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Original Article

Dentistry Section

Oral Health Status of Tibetan and Local School Children: A Comparative Study

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ABSTRACT

Introduction: India has seen a large influx of refugee populations throughout history and the Tibetan immigration is one among them. Understanding the health status and needs of immigrants is imperative because of their growing numbers and their input to the health of the nation. The oral health professionals face many challenges while confronting refugees and immigrants from cultures different from their own. Earlier studies have shown that children, especially refugees and immigrants have had a higher prevalence of unmet oral health needs.

Aim: The purpose of this study was to assess and compare the oral health status of 11-13 year old Tibetan and non-Tibetan school children in Bylakuppe, Karnataka, India.

Materials and Methods: A stratified cluster sampling of 11-13 year old Tibetan and non-Tibetan school children (431 and 434 respectively) formed the study participants for this study. Assessment of dental caries, periodontal disease and malocclusion was done in accordance with criteria laid down by WHO in oral health assessment survey basic methods, 1997. Data was collected by a single trained examiner. The results obtained were analyzed by SPSS version 18. The data was statistically analyzed by using chi-square test and independent t test. The level of significance was set at 5%.

Results: The prevalence of caries was found to be higher among the Tibetan school children when compared to the non-Tibetan school children (71% and 53.9% respectively). The mean number of sextants with healthy gingiva (2.49±2.40) and calculus (1.63±2.28) was higher among the non-Tibetan school children. The mean Dental Aesthetic Index score was found to be higher for Tibetan school children than the non-Tibetan school children (26.57±4.62 and 23.52±4.36 respectively).

Conclusion: The prevalence of caries, periodontal disease and malocclusion were found to be higher among immigrant Tibetan school children as when compared to non-Tibetan school children. The high level of unmet needs in the study population highlights the need for a comprehensive dental care programme in Bylakuppe.

Keywords: Dental caries, Immigrants, Malocclusion, Periodontal status

INTRODUCTION

The last century has seen an obvious acceleration of international immigration, mostly from less developed countries to developed countries. From year 1970 to 2002, the number of people living outside their citizen country grew from 80 to 185 million worldwide, resulting in an increased ethnic and racial diversification of populations in many countries [1]. On arriving in a different society, immigrants confront a new culture and are exposed to a course of acculturation. Acculturation, as a term in anthropology, explains those experiences when groups of individuals having different cultures come into continuous first hand contact, with consequent changes in the original culture pattern of either or both groups [2].

The effects of acculturation on health began gaining eminence since 1960s, pioneered by the research work between acculturation and cardiovascular diseases. In disparity to the long history of acculturation research in the field of medicine, the effect of acculturation on oral health gained thought in recent years. Making a base for understanding the relationship involving acculturation and various health behaviours and diseases, United States conducted the Hispanic Health and Nutrition Examination Survey (HHANES) from 1982 to1984 [1]. Health disparities are well documented in minority populations, such as African Americans, Hispanics, American Indians, Alaska Natives and other racial and ethnic minority groups. A major determinant of oral health disparities is limited access to dental care, the others being issues related to doctor-patient communications with cultural and linguistic competency of care providers and the health beliefs and health literacy of care seekers. Personal characteristics of the population influence oral health behaviours, which in turn influence oral health status and consumer satisfaction. Other predisposing factors include length of time in the community, acculturation, language, educational level, occupation and the health beliefs [2].

Following the footsteps of the 14th Dalai Lama, more than 80,000 Tibetan refugees have fled to India during the past 52 years. Lugsung Samdupling Tibetan Settlement is the first Tibetan Settlement in India started in 1960 with the help of Indian Government for an initial population of 3000 settlers [3]. Bylakuppe, situated in the district of Mysore, in Karnataka state, India, has two Tibetan settlements viz. Lugsung Samdupling (L.S.), formed in 1960, and the oldest settlement in India, and the Tibetan Dickyi Larsoe (TDL) settlement set up in 1969, with a total population of 11,048 and 4,526 respectively [4]. Almost all the elder Tibetan refugees who came to India were uneducated. Schools were opened in the settlements and the subsequent generations received education [4].

Periodontal diseases and dental caries are the two common oral diseases that affect almost all the individuals [5]. Immigrants, poor population, medically compromised people, and racial and ethnic minorities are the ones who mostly suffer from poor oral health. According to the evidences, immigrants and minority ethnic groups should be regarded as "whole populations at-risk" relatively on the

verge of oral health degradation [6,7]. People crossing national and cultural barriers often come from populations with disease patterns, health utilization and health care measures different from those at their native places. The stress of migration may direct to depression, lack of self-confidence, personal and family crisis, under utilization of health services and poor health behaviour [7-9].

The dental profession faces many challenges when confronted with refugees and immigrants from cultures different from their own. These challenges are relevant both to the organizers of oral health services and to individual clinicians. Ignorance of these factors can lead to lack of compliance, misunderstanding and even insult. Many refugees may have fled from areas where disease control, diagnosis, and treatment are inadequate and war or civil unrest has disrupted the function of health care systems. Unmet dental needs are the single most frequently reported health need of children [10,11]. Nevertheless, there is a paucity of research studies for the unmet normative needs among school going children aged 11-13 years in the Tibetan population in Bylakuppe.

The underlying rationale of this study was that a paramount understanding of oral health is a vital component in assessing and planning all community dental health programs, but particularly among immigrant and deprived populations. Thus, the purpose of this study was to assess and compare the oral health status of 11-13 year old Tibetan and Indian school children in Bylakuppe. Furthermore, to date, studies providing information about the relative oral health status of the Tibetan school going children in Mysore and the native Indian school children are limited. So this study was carried out with an endeavor to fill this vacuum of information. This information may be valuable to plan preventive strategies and practice the holistic approach towards oral health.

MATERIALS AND METHODS

A cross-sectional observational study was conducted in Coorg Institute of Dental Sciences among the Tibetan and local non-Tibetan school children of Bylakuppe, Mysore District, Karnataka, India over a period of eight months. The ethical clearance for the study was obtained from the Institutional Review Board of Coorg Institute of Dental Sciences, Virajpet, India.

Before the start of the survey, permission to examine children was obtained from: 1) Block Education Officer (Periyapatna Taluk, Mysore District, Karnataka, India) and 2) Representative of Department of Home, Central Tibetan Administration of His Holiness the Dalai Lama, Tibetan Government in Exile, Dharamsala, Himachal Pradesh, India.

For conducting the study in schools, permissions were obtained from the principals of the respective schools. Prior written informed consent was obtained from parents of children participating in the study. In case of children who were in residential schools (monasteries) consent was obtained from the head of the institution.

Based upon the results of the Pilot study obtained effect size was found to be 0.23, α-error and power of the study (1-B) was set at 0.05 and 0.95 respectively. Final sample size determined was found to be minimum 411 and 420 in Tibetan and local school children respectively. A total of 431 Tibetan and 434 local school children were examined in the current study.

A stratified cluster sampling was followed for the present study. All school children aged 11-13 years in Bylakuppe (both Tibetan and non-Tibetan local school children) were included in the study. Schools which denied permission for the study were not considered.

Calibration: The oral examination of all the study subjects was carried out by a single investigator. A group of 30 patients of the above given age group were selected for the assessment of oral health status. The investigator was trained and calibrated on group of patients for two successive days. Each patient was meticulously examined and the findings were compared to know the diagnostic variability agreement. The agreement was found to be 80%. A local dentist working in the settlement, well versed with both the population was trained for recording proforma and accompanied the examiner throughout the study. Subjects included in calibration were not included in the main study.

Implementing the Survey: A proforma, was designed to record information about oral hygiene practices. The proforma was filled by the examiner himself by interviewing children in both groups before examination. The same examiner conducted the clinical examination using WHO oral health assessment form (1997) [12].

Dentition status, Community Periodontal Index, and Dentofacial Anomalies in the WHO Oral Health Assessment Form (1997) were used to assess the prevalence of dental caries, periodontal disease and malocclusion [12].

The subjects requiring immediate care were referred to the dental clinics run by attached hospital where the investigator was working in the settlement area.

STATISTICAL ANALYSIS

The data was transferred from pre-coded proforma to the computer. The data was analyzed using SPSS version 18. Z-test was used to compare decayed missing and filled primary and permanent teeth and chi square test was employed to compare prevalence of dental caries in both the populations. The data was statistically analyzed by using “chi-square” test and “Z-test”. Descriptive statistics was used to compare the treatment needs of both the populations. Z-test and chi-square test were used to compare the periodontal status and malocclusion of both the populations. The level of significance was set at 5%.

RESULTS

On comparing the mean DMFT between the two groups, it was found that the mean number of decayed, missing and filled teeth were higher in the non-Tibetan school children [Table/Fig-1].

The mean DMFT scores were higher in the Tibetan school children when compared to the non-Tibetan school children and the differences seen were found to be statistically significant. However, there were no significant differences between Tibetans and non-Tibetans in the mean number of missing teeth [Table/Fig-2].

[Table/Fig-3] shows the distribution of study subjects according to presence/absence of caries. The p-value on the application of chi-square test was found to be significant.

STUDY POPULATION	DECAYED TEETH (μ±σ)	MISSING TEETH (μ±σ)	FILLED TEETH (μ±σ)	DMFT (μ±σ)
Tibetans	0.12±0.40	0.042±0.26	0.023±0.15	0.186±0.50
Non-Tibetan	0.30±0.72	0.234±0.65	0.048±0.21	0.585±0.98
Z-value	-4.600	-5.697	-1.981	-7.516
p-value	0.000*	0.000*	0.048*	0.000*

[Table/Fig-1]: Mean number of decayed, missing and filled primary teeth in the study subjects.
*statistically significant
Test used: Z test

STUDY POPULATION	DECAYED TEETH (μ±σ)	MISSING TEETH (μ±σ)	FILLED TEETH (μ±σ)	DMFT (μ±σ)
Tibetans	1.139±1.07	0.042±0.25	0	1.142±1.04
Non-Tibetan	0.326±0.69	0.028±0.16	0.101±0.36	0.456±0.80
Z-value	+9.08	+0.98	-5.76	+9.90
p-value	0.000*	0.32	0.000*	0.000*

[Table/Fig-2]: Mean number of decayed, missing and filled permanent teeth in the study subjects.
*statistically significant
Test used: Z test

STUDY POPULATION	CARIES ABSENT n (%)	CARIES PRESENT n (%)
Tibetans	125 (29.0)	306 (71.0)
Non-Tibetans	201 (46.1)	235 (53.9)
χ^2 =27.008, df=1, p=0.000*		

[Table/Fig-3]: Distribution of study subjects according to presence/absence of caries.
*Statistically significant at 5% level of significance (p<0.05)
Test used: Chi square

TREATMENT NEEDS	TIBETANS n (%)	NON-TIBETAN n (%)	TOTAL n (%)
No Treatment	258 (59.9)	190 (43.6)	448 (51.7)
Preventive Resin	56 (13.0)	10 (2.3)	66 (7.6)
Fissure Sealants	56 (13.0)	19 (0.4)	73 (8.4)
One Surface Filling	111 (25.8)	87 (20.8)	198 (22.8)
Two Surface Filling	91 (21.1)	18 (4.1)	109 (12.6)
Crown	4 (0.9)	4 (0.9)	8 (0.9)
Veneer	3 (0.7)	2 (0.5)	5 (0.6)
Pulp Care	42 (9.7)	11 (2.5)	53 (6.1)
Extraction	40 (9.3)	109 (25.0)	149 (17.2)

[Table/Fig-4]: Distribution of subjects according to treatment needs.

STUDY POPULATION	MEAN NUMBER OF SEXTANTS WITH CPI SCORES		
	0 (μ±σ)	1 (μ±σ)	2 (μ±σ)
Tibetans	2.02±2.08	2.59±1.86	1.38±1.980
Non-Tibetans	2.49±2.40	1.86±1.86	1.63±2.28
Z-value	-3.086	5.746	-1.771
p-value	0.002*	0.000*	0.077

[Table/Fig-5]: Mean number of sextants with healthy periodontal tissue, bleeding and calculus.
(μ±σ)= Mean± standard deviation
*Statistically significant at 5% level of significance (p<0.05)
Test used: Z Test

STUDY POPULATION	TIBETANS	NON-TIBETANS
No Abnormality n (%)	162 (45.4)	214 (67.1)
Definite Malocclusion n (%)	121 (33.9)	84 (26.3)
Severe Malocclusion n (%)	70 (19.9)	19 (6.0)
Very Severe Malocclusion n (%)	4 (1.0)	2 (0.6)
p-value	0.000*	

[Table/Fig-6]: Distribution of study population according to malocclusion.
*Statistically significant at 5% level of significance (p<0.05)
Test used: Chi Square

STUDY POPULATION	TIBETANS	NON-TIBETANS
N	357	319
Mean DAI	26.57	23.52
Standard Deviation	4.62	4.36
Z-value	8.835	
p-value	0.000*	

[Table/Fig-7]: Mean dental aesthetic index score of the study subjects.
*Statistically significant at 5% level of significance (p<0.05)
Test used: Z Test
DAI- Dental aesthetic index

The distribution of subjects according to various treatment needs is shown in [Table/Fig-4]. It depicts the number and percentage of subjects according to treatment needs.

The comparison of mean number of sextants with healthy periodontal tissue, bleeding and calculus among the study subjects is depicted in [Table/Fig-5]. The mean number of sextants with score 0 was 2.02±2.08 for Tibetan school children and 2.49±2.40 for the non-Tibetan school children. This difference was found to be statistically significant (p<0.05).

Mean number of sextants in Tibetan school children with score 1 was 2.59±1.86 and 1.86±1.86 among non-Tibetan school children and this was found to be highly significant (p<0.05).

However, there was no significant difference in the mean number of sextants with score 2.

[Table/Fig-6] shows the distribution of study population according to malocclusion with a significant p-value.

[Table/Fig-7] represents the mean Dental Aesthetic Index (DAI) score of the Tibetan school children was found to be 26.57±4.62 as compared to 23.52±4.36 in the non-Tibetan school children. The difference in the mean DAI score between the populations was found to be highly significant (p<0.05).

DISCUSSION

The re-settlements of people have received scarce attention. The extent of migration – regular and irregular, forced and voluntary, clearly says that such resettlement can raise public health issues. Migration can cause various health risks to migrants. Many individuals and groups, in different kinds of settings, remain barred from the benefits of oral health [12]. Accordingly, there is also a need to view oral health and oral health care in these perspectives.

Since their exodus from Tibet in 1959, about 1, 00, 000 Tibetans have settled in small disparate communities as refugees in various states of India. Bylakuppe remains one of the main settlement areas of these Tibetan refugees [13]. Little is known regarding oral health status and treatment needs of this refugee population who constitute one of the minority ethnic communities of our country.

The results of surveys on varying immigrant or refugee populations in different parts of the world have revealed lower rates of dental visiting and higher rates of caries in them. These findings have been mainly attributed to lack of preventive care, among them [14,15]. The availability of limited data on oral health status of 11-13 year age Tibetan refugee school children in Bylakuppe prompted us to undertake this particular study. To end this, all the school children in this age group in Bylakuppe were considered for this study.

A sample of 431 Tibetan and 434 non-Tibetan children were examined in the present study. Majority of the children (approximately 40%) in both the Tibetan and non-Tibetan study groups were 12-year-olds. It was found that a sizeable proportion of the study samples across both the groups (84.9% and 85.6% respectively), used tooth brush for cleaning their teeth. The remaining subjects used finger for cleaning their teeth. Many authors have reported that the use of tooth brush as an oral hygiene aid was common among the Indian school children. Few studies have also reported that tooth brushing also is common among the Tibetan children [16-18].

The use of tooth paste as a material for cleaning teeth was prevalent in both the populations. However, more non-Tibetan subjects used salt as a dentifrice than Tibetan children. Majority of the school children in both the populations reported tooth cleaning once in a day. But this was found to be higher in the non-Tibetan population. Only few of the subjects in both study groups reported brushing twice daily. Contrary to this study, a study by Selikowitz HS has documented poor oral hygiene practices among the Vietnamese refugees in Norway, in whom oral hygiene was not a priority when survival was at stake [19].

The present study is in accordance with the study conducted by Lo E et al., who reported a higher mean DMFT in 11-13 year old immigrant Tibetan school children when compared to Han children [18]. The reason for the increase in the caries experience was attributed to difference in the diet between Han and Tibetan school children. The mean DMFT value of 1.142±1.04 obtained in this study is similar to that results obtained by Robertson JA et al., who reported that the DMFT of 12 year old Tibetan children in Dharamsala was 1.1 [16]. Thus, prevalence of caries was found

to be higher in the Tibetan school children when compared to the non-Tibetan school children. Although most of the children reported that they brushed their teeth daily, the high prevalence of caries may be due to the lack of proper brushing techniques. The differences noted can be attributed to the cross cultural differences between the two ethnic groups which could be related to the oral hygiene and dietary practices. Report of the study by Havaldar K et al., [20] documents a higher prevalence of caries among non-Tibetan children; however, the results were not statistically significant.

The number of subjects requiring treatment was higher in the Tibetan school children when compared to non-Tibetan school children. The number of subjects requiring extractions was higher in the non-Tibetan school children. This might be due to the higher prevalence of decayed primary teeth in the non-Tibetan school children as when compared to Tibetan school children. Selikowitz HS reported high treatment need among the Vietnamese refugees in Norway. The reason cited for the high unmet treatment needs is that, when refugees and immigrants with different social and cultural backgrounds come in contact with the health services of a new country, coping problems may be encountered thus, leading to underutilization of the existing general health services including dental services [19]. In a study conducted by Wang NJ, he described that the immigrants had fewer sound teeth and more decayed, missing and filled teeth than the native Norwegian children and the pre-school immigrant children had higher treatment needs [21]. In the Tibetan school children the number of subjects with a CPI score of 0 was significantly lower in all the age group when compared to CPI scores 1 and 2. This difference was found to be statistically significant. Similar observation was found in the non-Tibetan school children, though differences found were not significant. The difference observed can be attributed to the existing dental status where deciduous teeth are in a state of exfoliation and permanent teeth are in the process of eruption. As a consequence, failure to maintain oral hygiene in the concerned area may result in subsequent plaque accumulation, gingivitis and periodontal disease. Altered tissue reaction to plaque during the circum-pubertal period may result in an elevated gingival bleeding value in this age group. Similar results were obtained in a study conducted by Alexander S et al., on prevalence of malocclusion and periodontal status in Tibetan school children of Kushalnagar, Mysore, which showed an increase in number of subjects with gingival bleeding and calculus as age increases [22]. Bleeding was found to be higher in the Tibetans when compared to non-Tibetan school children. But healthy gingiva (CPI score=0) was found more in non-Tibetan school children. This finding is also in accordance with the study conducted by Mac Allan LH which revealed a higher prevalence of gingival bleeding in Indo-Chinese refugee children [23]. Study by Robertson JA et al., reported that there was a little intense gingivitis and signs of advanced gingivitis were less among the Tibetan school children in Dharamsala [16]. Similar findings have been reported by Havaldar K et al., where the prevalence of calculus was higher in the non-Tibetan population [20].

Definite, severe and very severe malocclusions were reported in 23.1%, 6.7% and 0.7% of the 12 year old non-Tibetan school children respectively. In National Oral Health Survey 2002-2003, in Karnataka state for 12 year olds, 13.1% subjects reported definite malocclusion, 3.4% reported severe malocclusion and 2.9% reported very severe malocclusion [17].

When the prevalence of malocclusion was assessed in both the study populations, no abnormality was observed in majority of the school children. But definite, severe malocclusion and very severe malocclusion was found to be higher among the Tibetan school children as when compared to non-Tibetan school children. Similar findings have been reported by Shivakumar K et al., in which no abnormality in malocclusion was noted in majority of school children examined [24]. When the mean DAI score of both the study population was assessed, it was seen that the mean DAI score was significantly higher among the Tibetan school children. This finding is in contrast to the study by Esa R et al., who found no significant differences in mean DAI scores between various ethnic groups (Malays, Chinese and Indian school children) residing in Malaysia [25]. Similar findings of higher prevelance of malocclusion in Tibetans comparative to the local population has been reported by Havaldar K et al., [20].

The higher prevalence of malocclusion found in the Tibetan school children might be attributed to the influences of genetic and racial factors in formation of dentition [26].

The study results provide significant information about the oral health status among 11-13 year old Tibetan and local non-Tibetan school children in Bylakuppe. The high level of unmet treatment needs in the study population reflects the poor utilization of dental services. Similar study has been reported by Havaldar K et al., however, a direct comparison could not be made to the study since the age group have not been specified [20]. One of the observation is that few of the findings are in line with our study, which shows there has been no major significant changes in the oral health status in these population with time.

LIMITATION

The limitation of the study is the non-participation of two schools. A sense of fear and apprehension still prevails in this gated community due to international attention. Bylakkupe receives as one of the largest Tibetan settlement. Few of the parameters were not to be disclosed as requested by the head of the monasteries. However, in light of the international attention that refugee population receives and their existence as a closed community, this study is of high importance in research arenas.

CONCLUSION

Following conclusions were drawn from the present study:

1. The prevalence of caries was higher in the Tibetan school children when compared to non-Tibetan school children.
2. The number of subjects with healthy gingiva was higher in non-Tibetan school children and bleeding was higher in the Tibetan school children.
3. Prevalence of malocclusion was higher among the Tibetans when compared to non-Tibetans.

A comprehensive dental care programme including dental health education of individuals, teachers and parents, individual-active methods of prevention are recommended. To implement such a programme, the following actions are suggested:

As a prelude to the above mentioned recommendations, an oral health awareness programme was conducted by the examiner with the help of school authorities. The awareness programme included an oral health talk in the Tibetan monasteries and local schools and the distribution of pamphlets containing information on healthy dental practices. The pamphlets were made available in Tibetan and local languages.

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