

Dental Caries and Fluorosis Among Muslims of Kurnool, Andhra Pradesh

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KEY WORDS Dental Caries. Fluorosis. Prevalence. Rural-Urban.

ABSTRACT This study reports prevalence of dental caries and fluorosis for 500 Muslim persons in rural and urban situation in the vicinity of Kurnool district in Andhra Pradesh. Study samples include both males and females with ages between 20-50 years from low, middle and upper income groups. Dental caries prevalence is about 38.6% of the overall sample with considerable variation between age, sex, income, and habit. Caries prevalence for sex combined samples in relation to rural and urban, is higher among the urban (42.4%) than rural (34.8%). Further, the study also reports how dental caries correlates with fluorosis in rural and urban situation, where persons unaffected by fluorosis show a high percentage of caries.

Dental caries is one of the common oral health problems of humanity in developing as well in developed countries. Dental caries has been reported in pre-historic human populations, in non-human primates and in lower mammals. The pioneering study of dental caries was first conducted by Shourie (1946). No systematic work has been undertaken on the disease until 1970s' and only few studies have been reported among Southern Indian samples (Rami Reddy, 1980a, b, 1985, 1986; Rami Reddy et al., 1982 a,b,c, 1987; Busi et al., 1985; Dharma Rao et al., 1985; Hrudayanath Kunzru and Krishna Reddy, 1985; Sayi Prasad and Papa Rao, 1985). The populations covered by these studies include various castes of Hindus, Muslims and Christians from Gulburga, Karnataka and South-eastern Andhra Pradesh. The present study investigates on dental caries and fluorosis variation in rural and urban areas among Muslim population in Kurnool district of Andhra Pradesh where no previous studies in this direction are conducted.

MATERIALS AND METHODS

The materials for the present study are Mus-

lim subjects from Kurnool district in Andhra Pradesh. Altogether 500 subjects of both sexes are drawn randomly from age groups between 20-50 years. The distribution of subjects are even in both rural and urban areas and are classified according to their income as lower, middle and upper economic groups. A suitable questionnaire was developed inquiring into tooth brushing habits and other bio-behavioural data like, dietary habits and oral hygiene.

Caries and fluorosis observations were made on each subject with the help of mouth mirror and probe following the recommendations of W.H.O. (1977). All observations were made in day light and care was taken to record the location of caries sites on the tooth crown and the extent of fluorosis.

Frequencies and percentages of subjects affected by caries and fluorosis out of the total number of subjects examined were calculated by sex, income and rural and urban differences. Suitable statistical methods were used especially chi-square statistics for highlighting associations between variables.

RESULTS

Table 1 shows the frequency distribution of caries by age and sex in rural and urban areas. About 38.6% of the overall sampled subjects are affected by caries and there is no significant difference in prevalence by rural and urban situation as indicated by insignificant chi-square value. However in rural area as the age increases the frequency of affected persons also increases. The same trend occurs in the urban situation also. In both areas, the age group 50+ years are affected more compared to the rest of other age groups. Prevalence of dental caries is more *i.e.*, 42.4% in urban area compared to the rural area 34.8%. However, the χ^2 values of 3.05 shows that there is no

Table 1 : Frequency distribution of caries by age and sex in rural and urban areas

Age groups	Rural						Urban						Combined					
	Male			Female			Male			Female			Rural			Urban		
	No. exa.	No. aff.	%	No. exa.	No. aff.	%	No. exa.	No. aff.	%	No. exa.	No. aff.	%	No. exa.	No. aff.	%	No. exa.	No. aff.	%
20-24	24	4	16.7	38	7	18.4	27	7	25.9	29	11	38.0	62	11	17.7	56	18	32.1
25-29	27	6	22.2	22	7	31.8	29	10	34.5	29	10	34.5	49	13	26.5	58	20	34.5
30-34	19	1	5.3	15	6	40.0	17	4	23.5	19	10	52.6	34	7	20.6	36	14	38.9
35-39	15	10	66.7	13	2	15.4	17	11	64.7	19	11	57.9	28	12	42.9	36	22	61.1
40-44	14	7	50.0	10	5	50.0	17	6	35.3	12	6	50.0	24	12	50.0	29	12	41.4
45-49	11	3	27.3	17	7	41.2	8	6	75.0	11	4	36.4	28	10	35.7	19	10	52.6
60+	15	14	93.3	10	8	80.0	10	5	50.0	6	5	83.3	25	22	88.0	16	10	62.5
Total	125	45	36.0	125	42	33.6	125	49	39.2	125	57	45.6	250	87	34.8	250	106	42.4

No. = Number; Exa. = Examined; Aff. = Affected; % = percentage

significant difference between rural and urban situation.

In rural situation, males are more often affected (36.0%) compared to females (33.6%) whereas in the urban area it is female folk who are more prone (45.6%) to the disease than the males (39.2%). The bisexual difference, both for urban and rural samples fall short of significance. At age group (40-44) both sexes were equally affected with 60%.

Table 2 shows the frequency distribution of caries by income group in rural and urban areas. Persons of upper income groups in both rural and urban areas were relatively more affected than those of middle and lower income groups. The differences between the lower and upper income groups in rural ($\chi^2 = 4.82$; $p > 0.05$) and in urban ($\chi^2 = 30.83$; $p > 0.05$) are significant. Similarly the differences between middle and upper income groups in rural ($\chi^2 = 27.86$; $p > 0.05$) and in urban ($\chi^2 = 24.80$; $p > 0.05$) are also found to be significant. However, the lower and middle income groups in both rural and urban areas do not show marked difference among them and fall short of significance. The reasons for such a significant difference between lower and upper income

groups could be due to the fact that the lower and middle income groups of both areas are found to take more coarse and fibrous food products, vegetables, greens, and fruits along with other flesh foods. Where as, the urban upper income groups in both areas are found to consume carbohydrate-rich food particularly, refined wheat flour, bakery products and confections.

Table 3 shows the caries experience by diet and habitual behaviour in rural and urban areas. Majority of the subjects examined are non-vegetarians. The subjects of rural area (35.1%) were less affected by caries than their urban counterparts (41.1%). The small number of vegetarians examined in rural area show that 8.3% of them were affected by the disease while in the urban area none were affected. Similarly smokers (42.7%) and betel chewers (43.7%) have shown higher proportion of caries than non-smokers (32.0%) and non-betel chewers (35.4%) in both areas.

Table 4 shows the frequency distribution of fluorosis in relation to caries in rural and urban areas. It is observed that among 26 persons (10.4%) affected by fluorosis only 4 persons (15.38%) were found to be with dental caries

Table 2 : Frequency distribution of caries in income groups

Income groups	Rural			Urban			Combined		
	No. exa.	No. aff.	%	No. exa.	No. aff.	%	No. exa.	No. aff.	%
Lower	217	70	32.3	126	44	34.9	343	114	33.2
Middle	28	11	39.3	93	36	38.7	121	47	38.8
Upper	5	4	80.0	31	28	90.3	36	32	88.9
Total	250	85	34.0	250	108	43.2	500	193	38.6

Table 3 : Caries experience by habit in rural and urban areas

Habit	Rural									Urban								
	No. of persons			No. of teeth			No. of teeth			No. of persons			No. of teeth			No. of teeth		
	Obs.	Aff.	%	Obs.	Aff.	%	Obs.	Per person	Per person aff.	Obs.	Aff.	%	Obs.	Aff.	%	Obs.	Per person	Per person aff.
Diet																		
Veg.	24	2	8.3	758	13	1.72	31.58	6.50	0.54	4	0	0	122	0	0	30.50	0	0
Non-Veg.	225	79	35.1	7050	241	3.42	31.33	3.05	1.07	246	101	41.1	7700	246	3.18	31.30	2.44	0
Smoking																		
Smokers	75	31	41.3	2374	90	3.79	31.65	2.90	1.20	75	33	44.0	2388	94	3.94	31.84	2.85	1.25
Non-Smokers	50	17	34.0	1558	47	3.02	31.16	2.76	0.94	50	15	30.0	1564	23	1.47	31.28	1.53	0.46
Betel Chewing																		
Chewers	47	18	38.3	1486	58	3.90	31.62	3.22	1.21	72	34	47.2	2432	120	4.93	33.78	3.53	1.67
Non-Chewers	203	65	32.0	6320	208	3.29	31.13	3.20	1.02	178	70	39.3	5422	126	2.32	30.46	1.80	0.71

Table 4 : Frequency distribution of fluorosis in relation to caries in rural and urban areas

Areas	Fluorosis											
	Fluorosis affected						Fluorosis unaffected					
	caries			caries			Caries			Caries		
	Obs.	Aff.	%	Obs.	Aff.	%	Obs.	Aff.	%	Obs.	Aff.	%
Rural	250	26	10.4	4	15.38	22	250	224	89.6	82	36.61	142
Urban	250	13	5.2	2	15.38	11	250	237	94.8	101	42.62	136

in rural area. Likewise, among 224 persons (89.6%) unaffected by fluorosis, 82 subjects (36.61%) were found to be with dental caries. This finding is in agreement with others that persons affected by fluorosis are least affected by caries both in rural and urban areas. In urban area, among 13 persons (5.2%) affected by fluorosis only 2 persons (15.38%) show dental caries. Likewise, among 237 persons (94.8%) unaffected by fluorosis, 101 persons (42.62%) show dental caries. Thus, the present finding suggests that persons who are unaffected by fluorosis show a high percentage of caries. Therefore, the rural and urban samples in this respect show a significant difference at 5% level ($\chi^2_1 = 4.70$; $p > 0.05$).

Table 5 shows caries prevalence by caste group of Andhra Pradesh. Caries experience reveals the highest proportion of affected persons (50%) among the Kshatriya followed by Muslims of the present study (38.60%), Reddy (32.65%), Mala (29.41%), Yadava (26.79%)

and Balija (22.86%). Chi-square values also indicate that the proportion of caries affected persons differ significantly between groups, with Muslims having more caries affected persons than Balija ($\chi^2_1 = 9.40$; $p > 0.05$), Yadava ($\chi^2_1 = 5.50$; $p > 0.05$) Kshatriya ($\chi^2_1 = 4.38$; $p > 0.05$) Mala ($\chi^2_1 = 3.07$; $p < 0.05$) and Reddy ($\chi^2_1 = 1.68$; $p < 0.05$). However, the comparison of Muslims with Mala and Reddy communities is insignificant. Whereas, statistical significance is seen between Muslim and Balija.

Table 5 : Comparison of caries experience by community

Communities	No. of Persons		
	Obs.	Aff.	%
Muslims of Kurnool (Present Study)	500	193	38.60
Kshatriya	96	48	50.00
Reddy	98	32	32.65
Balija	105	24	22.86
Yadava	112	30	26.79
Mala	102	30	29.41

DISCUSSION

Prevalence of dental caries exhibits a wide range of variation in Muslims of the present study. The average of caries affected is 38.6%. This proportion is comparatively very low when compared with some caste populations in Andhra Pradesh like Vysyas (69.81%) (Rami Reddy and Vijaya Kumar, 1978); Muslims (46.0%) (Rami Reddy et al., 1982b,c); Balijas (43.81%) (Rami Reddy et al., 1984); Kammas (42.1%) (Kunzru and Krishna Reddy, 1984); Eastern Indian Population (44.3%) (Shourie, 1946); Australian Aborigines (41.6%) (William, 1972). Most of these groups including the present sample of Muslims show caries prevalence being higher in urban area. The disease is common in females of urban area with high percentage (45.6%) compared to their counterparts (39.2%). The studies conducted elsewhere in Andhra Pradesh also show that the Muslim females are affected more with 48.4% compared to males (38.5%) (Rami Reddy et al., 1984) and Valmiki females (19.2%) show more than that of males (16.4%) (Kunzru and Krishna Reddy, 1984); urban Kshatriyas (Papa Rao, 1984: males 12% and females 16%) Texas Indian females (37%) show more than males (32.5%) (Goldstein, 1948). Similar trend was seen by Nelson (1938) among the Pecos Indians.

The present study also highlights the fact that rural females are less affected (33.6%) than males (36%). A trend similar to the one was reported earlier in Karnataka (Rami Reddy, 1980a: males: 33.4%; females: 26.8%) and among Kammas in Andhra Pradesh (Kunzru and Krishna Reddy, 1984; males: 30%; females: 39%).

In urban and rural areas of the present study it is observed that as the age increases the prevalence of caries also increases. Similar is the case in other studies like, Vysyas (Rami Reddy and Vijaya Kumar, 1978); Pattusalis (Rami Reddy et al., 1982a); Balijas (Rami Reddy et al., 1984); and Yadavas and Pallis (Dharma Rao et al., 1985).

The present study shows that the upper income group (88.9%) were relatively more affected than the lower (33.2%) income groups

with significant difference ($\chi^2 = 30.83$; $p > 0.05$). Similar trend was seen in Gulbarga with significant difference between the upper and lower income groups ($\chi^2 = 6.77$; $p > 0.05$) (Rami Reddy, 1980a). It also shows similar trend between upper and lower income groups in rural area with significant difference ($\chi^2 = 4.82$; $p > 0.05$). A reverse trend is, however seen in rural area (Rami Reddy et al., 1982).

The present study shows high prevalence of caries among non-vegetarians, smokers, and betel chewers with the proportion of 35.1%, 41.3% and 38.3%, respectively. The smokers and betel chewers seen affected with more percentage than non-vegetarians. Similar trend is seen in the study of periodontal disease and dental caries in rural Andhra Pradesh by Rami Reddy et al. (1992).

A low frequency of caries in fluorosis affected persons is established in the present study. There is relation between caries and fluorosis wherein fluorosis affected persons show least percentage of dental caries. In this connection, when both rural and urban areas are compared, there is a significant difference at 5% level ($\chi^2 = 4.70$; $p > 0.05$). Similar trend is seen in the study of Shourie (1946) and Sidhu (1977). Rami Reddy (1984) opines that an inverse relationship is seen between dental caries and fluoride consumption and is as strong as the positive association between caries and consumption of sucrose.

The present analyses and comparison of data show that Muslims tend to have more caries experience over many of the regional communities like Reddy, Balija, Yadava and Mala excepting the Kshatriya. Further research in this direction would help us to understand the status of various populations of the country in caries prevalence and fluorosis.

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Morphological Characters of Foot Among The Lepcha of Kalimpong, West Bengal

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KEY WORDS Foot, Digital Formula, Morphology, Tribal.

ABSTRACT This note reports the frequency distribution of digital formulae and other morphological characters of foot among the Lepcha of Kalimpong sub-division, West Bengal.

INTRODUCTION

Foot is an important part of the body, which not only bears weight of the body but also an essential organ for locomotion. Foot has undergone several significant changes through evolutionary processes due to the assumption of erect posture. Environment is also an important factor which can bring about changes in shape and size of foot. Unfortunately, in India, not many researchers till date have shown much interest in studying various morphological characters of human foot from an anthropological point of view.

In the present study an attempt has been made to investigate some morphological characters of foot, like relative length of first and second toes and a few anthropometric traits like length, breadth and hallux divergence angle of foot among the Lepcha, a scheduled tribe of West Bengal. They are having Mongoloid affinities and speak Rong language, which belongs to the Tibeto-Burman family. They also identify themselves as Rongpa, meaning inhabitants (pa) of the valley (rong). The religious beliefs of the Lepcha may be classified into three categories, a) Animism, b) Buddhism, and c) Christianity.

MATERIAL AND METHOD

Data used in the present study were obtained from 90 unrelated Lepchas (45 males, 45 females) of Ngassey village in Kalimpong sub-division of Darjeeling district, West Bengal.

The techniques of collecting contour tracings of foot, followed in the present work, conform in general to those, described by Sarkar (1958). The relative lengths of first and second toes was determined by measuring the length from pterion to acropodion. Following three fold classification of Minami (1952), digital types of the Lepcha have been divided into tibial or type T ($1>2$), fibular or type F ($2>1$) and type 0 ($1=2$).

RESULTS AND DISCUSSION

The prevalence of type T, more particularly in males, and complete absence of type 0 in both sexes of the Lepcha is a remarkable feature (Table 1). However, no significant difference exists in foot types between sexes ($\chi^2 = 1.658$, d.f. = 1, >0.05). Data from other populations of North East India (Table 1) show that the tibial (T) type overwhelmingly predominates in all populations, and it is closely followed by fibular (F) type. The exception is limited only to the male Mikir and female Khasi (Das and Uzir, 1961), among which type 0 changes its sequential position with F type. The frequency of type T is relatively higher among the Boro Kachari, but it occurs in lesser frequency among the Turung. The test of significance reveals that so far as relative length of digits is concerned, the Lepcha in no way resemble the other Mongoloid population of the region.

In male, the Turung have got the highest foot length, while the Khasi, studied by Das and Uzir (1961), show the lowest value. In females, the highest mean value of foot length is noticed among the Ao Naga. Considerable differences are noticed among these populations in respect of foot length. However, variation observed in between male Lepcha and Khasi, and female Lepcha and Rabha, Khasi is not