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Original Article

Dentistry Section

Periodontal and Dentition Status among Orphans and Children with Parents in Mysore City, India: A Comparative Study

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ABSTRACT

Introduction: Oral health symbolises the general health and quality of life of an individual. The socioeconomic status of the parents shows direct impact on oral health status of children. Thus, it can be hypothesised that the pattern of oral diseases would be different among children living with parents and orphans.

Aim: To explore periodontal and dentition status among orphans and children with parents in Mysore city, India.

Materials and Methods: A cross-sectional study was conducted among six to 15-year-old children residing in eight orphanages. Equal number of age and gender matched children living with parents were selected from government schools (non orphans) located in the same geographical areas for comparison. Clinical examination was conducted by a single trained, calibrated examiner and oral findings were recorded according to World Health Organization (WHO) diagnostic criteria 2013. The data collected was analysed using Mann–Whitney U test and Chi-square test.

Results: A total of 957 children (478 from orphanages and 479 from government schools) were examined in the study. The mean defs and DMFS were significantly higher among government school children (non orphans) (defs: 3.20±4.0; DMFS: 2.43±2.8) compared to children from orphanages (defs: 2.72±4.4; DMFS: 1.72±2.3). Prevalence of gingival bleeding among orphans (79.49%) was higher compared to non orphans (71.4%).

Conclusion: The present study concluded that prevalence of caries was lower among orphans but periodontal status was poor among them as compared to non orphans.

Keywords: Gingival bleeding, Oral health status, DMFT (Decayed, Missing and Filled teeth)

INTRODUCTION

Oral health symbolises the general health and quality of life of an individual [1]. It may be defined as a standard of health of the oral and related tissues which facilitates an individual to eat, speak and socialise without active disease, distress or awkwardness and which contributes to general well being [2].

In developing countries, majority of the population is formed by poor and marginalized people. This underserved low socioeconomic population has poor oral health status due to their lack of affordability towards basic and emergency health care services [3]. UNICEF and global partners define an orphan as a child who has lost one or both parents [4]. One of the known high risk groups is the orphans [5].

India has the highest population of children below the age of 18, i.e., 41% of the total population. According to study done by SOS Children's Village by analysing data from National Family Health Survey-3 (2005-06), about 4% of Indian population i.e., more than people residing in Delhi are orphans which constitute about 20 million children [6]. These children form a population at risk with reference to abnormal psychosocial development [7]. According to the recent estimates, 71% of Indian children are educated through government schools [8], making them as the major provider of education. Students of government schools are one more high risk group which normally house children from low socioeconomic background [9].

The schools have been an important setting in offering an effective way to reach children worldwide and, through them, families and community members. During schooling, children are particularly sympathetic and earlier the habits are established, more enduring the impact will be. Furthermore, messages can be reinforced repeatedly throughout the school years [10]. After many studies being conducted to assess the periodontal and dental status among low socioeconomic status [11,12], handicapped [13] and mentally challenged populations [14,15], there is still scanty information on periodontal and dentition status among orphan population and their comparison with children with parents.

Early identification of high risk groups helps in preventing and controlling diseases during their early stages by the implementation of preventive and educational programs on health [16]. In the present circumstances, it is important to identify high risk groups for best utilisation of scant resources that helps in prioritising the oral health services to the deprived population during policy making and school health programs. Hence, the present study was undertaken to assess and compare the periodontal and dentition status among orphans and children with parents from low socioeconomic background in Mysore city (presently called as Mysuru), India.

MATERIALS AND METHODS

The present descriptive cross-sectional study was undertaken over a period of six months from March to August 2015 on children from eight orphanages and seven government schools in Mysuru city, India. The children selected from government schools situated in localities housing the orphanages in Mysuru city were considered as comparative group. (Since two orphanages were in nearby location, only one government school in same geographical area was considered for comparison)

Prior to the study, ethical clearance was obtained from the Institutional Ethical Committee, JSS Dental College and Hospital, Mysuru in accordance with the World Medical Association Declaration of Helsinki 2008. The list of orphanages was obtained from the Department of District Women and Children Welfare Office, Mysuru.

The written permission from the concerned authorities (heads of the orphanages and head masters/head mistress of government schools) was obtained. The caretakers/wardens of orphanages offered written proxy consent for the children selected from orphanages. The information sheet was sent to the parents of the children in government schools. The teachers procured written permission from the parents of these children. Based on the permission from the parents, the head master of the concerned school offered proxy consent for these children. Before administration of the predesigned structured questionnaire (that elicited demographic information and school details) and clinical examination, all the subjects were assured that the information collected from them would be kept anonymous and reported in aggregate form. A written assent was obtained from each study participant prior to their clinical oral examination.

The sample size for the present study was obtained using the following equation [17].

$$N = \frac{Z_{\alpha/2}^2 \times p\,(1-p)}{E^2}$$

Where,

$Z_{\alpha/2}$ = normal deviate for two tailed alternative hypothesis at a level of significance.

p = prevalence or proportion of event of interest for the study.

E = precision or margin of error.

The prevalence of dental caries in primary dentition among children in an orphanage was found to be 49% in a study conducted by Khare V et al., [16]. Based on the results of this study, with 95% confidence interval, 5% margin of error (E) and an anticipated non response rate of 10%, sample size was estimated to be 421 per group. This was rounded off to 430 per group. So, the minimum sample size for the present study (including orphan and non-orphan group) was estimated to be 860. The study included six to15-year-old children with approximately equal numbers of males and females in each group.

Training and calibration of the investigator was conducted on 22 school children selected from a government school undertaken in the Department of Public Health Dentistry, JSS Dental College and Hospital over a period of one week from second March to seventh March 2015. The oral health assessment form-2013 [18] was discussed with the subject experts to clarify ambiguities related to the scoring. After training, the investigator conducted clinical oral examination on 22 school children on day one and reexamination of the same children was done after a couple of days under the similar circumstances. The intra-examiner reliability for dentition status (untreated carious lesions) was assessed. The kappa coefficient value for intra-examiner reliability was found to be 0.94.

Age and gender matched children (six to15-year-old) residing in orphanages and government schools in the same geographical locality available on the scheduled day of clinical oral examination were considered for study. Children with any systemic diseases and mental disability were excluded.

The list of registered orphanages obtained comprised of 14 registered orphanages, out of which, two were for physically challenged children (one for blind and another for deaf and dumb children). Among the remaining, four orphanages declined to grant permission for study due to various reasons such as having their own dentist, lack of interest and financial aspects. Finally, eight orphanages consisting of 484 inmates that housed male as well as female children were included in the present study. The number of inmates at each orphanage varied from 25 to 170. Since, the estimated sample size (430) was approximately the total number of orphans housed in these eight orphanages, all the available children residing in these orphanages were considered. Equal number of age and gender matched children living with parents were selected from government schools located in the same geographical areas for comparison.

All the examinations were performed in their respective school premises on a normal chair under natural light and using sterilized instruments. The children were examined by the investigator and relevant information (periodontal and dentition status) was entered on WHO oral health assessment form [18] by a trained dental assistant (intern). Total caries experience (defs/DMFT) was derived and analysed from the dentition status in accordance with WHO oral health assessment criteria [18]. ADA Type 3 examination using mouth mirror, CPI (Community Periodontal Index) probe, was done under good illumination [19,20].

STATISTICAL ANALYSIS

The statistical analysis was done using Statistical Package Of Social Sciences (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) and the analysis include descriptive statistics, Mann–Whitney U test and Chi-square test. The statistical significance level was fixed at 0.05.

RESULTS

The present study was conducted among 957 children. Among these, 478 children were selected from orphanages and 479 were from government schools located in the same geographical areas.

The age range of the study participants was six to 15 years with a mean age of 11.39±2.74 years (mean±standard deviation). The mean age of orphans was 11.49±2.78 and of non orphans was 11.28±2.71 years. The gender distribution of the study participants in different groups (orphans and non orphans) are mentioned in [Table/Fig-1].

	Orphans	Non orphans	Total
Mean age	11.49±2.78	11.28±2.71	11.39±2.74
Gender	**Orphans N (%)**	**Non orphans N (%)**	**Total N (%)**
Male	247 (51.7)	227 (49.5)	474 (49.5)
Female	231 (48.3)	252 (50.5)	483 (50.5)
Total	478 (100)	479 (100)	957 (100)
Statistical inference	Chi-square value= 1.756 Df= 1 p-value =0.185		

[Table/Fig-1]: Gender distribution of the study participants in different groups.

The mean carious experience (defs and DMFS) among male and female study participants in orphans and non orphans are mentioned in [Table/Fig-2]. The mean scores were significantly higher among non orphans compared to orphans ($p<0.05$) and also significantly higher among males compared to females ($p<0.05$). The prevalence of carious experience among study participants in different groups (orphans and non orphans) along with the prevalence of individual components (decay, missing and filled) has been mentioned in [Table/Fig-3]. The prevalence of gingival bleeding (periodontal status) was significantly higher among orphans (79.49%) compared to non orphans (71.4%) (p-value=0.02) and high among males compared to females (p-value=0.001) as mentioned in [Table/Fig-4].

DISCUSSION

It is undeniable that oral health is an integral part of general health [21]. Socioeconomic status has a direct influence on health, with lower end individuals having markedly worse status compared to higher end [22]. Children residing in orphanages are a disadvantaged section of population as these homes can barely meet the needs of their inmates owing to poor funding and low caretaker to child ratio [7]. This is also applicable to children from government schools. These children although living with their parents (non orphans), are mostly from low socioeconomic background [9]. Most of the times

Category	Gender	Orphans	Non orphans	Total	Statistical inference (among orphans vs non orphans)
Mean defs	Male	3.49±4.9	4.22±4.5	3.84±4.7	Mann-Whitney=104426 Z-Value=-2.527 p-value=0.01*
	Female	1.91±3.6	2.28±3.3	2.10±3.4	
	Total	2.72±4.4	3.20±4.0	2.96±4.2	
	Statistical inference (between male and female)	Mann-Whitney= 21878.5 Z-value=-4.784 p-value< 0.001*	Mann-Whitney= 21450.0 Z-value= -5.035 p-value< 0.001*	Mann-Whitney= 87977.00 Z-value = -6.658 p-value< 0.001*	
Mean DMFS	Male	1.76±2.4	3.01±2.5	2.36±2.5	Mann-Whitney= 96450.50 Z-value=-4.442 p-value<0.001*
	Female	1.68±2.1	1.91±2.8	1.80±2.5	
	Total	1.72±2.3	2.43±2.8	2.07±2.6	
	Statistical inference (between male and female)	Mann-Whitney= 28480.0 Z-value= -0.34 p-value= 0.97	Mann-Whitney= 20286.5 Z-value= -5.714 p-value< 0.001*	Mann-Whitney =104002.0 Z-value= -2.579 p-value= 0.01*	

[Table/Fig-2]: Mean of caries experience among males and females study participants in different groups:
* p-value<0.05 is considered as statistically significant.

		Orphans N(%) N=478	Non orphans N(%) N=479	Total N(%)	Statistical inference (among orphans vs non orphans)
defs	d-surfaces	208 (43.5)	233 (48.6)	441 (46.1)	Chi-square=2.532 df=1 p-value=0.112
	e-surfaces	30 (6.3)	23 (4.8)	53 (5.5)	Chi-square= 0 .994 df=1 p-value=0.318
	f-surfaces	4(0.8)	1 (0.2)	5 (0.5)	Chi-square=1.816 df=1 p-value=0.178
	defs score	225 (47.1)	245 (51.1)	470 (49.1)	Chi-square=1.591 df=1 p-value=0.20
DMFS	D-surfaces	223 (46.7)	283 (59.1)	506 (52.9)	Chi-square=14.832 df=1 p-value<0.001*
	M-surfaces	3(0.6)	9(1.9)	12 (1.3)	Chi-square=3.025 df=1 p-value=0.08
	F-surfaces	40 (8.4)	6 (1.3)	46 (4.8)	Chi-square=26.474 df=1 p-value<0.001*
	DMFS score	240 (50.2)	286 (59.7)	526 (55.0)	Chi-square=8.720 df=1 p-value=0.003*

[Table/Fig-3]: Prevalence of caries experience among study participants in different groups.
* p-value<0.05 is considered as statistically significant.

Gender	Orphans N(%)	Non orphans N(%)	Total N(%)	Statistical inference (between male and female)
Males	213 (86.23%)	184 (81.1%)	397 (83.75%)	Chi-square=19.711 df=1 p-value<0.001*
Females	167 (72.3%)	158 (62.7%)	325 (67.3%)	
Total	380 (79.49%)	342 (71.4%)	722 (75.44%)	
Statistical inference (among orphans vs non orphans)	χ^2:5.39 df=1 p-value=0.02*			

[Table/Fig-4]: Prevalence of gingival bleeding (periodontal status) among males and females in different groups (orphans and non orphans).
* p-value<0.05 is considered as statistically significant.

resources fall short of requirement. This recognition of neglected population among these high risk groups aids in concentrating health services towards most deserving group when resources are limited. In view of scanty published literature regarding assessing and comparing oral health status among children from these groups (orphanages and government schools), the present study was undertaken.

In the present study, the caries prevalence was significantly higher among children from the government schools (59.7%) compared to those in orphanages (50.2%). Similar results were reported in other studies conducted by Mewari SA et al., in Saina city, Yemen [23] and by Gaur A et al., in Vadodara city, India [24] among orphans and government school children. Al-Jobair AM et al., and Mohan A et al., in Riyadh, Saudi Arabia and Lucknow respectively, in their study found significantly higher carious prevalence among orphans compared to control children [5,25]. Singh A et al., in their study on 12-year-old socially disadvantaged children in Udupi district, Karnataka found significantly higher mean DMFT among children residing in ashrama schools compared to those in government schools. The results of these studies were contradictory to our results [26].

In the present study, there was a significant difference in the "D-component" (decayed teeth) between orphans (46.7%) and non orphans (59.1%). The lower "D-component" among orphans in the present study could be attributed to restricted diet pattern, lack of availability of sugars, carbohydrate rich sticky foods to the orphans while the children from comparison group may have frequent habit of snacking in between meals [24].

A significantly higher percentage of children having restorations (F-component) among orphans (8.4%) compared to non orphans (1.3%) may be attributed to health, oral health care and other charitable services extended by Philanthropic Institutions and other Non-Governmental Organizations (NGO) while children living with parents from low income families may have difficulty in accessing oral health care. This highlights the need to extend such oral health care services to all government schools using Public–Private Partnership (PPP).

The mean DMFS was significantly higher among males (2.36±2.5) compared to females (1.80±2.5) in the present study. The higher caries experience among males compared to females was in agreement with the studies conducted by Khare V et al., Gaur A et al., and Rao A et al., [16,24,27]. The higher caries experience among males could probably be due to the fact that females are more particular about maintaining aesthetics, appearance, cleanliness and hygiene while males are negligent about their health particularly oral health [16].

Sudha P et al., and Lagana G et al., found no statistically significant difference in caries prevalence between different genders [28,29]. Sharma A et al., in Jaipur, Shailee F et al., in Shimla, Saravanan S et al., in Chidambaram taluk, Tamil Nadu found females to have significantly higher caries experience compared to males which is contradictory to the findings of the present study [7,30,31]. The authors of these studies attributed higher caries experience among females to early eruption of teeth and their prolonged exposure to deleterious oral environment in females [30].

In the present study, the prevalence of gingival bleeding (periodontal status) was significantly higher among orphans (79.49%) compared to non orphans (71.4%). Similar results were found in a study conducted by Al-Jobair AM et al., [5]. The higher prevalence of gingival bleeding among orphans could be attributed to non availability of oral hygiene aids (toothbrush and toothpaste), improper brushing techniques and lack of close supervision of their oral hygiene practices. The government school children (non orphan group) might have more supervised and/or assisted brushing compared to orphans group [5].

In the present study, the prevalence of gingival bleeding was relatively higher among males (83.75%) compared to females (67.3%) and was found to be statistically significant. The results of study

conducted by Sharma A et al., was found to be in line with present study [32]. Contrary to the present study, Varas F et al., Azodo CC et al, Hiremath VK et al., found significantly higher prevalence of gingivitis in females as compared to males [33-35].

Based on the results of the present study it can be recommended that screening programs and preventive dental health programs should be organized on regular basis to assess oral health status and to make provision so as to fulfill dental needs of these high risk groups. Oral health promotion and reinforcement of knowledge through well structured oral health education programs can create positive change in awareness for government school children and special groups like orphans. Prevention oriented dental care by utilizing resources of the dental colleges, NGO and PPP needs encouragement.

LIMITATION

As in any research, the present study is also not without limitations. The present study design being cross-sectional makes it difficult in identification of causal relationships. Our results could be generalized only to the high risk group of disadvantaged children residing in orphanages and government school children of low socioeconomic status.

CONCLUSION

Although, prevalence of caries was lower among orphans, periodontal status was poor among them as compared to non orphans. However, oral health care services needs to be offered for all the children, there is an apparent need for implementing oral health programmes to target the government schools in particular and orphanage homes in general for prevention of oral diseases that leads to the betterment of the oral health status.

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