Prevalence of Dental Caries and Treatment Needs in Tibetan Monks and Nuns in Karnataka

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Aim: The aim of this study was to assess the prevalence of dental caries and treatment needs among Tibetan monks and nuns in Bylakuppe. Materials and Methods: In this cross-sectional study, stratified random sampling was used to obtain desired sample for the study. The clinical examination was carried out to obtain data regarding dental caries status and treatment needs using World Health Organization (WHO) Oral Health Assessment Pro forma 1997. Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) software program, version 20.0. The data were statistically analyzed by using descriptive statistics and chi-square test. Results: The study population consisted of 345 Tibetan monks (men) and 35 Tibetan nuns (women). Prevalence of dental caries was 88.68% with mean decayed, missing, and filled teeth (DMFT) value of 6.06 ± 5.37. Assessment of dental treatment needs showed 82.3% of participants needed one surface filling, 11.9% of participants needed pulp care and restoration, and 9.3% of participants required extraction of teeth. Conclusion: The study population is characterized by high prevalence of dental caries and lack of awareness about treatment needs.

Keywords: Acculturation, dental caries, immigrants, Tibetan, treatment needs

INTRODUCTION

Migration is a vital component of globalization. International migration is nearly at 200 million people and the volume of migration continues to increase.[1] After the Chinese invasion of Tibet in 1959, the Tibetan refugees followed His Holiness the Dalai Lama in exile in India. So far more than 80,000 Tibetan refugees have settled in India.[2]

In 1960, the Government of Karnataka (known as Government of Mysore then) gave nearly 3000 acres (12 km²) of land in Bylakuppe at Mysore district

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and the first ever Tibetan exile settlement, Lugsung Samdupling, was formed in 1961.\textsuperscript{[3]} Presently, Bylakuppe has two Tibetan settlements viz. “Lugsom Samdupling Tibetan Settlement” (LST) and “Tibetan Dickey Larsoe Settlement” (TDL) in 1969. LST has a total population of 10,496 and TDL has a total population of 4,056 according to the 2001 census.\textsuperscript{[4,5]} There are six monasteries and one nunery and temples in all the major Tibetan Buddhist traditions in Bylakuppe, where around 7000 monks and nuns are taking their religious education.

Immigrants face dissimilarities in cultural norms after coming to a new culture. Which is known as “acculturation” which can either be detrimental or beneficial to health of immigrants. Global indicators such as country of origin, age at migration, period of stay in the host country, and language barriers are used as acculturation substitute measures that could affect immigrants’ acculturation and health.\textsuperscript{[6]}

Acculturation may promote some adverse practices that may impact the oral health of immigrants and ethnic minorities, such as the taking up a cariogenic diet.\textsuperscript{[7]}

In one of the study carried out on Tibetan immigrants to Bangalore city, it was noticed that 82.5% had gingivitis, 51.1% had dental caries, 7.5% had periodontal involvement, and 17.8% had dental fluorosis.\textsuperscript{[8]}

Tibetan refugees are associated with India since 1959 and Tibetan monks and nuns are integral part of Tibetan culture but to date there are no studies regarding their dental caries status and treatment needs.

This cross-sectional survey was conducted to assess the prevalence of dental caries and treatment needs and to determine the impact of dietary habits on caries prevalence of Tibetan monks and nuns in Bylakuppe, Karnataka.

**MATERIALS AND METHODS**

This cross-sectional survey was carried out among Tibetan monks and nuns aged 18 years and above in Bylakuppe, India. The ethical approval for the study was obtained from the Institutional Review Board of Coorg Institute of Dental Sciences, Virajpet, India. Before starting study, all necessary permissions were taken from Tibetan settlement office, monasteries, and nunneries.

Required data were collected by stratified random sampling. For this study, stratification was carried out by considering all the major different monasteries and a nunery in Bylakuppe as strata.

Sample size calculation was carried out based on total population size, that is, total number of monks and nuns (n = 6590) and desired level of precision (ε = 0.05). Calculated sample size was 380.

Data regarding dentition status and treatment needs were collected by type III clinical examination under sufficient daylight using plane mouth mirror and community periodontal index (CPI) probe as recommended in World Health Organization (WHO) basic oral health survey method 1997 by single calibrated examiner.\textsuperscript{[9]} Dentition status and treatment needs (box no. 66–161) part of WHO oral assessment form was used. Also data regarding type of diet and sweet consumption were collected and following criteria were used to calculate sweet score [Table 1].\textsuperscript{[10]}

The data collected were analyzed applying descriptive and inferential statistical analysis. Chi-square was used to see the association between dietary habits and dental caries experience. Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS, IBM SPSS, New York, USA) software program, version 20. Level of significance was set at 5%.

**RESULTS**

A total of 345 Tibetan monks (men) and 35 Tibetan nuns (women) formed the study population. Age of the participants’ ranged from 18 to 82 years and the mean age was 34.56 ± 17.39.

**Dentition status and gender distribution**

In this study, 337 (88.68%) study participants had carious lesions. Mean DT (decayed teeth) was 3.32 ± 2.38 in monks, 4.17 ± 2.05 in nuns, and 3.39 ± 2.36 overall. The mean MT (missing teeth) was 2.22 ± 5.55 in monks, 1.14 ± 2.353 in nuns, and 2.12 ± 5.346 overall. The mean FT (filled teeth) was 0.7 ± 1.512 in monks, 0.57 ± 1.19 in nuns, and 0.69 ± 1.485 overall. The mean decayed, missing, and filled teeth (DMFT) were 6.07 ± 0.299 in monks, 5.89 ± 2.84 in nuns, and 6.06 ± 5.37 overall [Table 2].

It was noted that the mean number root caries was 0.21 ± 1.34 in monks, 0.14 ± 0.69 in nuns, and 0.2 ± 1.29 overall [Table 3].

**Table 1: Sweet score calculation criteria**

| Form                   | Points/score |
|------------------------|--------------|
| Liquid                 | Frequency *5 |
| Solid and sticky       | Frequency *10|
| Slowly dissolving      | Frequency *15|
| Sweet score            |              |
| ≤5—Excellent           |              |
| 10—Good                |              |
| ≥15—Watch out zone     |              |

*means multiplication
**Dental treatment needs**

Distribution of subjects according to various modalities of treatment needs due to dental caries is shown in Table 4. Seven (1.84%) study participants needed pit and fissure sealants, 326 (82.3%) study participants needed one surface filling, 52 (13.1%) study participants needed two or more surface fillings, 47 (11.9%) required crown, 47 (11.9%) needed pulp care and restoration, and 37 (9.3%) study participants required extraction of teeth [Graph 1].

**Association between dental caries experience and dietary habits**

Association of dental caries experience and sweet score is shown in Table 5, which was found to be statistically significant (0.001).

**Discussion**

Health is universal human need for every cultural group. General health cannot be achieved without oral health. Oral disease due to its high prevalence and social impact is a major public health problem.[11] In the refugee population oral health has been given less priority than other health concerns. Worldwide 70% of the refugees belong to Tibet.[12]

This study is a first of its kind, as there are no documented scientific data on dentition status and treatment needs of Tibetan monks and nuns. So, effort has been made to compare the study findings with studies conducted on immigrants, other monks and priests, and local adult Indian population.

In this study, 88.68% of study participants had caries experience. The mean DMFT was 6.07 ± 0.299 in monks, 5.89 ± 2.84 in nuns, and 6.06 ± 5.37 overall. Assessment of treatment needs among the study subjects showed that 82.3% of participants needed one surface filling, 11.9% of participants required crown, 11.9% of participants needed pulp care and restoration, and 9.3% of participants required extraction of teeth.

In accordance with this study results, a study conducted by Chaisupamongkollarp et al.[13] among priests and novices in Bangkok showed that 89.5% had evidences of caries experience, 71.5% had untreated caries, 72.9% needed 1-surface filling, and 45.6% needed extraction. The mean DMFT score was 7.4 (DT = 2.9, MT = 3.2, and FT = 1.2). A study conducted in Shimla on Tibetan refugees by Mahajan.[12] showed that the mean DMFT was 7.3. This was found to increase with the age. Mean number of teeth requiring one surface filling was 1.27 and extraction 2.08.

**Table 2: Distribution of study subjects according to mean number teeth affected by dental caries and gender**

| Dentition status  | Monks (mean ± SD) | Nuns (mean ± SD) | Overall (mean ± SD) |
|-------------------|-------------------|------------------|---------------------|
| Decayed teeth     | 3.32 ± 2.38       | 4.17 ± 2.05      | 3.39 ± 2.366        |
| Missing teeth     | 2.22 ± 5.55       | 1.14 ± 2.353     | 2.12 ± 5.346        |
| Filled teeth      | 0.7 ± 1.512       | 0.57 ± 1.19      | 0.69 ± 1.485        |
| DMFT              | 6.07 ± 0.299      | 5.89 ± 2.84      | 6.06 ± 5.37         |

**Table 3: Distribution of study subjects according to mean number teeth affected by root caries and gender**

| Number of teeth affected by root caries (mean ± SD) | Monks | Nuns | Overall (mean ± SD) |
|---------------------------------------------------|-------|------|---------------------|
| 0.21 ± 1.34                                       | 0.14 ± 0.69 | 0.2 ± 1.29 |

SD = standard deviation

**Table 4: Distribution of subjects according to various modalities of treatment required due to caries status**

| Treatment need | Pit and fissure sealant | One surface filling | Two or more surface fillings | Crown for any reason | Pulp care and restoration | Extraction |
|----------------|------------------------|---------------------|-------------------------------|----------------------|---------------------------|------------|
| N             | %                      | N                   | n                             | n                    | n                         | n          |
| Total         | 7 1.84                 | 326 82.3            | 52 13.1                       | 47 11.9              | 47 11.9                   | 37 9.3     |
Another study conducted by Ploysangngam et al. among elderly priests in Bangkok showed that the mean DMFT score was 16.9 (DT = 2.6, MT = 13.2, and FT = 1.0).

This study had high prevalence of dental caries compared to local Karnataka population as per the National Oral Health Survey and Fluoride Mapping for State of Karnataka, which was 63.3% with mean DMFT of 3 and also treatment needs were less except for extraction and need for other care, that is, 0.6% need preventive care and fissure sealant, 47.1% need filling of one or more surface, 1.9% need crown, 9.3% need pulp care, 28.4% need extraction, and need for other care, that is, 0.6% need preventive care and fissure sealant, 47.1% need filling of one or more surface, 1.9% need crown, 9.3% need pulp care, 28.4% need extraction, and 46.9% need other care.\(^\text{[15]}\)

In this study, association of dental caries experience and sweet score was statistically significant (0.001). This may be due to mechanism of caries initiation as reported by American Dietetic Association, plaque bacteria by metabolism of fermentable carbohydrates produce acids and this causes demineralization of tooth enamel and enzymes that attack the protein component of the tooth, resulting in decay.\(^\text{[16]}\)

Keeping in view the nature of this study, further longitudinal study is suggested to explore and identify the prevailing etiological factors responsible for the current scenario among Tibetan monks and nuns.

**CONCLUSION**

Migration leads to unique cultural stresses, personal and family crises, low consumption of health services, and unfavorable health behavior, which are associated with mental and physical diseases including oral health diseases among immigrants. In a similar context, this study showed high prevalence of dental caries, that is, 88.6%. The findings of the clinical examination highlight high number of untreated caries and very minimal filled component, which may be attributed to be deficient in awareness and oral health services.

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**Conflicts of interest**

There are no conflicts of interest.

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