related to the living conditions in institutions. Children in orphanages are often abandoned by their families as infants, toddlers, or even at school age. Prior to abandonment, children may sustain neglect, physical, emotional, and sexual abuse, and under nutrition. The depression and withdrawal that sometimes results from institutionalization leads to immune suppression and puts children at risk for many infectious diseases. Malnutrition can result from poor quality and insufficient quantities of food available in these institutions.

Oral health cannot be divorced from the broader context of general health. Oral health means more than good teeth; it is integral to general health and essential for well-being. Oral diseases qualify as major public health problems owing to their high prevalence and incidence in all regions of the world, as for all diseases, the greatest burden of oral diseases is on disadvantaged and socially marginalized populations. While Dental caries (the single most common chronic childhood disease; 5 times more common than asthma and 7 times more common than hay fever) and gingivitis are among the most prevalent or widespread conditions in children, other conditions such as trauma of teeth and jaws, dental erosion, and developmental enamel defects are also important. Moreover, the psychosocial impact of these diseases often significantly diminishes quality of life.

Despite the poor oral health conditions in India, very few epidemiological studies have been undertaken on orphan children and there is no information available about their oral health status. A large number of studies have been conducted to evaluate the oral health and treatment needs of institutionalized elderly, psychiatric, mentally retarded, handicapped patients and veteran population but assessment of the same in orphan population is lacking in literature. The interplay of many factors such as age, institutional status and dental care etc. are known to determine the oral health status in institutionalized individuals. On the contrary, there is a dearth of data assessing the oral health status of this special group of children and adolescents. This is the gap the current study sought to fill.

AIM: To assess the oral health status and treatment needs of children and adolescents residing in the orphanages in Bangalore city.

OBJECTIVES: To assess the prevalence of dental caries, periodontal health status, oral mucosal lesions, malocclusion status, dental fluorosis status, extra oral and TMJ assessment, enamel opacities and treatment needs of the 3 to 18 year old institutionalized orphans of Bangalore city.

MATERIALS AND METHODS

Bangalore (Bengaluru) is the capital of the Indian state of Karnataka and located on the Deccan Plateau in the south-eastern part of Karnataka. It is India's third most populous city and fifth-largest metropolitan area. It is situated at a height of about 920 meters above sea level, is known for its decent climates, where temperatures stay moderate throughout the year.

A detailed list of the total number and names of orphanages in Bengaluru and number of inmates in them was obtained from Government of Karnataka Office of The Directorate of Women and Child development, Bengaluru. According to this source, there are 16 Govt. Aided Orphanages in Bengaluru. Other sources like Indian orphanages network and Makkalsahaya Vani i.e. children's helpline were consulted for the information on the unaided privately run centres. Finally, information regarding 34 unaided orphanages at Bengaluru city could be obtained, thus making a total of 50 centres.

The number of inmates at each orphanage varies from 25 to 200.

The study centres were contacted either telephonically or through a personal visit to ascertain the population size, have an overview of the living conditions of the population. Hence, a total population of 2897 inmates including both boys and girls was established. A total of 44 centres could be included in the study as the remaining 6 centres didn't give their consent to conduct the survey. The data collection was done between January and April 2013.

All the inmates aged 3 to 18 years residing in the orphanages, available during the study period were included. Inmates with any systemic diseases or conditions, not willing to take part in study or inmates with any handicapping or incapacitating conditions were excluded from the study. Ethical clearance was obtained by the institution review board of Maharaj Vinayak Global University, Jaipur. Permission was obtained from The Government of Karnataka Office of Directorate of Women and child development, Bangalore to conduct the survey. Further consent was also obtained from each orphanage authority before the start of the survey.

Name, age, sex, ethnic group, length of stay at the orphanage and occupation were recorded with the help of orphanage records or the interviews of staff- in charge. WHO oral health assessment form 1997³ was used to collect the following details: Extra-oral examination, Temperomandibular joint assessment, Oral mucosal lesions, Enamel Opacities/Hypoplasia, Dental Fluorosis, Community periodontal index, Loss of attachment, Dentition status and Treatment needs, Prosthetic status and needs, Dentofacial anomalies and need for care and referral.

As per the instructions given in the WHO oral health surveys manual, DAI was scored only for children in whom there were no longer primary teeth present. The scoring of enamel opacities was done only for the permanent teeth erupted in the mouths of the subjects. The prosthetic status was recorded for subjects aged 14 years and above. A pilot survey was undertaken in randomly selected two centres to have prior idea regarding the number of children to be examined per day and to check the average time required for examination of

each child which helped in proper planning and execution of the main study and to know the practical difficulties while conducting study.

Clinical examination was performed according to the methods and criteria described by WHO³ and done using plane mouth mirrors and the CPI probes. The examiner was standardized and calibrated first by practicing the examination on a group of 10 subjects with a wide range of levels of disease conditions and then applying the diagnostic criteria on a group of 20 subjects on successive days. The intra-examiner reliability was assessed to ensure consistency (kappa value, $\kappa = 0.86$). Duplicate examination was conducted on 5 % of the study population during the course of the study.

The Statistical software namely SPSS 21.0 was used for the analysis of the data. Mean, Standard Deviation, Chi-square test, Fisher exact test and Analysis of Variance were used for analyzing the results. The statistical significance was fixed at 0.05.

RESULTS

The total study population was 2477, comprising of 959 (38.31 %) males and 1518 (61.38 %) females in the age group of 3-18 years. The number and percentage of subjects with healthy oral mucosa were found to be 2302 (93.3 %); with lichen planus were 2 (0.08%), ulceration 102 (4.1 %), acute narcotizing gingivitis 1 (0.04 %) and Candidiasis were 3 (0.1 %), abscess 12 (0.48 %) and other condition of the oral mucosa like scalloped tongue, atrophic tongue and macroglossia and pericoronitis were 45 (1.8 %). (Table 1) The most commonly seen enamel opacity/hypoplasia by condition was diffuse opacity affecting 325 (13.1%) subjects, followed by hypoplasia, demarcated opacity and demarcated & diffuse opacity affecting 104 (4.2%), 95 (3.8%) subjects and 51 (2.1%) respectively. (Table 2) Number and percentage of subjects with dental fluorosis, by level of severity, indicates that subjects having normal teeth were 796 (32.1%), with questionable fluorosis 206 (8.3%), with very mild fluorosis 678 (27.4%), mild fluorosis 288 (11.6%), moderate fluorosis 158 (6.4%), Severe fluorosis 23 (0.9%). (Figure 1) Subjects with healthy periodontal tissues were found to be 18.8 % (465).

Table 1: Oral Mucosa-conditions.

Oral Mucosa condition	Number (n=2477)	%
No abnormal condition	2312	93.3
Malignant tumor	0	0.0
Leukoplakia	0	0.0
Lichen planus	2	0.08
Ulceration (aphthous, herpetic, traumatic)	102	4.1
Acute necrotizing gingivitis	1	0.04
Candidiasis	3	0.1
Abscess	12	0.48
Other conditions	45	1.8
Not recorded	-	-

Gingival bleeding and calculus were the most frequent with a prevalence of 22.2 % (549) and 56.4% (1397) respectively. Severe periodontal conditions were relatively rare with shallow pockets (4-5 mm) in only 2.5% (62) subjects; and deep pockets (≥ 6 mm) in 0.1 % (3). Gender distribution of the periodontal scores showed no major differences. Healthy periodontium was present in 19.1% in males and 18% in females, bleeding on probing observed in 22.1% and 22.2%, presence of calculus in 55.6% and 56.9%, shallow pockets of 4-5 mm in 3.0% and 2.2% and deep pockets of 6mm or more in 0.2% and 0.1% of boys and girls respectively (Figure 2). With regards to distribution of loss of attachment by age, where out of a total of 227 individuals examined between the ages between 16 and 18 yrs, 30. 4% had a 4-5 mm loss and 59.5% had no attachment loss. The mean number of sextants with healthy periodontal tissues was found to be 1.17 ± 1.61 , that of bleeding 2.21 ± 1.87 , calculus 1.68 ± 1.67 , shallow pockets (4-5 mm) 0.04 ± 0.24 , deep pockets (6mm or more) 0.01 ± 0.05 . Mean number of sextants not recorded in the examination was 0.82 ± 2.03 . (Figure 3)

Table 2: Prevalence of Enamel Opacities / Hypoplasia.

Enamel Opacities / Hypoplasia	Male		Female		Combined	
	No	%	No	%	No	%
1. Normal	729	76.0	1164	76.7	1893	76.4
2. Demarcated Opacity	38	4.0	57	3.8	95	3.8
3. Diffused Opacity	132	13.8	193	12.7	325	13.1
4. Hypoplasia	37	3.9	67	4.4	104	4.2
5. Other defects	3	0.3	1	0.1	4	0.2
6. Demarcated & diffuse opacity	17	1.8	34	2.2	51	2.1
7. Demarcated opacity and Hypoplasia	2	0.2	2	0.1	4	0.2
8. Diffuse opacity and Hypoplasia	1	0.1	-	0.0	1	0.0
Total	959	100.0	1518	100.0	2477	100.0

The prevalence of dental caries in primary teeth was found to be 37.5% and in permanent teeth was 26.7%. 1.3 % of the inmates had deciduous teeth which were found to be filled with decay and 1.5% had permanent teeth were filled with decay. The percentage of subjects having filled teeth with no decay was 1.0% for deciduous teeth and 2.1% for permanent teeth. The subjects having missing teeth as a result of caries were found to be 0.3% and 0.8% for primary and permanent teeth respectively. Percentage of subjects having permanent teeth missing due to other reasons was 0.6%. None of the inmates were found to be having fissure sealants placed in the mouth. (Table 3)

The mean number of sound permanent teeth per person was 16.08 ± 9.38 and that deciduous teeth was 6.73 ± 7.02 , that of decayed permanent teeth per person was 0.71 ± 1.44 and deciduous teeth was 1.01 ± 1 . Mean number of filled

Table 3: Dentition status.

Status	Primary teeth-Crown		Permanent teeth-crown		Permanent teeth-root	
	No.	%	No.	%	No.	%
Sound	1547	62.5	2378	96.0	55	2.2
Decayed	929	37.5	660	26.7	0	0.0
Filled with decay	33	1.3	38	1.5	0	0.0
Filled, no decay	26	1.0	53	2.1	0	0.0
Missing as a result of caries	8	0.3	20	0.8	0	0.0
Missing, any other reason	-	0.0	15	0.6	0	0.0
Fissure sealant	0	0.0	0	0.0	0	0.0
Bridge abutment, Special crown or veneer/implant	0	0.0	4	0.2	4	0.1
Unerrupted tooth/unexposed root	-	-	1801	72.7	2418	97.6
Trauma	91	3.7	189	7.6	-	-

Table 4: Treatment needs.

Treatment needs	Number	%
None	969	39.1
Preventive, Caries arresting care	29	1.2
Fissure sealant	174	7.0
One surface filling	965	39.0
Two or more surface fillings	786	31.7
Crown for any reason	12	0.5
Veneer or laminate	0	0.0
Pulp care and restoration	540	21.8
Extraction	246	9.9
Need for other care	72	2.9
Not recorded	58	2.3

deciduous teeth person was 0.01 ± 0.16 , that of filled permanent teeth person was 0.03 ± 0.25 and that of traumatized teeth per person was 0.08 ± 0.34 . Mean number of decayed permanent teeth per person (DT) was found to be 0.74 ± 1.49 , that of filled permanent teeth per person (FT) 0.03 ± 0.25 , that of missing permanent teeth per person (MT) 0.02 ± 0.13 and the total Mean DMFT per person 0.79 ± 1.59 . (Figure 4) Treatment needs among orphanages inmates showed that 1.2% needed preventive or caries arresting care, 7 % needed

Table 5: Prevalence of Dentofacial Anomalies among study population.

Dentofacial anomalies	Number (n=1219)	%
Missing Incisor, Canine, Premolar teeth	21	1.7%
Crowding in incisal segment	365	29.94%
Spacing in the Incisal segment	184	15.09 %
Diastema	128	10.5%
Anterior maxillary irregularity	196	16%
Anterior mandibular irregularity	223	18.29%

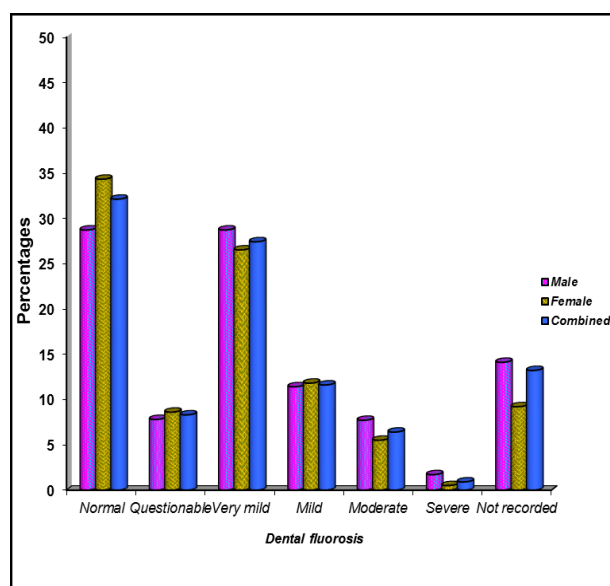


Fig 1: Prevalence of Dental Fluorosis in orphanages inmates.

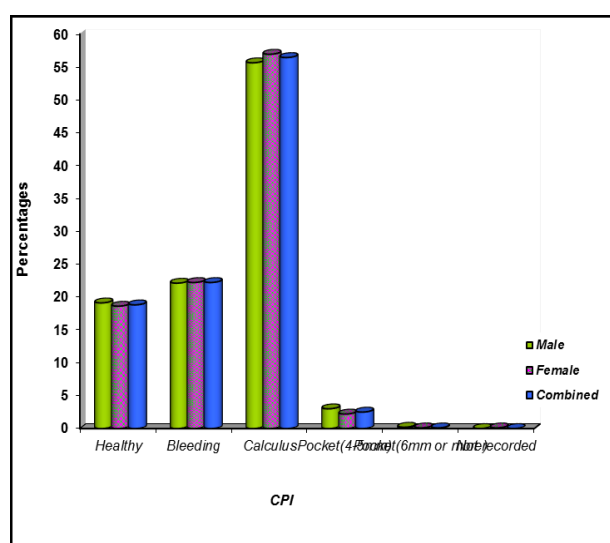


Fig 2: Community Periodontal Index (CPI) scores in study subjects.

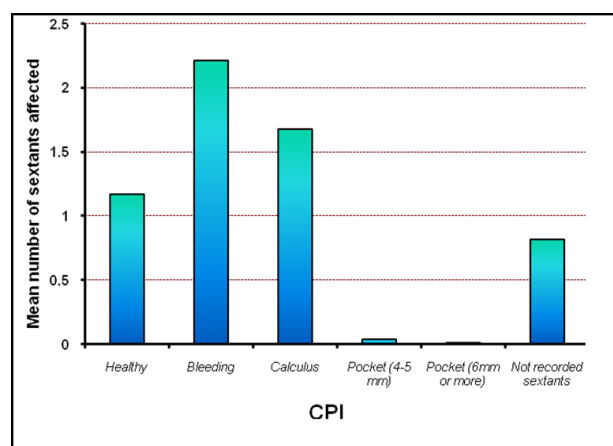


Fig 3: Mean number of sextants with CPI scores.

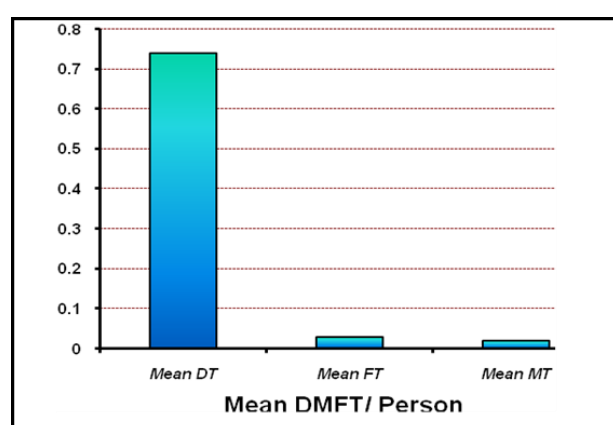


Fig 4: Mean DMFT (caries experience per person).

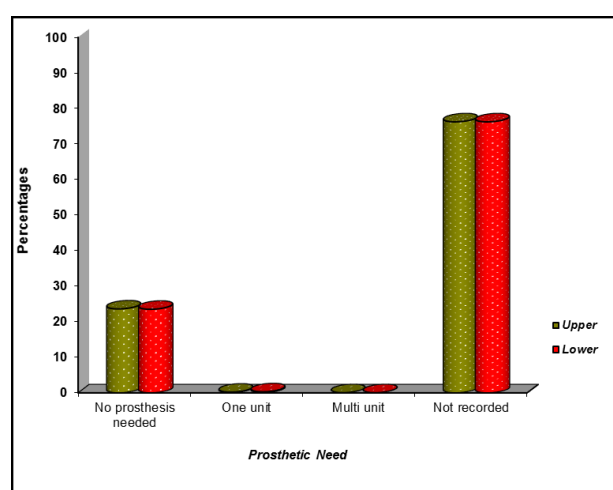


Fig 5: Prosthetic Needs of study subjects.

sealants, 39% needed one surface filling, 31.7 % needed two or more surface fillings, 0.5 % needed crown, 21.8 % needed pulp care and restoration, and 9.9% needed extraction teeth and 2.9% needed other treatments like space maintainers, implants

etc. (Table 4) With respect to the different components of dental aesthetic index (DAI), 1.7% (21) of the subjects had missing incisor, canine and premolar teeth, 29.94% (365) had crowding in the incisal segment, 15.09% (184) had spacing in the incisal segment, 10.5% (128) had midline diastema, 16% (196) of the subjects had anterior maxillary irregularity and 18.29% (223) had anterior mandibular irregularity. (Table 5)

Number and percentage of subjects requiring prosthesis shows that 4 (0.2%) and 8 (0.3%) subjects needed one unit prosthesis; 1 (0.04 %) and 1 (0.04%) needed multi-unit prosthesis; in the upper and the lower jaw respectively. (Figure 5)

DISCUSSION

Lack of parents and desertion, abandonment and a complete negligence by the society, put the orphans in a pitiable position, where they are devoid of any kind of health facilities. This study of oral health status of orphan children is a pioneer study by itself, so a direct comparison with studies conducted on other orphan children population is difficult; thus an attempt is made to compare the study results with other populations similar in character.

The majority of the study population was in the age group of 6 to 12 years (57.7%), with the mean age of 10.47 years. Pertaining to gender distribution, majority of the inmates were females (61.3%), owing to the fact that a number of institutions are only solely meant for girl orphan children. Consistent with CPI data reported from the national oral health survey of India ⁴, the present survey also demonstrated high levels of gingival bleeding and calculus and low scores of advanced periodontal symptoms. The most prevalent periodontal problems were the presence of calculus, as in agreement with other studies as E. A. O. Sullivan et al ⁵ where the authors state that the most prevalent dental problems were gingivitis and calculus, Benoit Varenne et al⁶ who reported about two thirds of children in their study had gingival bleeding and calculus. On the contrary, a few studies also report a contrasting result in terms of periodontal status where the calculus was rare in young children (Bjarne Klausen and Jan Gregera Fano⁷). The prevalence of dental fluorosis was not very high in the current study with questionable

fluorosis affecting 8.3% subjects; with very mild fluorosis affecting 27.4%, mild fluorosis 11.6%, moderate fluorosis 6.4% and severe fluorosis were 0.9% subjects as compared to the national average in India⁴ where the moderate and severe form of fluorosis was found to almost negligible. These findings are in accordance with a number of other studies conducted in different regions of India at different durations like one by Mahesh Kumar et al,⁸ which showed an insignificant dental fluorosis among their subjects. At the same time, contrasting results have also been found where dental fluorosis was essentially high like study of Harpreet Grewal and Mahesh Verma⁹ but there was no severe fluorosis found in their population.

The prevalence of untreated teeth decay was high in the orphan population where the average number of teeth requiring one surface filling was 0.87; followed by two or more surface fillings as 0.52, pulp care and restorations as 0.28 and extractions as 0.14. While the percentage distribution of the treatment needs of the population showed the largest number of individuals needed one surface filling viz. 39%, followed by two or more surface fillings as 31.7%, 21.8% needed pulp care and restoration, 9.9% required extractions and 7% required pit and fissures sealants. These figures when compared to the study of Manish et al¹⁰ showed varying results as 79.5% needed one surface fillings, 22% of their study subjects needed two or more surface fillings, 10.2% required pulp care and restoration and finally 5.5% of them needed extractions.

The healthy people 2010 goal for children with sealants on molar teeth is 50 %, but the current study population had none of the sealants placed. If pit and fissure sealants are applied routinely to susceptible tooth surfaces in conjunction with the appropriate use of fluoride, most of tooth decay in children can be prevented, because 90 % of the decay in children teeth occurs in tooth surfaces with pits and fissures.¹¹ The low prevalence of dental 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. This low prevalence of dental caries in the present study can be attributed to higher fluorosis prevalence found in the study subjects. This can be justified by the

fact that the water fluoride concentration in the Karnataka follows the pattern that a total of 69% of the areas having more than 1 ppm fluoride in drinking water.⁴

People in such socially deprived communities also have limited access to fresh foods and in areas where healthy food is available, competing priorities for limited quantity, lack of nutritional knowledge of the caregivers and lack of culturally appropriate information on healthy food may contribute to dietary choices that are not conducive to generating or maintaining health. As clearly understood, the orphans are quite vulnerable part of the society, in terms of physical, psychological as well as social aspects of life, placing them at a great risk for ill health (both physical and mental) including oral health, some specially designed programmes and policies must be introduced for this population. The child protection programmes have been initiated in India widespread across various Ministries, which have been implementing the schemes and programmes to reach out to varied groups of vulnerable children with complex and diverse needs. The important schemes and programmes for such children include Programme for Juvenile Justice, Integrated Programme for Street Children, Shishu Grih Scheme, Scheme for Working Children in Need of Care and Protection, General Grant-in- Aid Scheme, CHILDLINE Service, Rajiv Gandhi National Crèche Scheme for the children of working mothers, Pilot Project to Combat the Trafficking of Women and Children for Commercial Sexual Exploitation in Destination Areas, etc. Shishu Greh Scheme is meant for care and protection of orphans/abandoned/destitute infants or children up to 6 years and promotes in-country adoption for rehabilitating them. In spite of formulating so many policies and legislations for children, the critical issue of child protection remained largely unaddressed because of the lack of infrastructure to address the problem and the lack of investment in child protection.

The integrated physical, social and psychological growth and development of a child can take place only in a family environment. The mere provision of the food, shelter and the basic education to a child in an institutionalized condition in an orphanage doesn't ensure the expansion of

his/her horizon of capabilities to the fullest and more importantly, the evolution of emotional and moral aspects in a child. Thus the government of India considers adoption as the best non-institutional support for rehabilitation of such children because only a family environment can provide them the best opportunity to fulfill their potential. Children's health outcomes result from the complex interaction of biological determinants with sociocultural, family, and community variables.

This is implemented through the Central Adoption Resource Agency (CARA) by providing grants-in-aid to Government institutions and NGOs for providing institutional care to children below the age of six years and their rehabilitation through In-country adoption. The scheme thus helps in promoting adoptions within the country. Rs. 2.7 Crore has been allotted for the implementation of this scheme for the year financial year 2007-2008¹². The sole idea behind this is to facilitate finding a family for as many orphan children as possible and to safeguard their interests. It is hoped that as a result of procedures like adoption, these children will find their way to a healthier, safer and more empathizing family environment, thereby fulfilling the need for individual attention which every child deserves and thus ameliorating their overall health and in turn oral health. So it is the need of the hour to realize the problems faced by the orphan children in our society and join hands for their welfare and upliftment.

CONCLUSION

The overall results showed that in general dental caries experience was low but that the prevalence of gingivitis and fractured teeth was high. The unmet needs for the 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 very low availability of preventive or therapeutic oral health services.

The findings of the study provide with some insight into the complex relationship between the institutional status of the orphans and their oral health. They may be useful in designing the investigations that aim to further explore the causes for these findings and more importantly to plan an oral health promotion program implementing both

curative and preventive strategies. Thus the effective inclusion of the oral health professionals, care takers, community leaders, voluntary members and primary health workers play an important role in the delivery of preventive and curative services.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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