Oral health status & treatment needs of rural population of Ambala, Haryana, India

A Kumar, M virdi, K Veeresha, V Bansal

Abstract

Objectives: Assess the oral health status & treatment needs, among rural population of ambala. Study participants & methods: This was a cross-sectional descriptive study conducted in 12 villages of ambala district, Haryana, India. A total of 1250 subjects aged 20-74 years, were examined using modified WHO format 1997 & interviewed using structured questionnaire. Statistical Analysis: Chi-square and ANOVA were used. Results: 31.5% subjects were uneducated, 55.2% subjects were unemployed 72.6% (896) belonged to poor class. A total of 32828 teeth were examined among which 10% were decayed. The mean DMFT was 5.2. Most of the subjects had CPITN score 2.35.2% of subjects needed prosthetic status in maxillary arch & 45.3% in mandibulararch. Dental caries was significantly associated with gender, education, socioeconomic status & brushing frequency. Periodontal disease was significantly related to frequency of brushing & age.Conclusion: Oral health status was not satisfactory. Nearly 90% of subjects needed one or other form of dental treatment.

INTRODUCTION

Oral health is a standard of the oral & related tissues which enables an individual to eat, speak & socialize without active disease, discomfort or embarrassment & which contributes to general well being. Dental caries & periodontal disease are most common oral diseases affecting 50-60% & 95-100% adult population in India respectively. Nearly 19% of the population aged between 65-74 years is edentulous.

India is the second highest populated country with more than 1030 million population, out of which approximately 72% live in rural areas & remaining 28% in urban areas. The dentist to population ratio is 1:10000 in urban areas, whereas 1:150,000 in rural areas. There are several challenges being faced in delivery of oral health care to the rural population, such lack of man power & poor accessibility which is compounded by poverty & illiteracy. Moreover there is a great paucity of data pertaining to oral health status of rural population of India which is essential for planning oral health services for the population. Thus in the light of above situation, in rural areas it is essential to assess the oral health status & treatment needs, among rural population and hence this study was conducted.

MATERIALS & METHODS

This cross-sectional study was conducted to assess the oral health status of rural population, with prior clearance from ethical committee.

Sampling was done using systematic multistage random sampling. Sample size was calculated using the formula $n=4p(1-p)L^2$ where $p =$ population proportion of positive character, $q=1-p$ & $L =$ Allowable Error. For this study $L$ was presumed to be 5% of $p$ giving a power of (1-L) i.e. 95% to study. $p$ was 60%,as obtained from pilot study. The final sample consisted of 1250 subjects.

Multistage sampling was used, Ambala district consist of three blocks one block was randomly selected. List of villages falling within this block was obtained from Block development office. The block was divided was divided into north, east, south & west & in each zone 3 villages are randomly selected & in each village one anganwadi was randomly selected & in the selected anganwadi with the help of anganwadi workers & sarpanch of the village, houses were visited & approximately 100 subjects who were the permanent residents of that place were examined after taking the verbal consent. There is one anganwadi in every village for every 1000 population, thus forming a natural cluster of population for selection. All individuals below 20 years &
above 74 years were excluded from the study. The study was conducted from house to house.

The subjects were made to sit on available furniture & were examined with adequate illumination (Type III examination)\(^8\). Calibration of the examiner was done in the department of Community dentistry in the college. Demographic details were recorded on a structured format. The data regarding oral health status & treatment needs were recorded on a modified WHO format 1997\(^9\). Socioeconomic status was calculated using B.G Prasad’s classification which was modified using the Aggarwal criteria\(^10\) (Table 1). Recording was done with the help of a recorder who was made to sit near the examiner.

**Figure 1**
Table 1. Showing socioeconomic classification using modified B.G Parsad’s classification

The All India wholesale price index (AIWPI) for the month of July 2008 was 239.3\(^10\).

Multiplication factor 239.3 * 0.53 = 127

Before examination complete dentures & partial dentures were removed in the subjects wearing them. After examination & recording, subjects were educated regarding healthy oral hygiene practices & pamphlets regarding health education were distributed. The needy population in the village was treated following recording by organizing a dental camp. Referral cards were issued for those needing further treatment. The data was analyzed using SPSS version 13 & Epinfo 3.4.3. ANOVA, logistic regression & Chi-square test were used & Yates correction was done where needed.

**RESULTS**
Among the 1250 subjects examined 47.8% (597) were males & 52.2% (653) were females (Table 2).

31.5% (394) subjects were uneducated, among the remaining 14.6% (183) attended primary school, 20.7% (259) middle school, 17.0% (212) high school, 9% (113) senior secondary school, 0.6% (8) had diploma, 5.4% (67) were graduates & 1.1% (14) were post-graduates.

55.2% (690) subjects were unemployed majority of them being females (88.2%) with farming being the main occupation. The mean per capita income of subjects was 1689. 0.9% (11) of subjects belonged to upper high class, 2.8% (35) to high class, 5.8% (72) to upper middle, 17.9% (221) to lower middle & 72.6% (896) to poor class.

Out of the total subjects, 18.5% (36.2% of the males & 2.3% of the females) had a habit of smoking tobacco. Distributions of deleterious oral habits among males are given in table 3.

**Figure 2**
Table 2. Showing distribution of subjects according to age and gender

<table>
<thead>
<tr>
<th>Age</th>
<th>Female % [n]</th>
<th>Male % [n]</th>
<th>Total % [n]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>16.1% (105)</td>
<td>20.0% (133)</td>
<td>18.2% (128)</td>
</tr>
<tr>
<td>25-34</td>
<td>27% (176)</td>
<td>22.0% (137)</td>
<td>25% (113)</td>
</tr>
<tr>
<td>35-44</td>
<td>25.4% (166)</td>
<td>15.1% (114)</td>
<td>22.3% (140)</td>
</tr>
<tr>
<td>45-54</td>
<td>19.9% (134)</td>
<td>14.9% (99)</td>
<td>19.5% (133)</td>
</tr>
<tr>
<td>55-64</td>
<td>3% (20)</td>
<td>12.7% (80)</td>
<td>11.3% (41)</td>
</tr>
<tr>
<td>65-74</td>
<td>5.7% (37)</td>
<td>9.7% (64)</td>
<td>7.6% (39)</td>
</tr>
<tr>
<td>Total</td>
<td>52.2% (353)</td>
<td>47.8% (307)</td>
<td>100% (250)</td>
</tr>
</tbody>
</table>

**Figure 3**
Table 3. Showing distribution of Oral habits in males

<table>
<thead>
<tr>
<th>Age</th>
<th>Smoking [%]</th>
<th>Tobacco chewing [%]</th>
<th>Alcoholic [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>13.8% (17)</td>
<td>17.1% (11)</td>
<td>16.8% (12)</td>
</tr>
<tr>
<td>25-34</td>
<td>33.6% (40)</td>
<td>21.5% (17)</td>
<td>12.4% (17)</td>
</tr>
<tr>
<td>35-44</td>
<td>47.9% (54)</td>
<td>15.8% (13)</td>
<td>34% (30)</td>
</tr>
<tr>
<td>45-54</td>
<td>89</td>
<td>8% (7)</td>
<td>12.5% (11)</td>
</tr>
<tr>
<td>55-64</td>
<td>36% (30)</td>
<td>38% (32)</td>
<td>16% (14)</td>
</tr>
<tr>
<td>65-74</td>
<td>31% (36)</td>
<td>8% (7)</td>
<td>15% (13)</td>
</tr>
<tr>
<td>Total</td>
<td>26.2% (216)</td>
<td>15.9% (135)</td>
<td>16.4% (139)</td>
</tr>
</tbody>
</table>

Among the dentate subjects (1167), 75.8% of the females & 61.4% of the males used tooth brush while 12.3% (7.8% of the females & 17.1% of the males) used tree stick. 2.7 % of the dentate subjects did not use any brushing aid. 81.4% of the females & 70.5% of the males used tooth paste while 5.2% of the females & 6.5% of the males used tooth powder.
75.3% of the females & 70.5% of the males brushed their teeth once a day or more while 2.8% of the females & 4.9% of the males never or rarely brushed their teeth. Oral hygiene practices were significantly related to educational status. (P < 0.05).

The prevalence of oro-mucosal lesions was 15%. 80% of oral mucosal lesion occurred in males (Table 4). Oral lesions were significantly related to socioeconomic status with approximately 81.6% (173) of lesion occurring in poor class. Most of the lesions occurred on buccal mucosa. Smokers had significantly higher prevalence (16%) of Leukoplakia and the odds ratio was 16. Logistic regression showed that male subjects were 2.8 times and female subjects 5.7 times likely to smoke if they were uneducated or had less than primary education than those with higher education.

**Figure 4**
Table 4. Showing prevalence of oro- mucosal lesions according to gender

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>0.9%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Leukoplakia</td>
<td>5.0%</td>
<td>7.7%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Erosion plate</td>
<td>2.7%</td>
<td>3.3%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Uler</td>
<td>0.6%</td>
<td>0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Betel chewing cream</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Smoker's palate</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Abscess</td>
<td>0.1%</td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Other</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Hypoplastic</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Total</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

A total of 32828 teeth were examined among which 89.3% (29321) were sound, 10% (3263) decayed, 0.3 % ( 125) were filled with no decay, 0.1% (39) filled with decay, 0.2%(68) teeth had traumatic injury & 0.03%(12) were bridge abutment. Females (77.3%) had higher caries experience as compared to males (Table 5).

**Figure 5**
Table 5. Showing prevalence of dental caries according to age

<table>
<thead>
<tr>
<th>Age</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>128</td>
<td>126</td>
<td>125</td>
</tr>
<tr>
<td>25-34</td>
<td>112</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td>35-44</td>
<td>254</td>
<td>260</td>
<td>257</td>
</tr>
<tr>
<td>45-54</td>
<td>194</td>
<td>202</td>
<td>198</td>
</tr>
<tr>
<td>55-64</td>
<td>140</td>
<td>146</td>
<td>143</td>
</tr>
<tr>
<td>65-74</td>
<td>95</td>
<td>102</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>1253</td>
<td>1278</td>
<td>1265</td>
</tr>
</tbody>
</table>

The mean DMFT was 5.2 & it was higher in females (Table 6). Number of teeth present per person was 26.2 & it showed a gradual decrease with increase in age. Mean number of teeth decayed, missing due to caries & missing due to other reason were 2.61, 2.46 & 2.52 respectively & these were significantly related to age. Females had higher mean number of teeth decayed (3.19) & missing due to caries (2.83) as compared to males (1.97 & 2.05, respectively). Uneducated subjects had a higher mean number of decayed & missing teeth but lower filled teeth as compared to educated subjects. Subjects brushing their teeth once a day or more had significantly lower mean number of teeth missing due to caries (1.69) & missing due to other reason (1.84) as compared to those who never brushed (8.77 & 11.88, respectively). The comparison of socioeconomic status with dentition status was not found to be statically significant (P < 0.05).

Mean number of teeth requiring one surface filling, two or more surface filling, pulp therapy & extraction was 1.27, 0.42, 0.27 & 2.14, respectively. Mean number of teeth requiring filling of one or more surface was significantly associated with age & gender (P < 0.05). Mean number of teeth requiring extraction was higher for subjects who never brushed their teeth or brushed less than once a day (P < 0.05).

**Figure 6**
Table 6. Showing DMFT according to age and gender

A total of 1152 subjects were examined for CPITN. Maximum subjects (74.7%) had a CPITN score of 2 (Calculus & other plaque retentive factors). There was no significant gender difference regarding CPITN scores (Table 7).
The analysis of data regarding the mean number of sextants affected showed that scores 1 & 2 were the most common with values of 2.63 & 0.33 respectively. Maximum CPITN score was significantly related to educational status, smoking & alcohol habits (P < 0.05) whereas non-significant in relation to gender, socioeconomic status & tobacco chewing habit.

When prosthetic status of subjects was studied, it was found that partial dentures in maxillary arch & mandibular arch were 4% & 1.4% respectively. 2% of the subjects had complete denture & the highest number of them was present in 65-74 year age group. Maximum partial dentures were present in 45-54 age group (Table 8).

When prosthetic needs of the subjects was estimated it was found that 35.2%(440) of subjects needed prosthesis in maxillary arch & 45.3% (566) needed prosthesis in mandibular arch. Prosthetic needs in all the categories were higher for mandibular arch except the need for complete denture in males (Table 9).

DISCUSSION

The present study was a cross-sectional study carried out to assess the oral health status & treatment needs of rural population of, Ambala. Male to female ratio in our study was lower whereas literacy rate & employment status was better as compared to that of rural population of Haryana state. Majority of the people were either farmers or laborers which is the major occupation of Haryana. The number of males & females was not equal in our study as the study was conducted during the day time & some of the male members could not be contacted. Moreover, it was seen that females cooperated better than males for the study.

The overall prevalence of smoking was higher as compared to Fatin A et al, Saraswathi TR et al & Wang QT et al but lower than reported by Sajid A et al, Gupta R. The prevalence of overall tobacco use was 2.3% among rural women which was at par with the national statistics.
Prevalence of dental caries was higher than reported by Damle et al \(^2\) (61.5% in rural population of Haryana), Goyal et al \(^3\) & Uetani M, et al\(^4\) but similar to Tiwari et al \(^5\). The average DMFT in the present study was 5.2 which is lower than that reported by Jolanta S\(^6\), Jagadeesan M\(^7\)

There was an inverse relationship between economic status & dental caries which is in accordance with Macedo TC et al\(^8\).

This study showed dental caries was significantly associated with gender, education, socioeconomic status & brushing frequency.

Overall prevalence of periodontal disease was 92.7% which was similar to that reported by Stjepan C\(^9\). 69.5% of subjects in age group 35-44 had calculus which is same as reported by DCI survey\(^10\). 12.2% had shallow pockets & 2.4% had deep pockets which was lower than that reported by WHO report \(^11\) & Jolanta S\(^12\) but higher than Singh GPI et al\(^13\).

Subjects with higher educational status had less severe periodontal disease which is similar to as reported by Mukerjee et al\(^14\). The present study also showed smoking as a risk factor for periodontal disease which is similar to that reported by Peterson PE\(^15\), & Kinane DF\(^16\). CPITN scores were significantly related to frequency of brushing & age which was similar to that reported by Macedo TC et al\(^17\).

Subjects in need of either periodontal or restorative treatment were higher than that reported by Mikael G\(^18\). Treatment needs were higher among females. This may be because of cultural reasons.

A significantly lower number of subjects had some prosthesis. Number of subjects wearing prosthesis in maxillary arch was higher & lower in mandibular arch as compared to DCI survey \(^19\).

Prevalence of edentulousness was 6.3% among females which is higher than that reported by Jagadeesan et al\(^20\) & Ekanayaka A\(^21\). In age group 35 to 44 years, 5.3% of female subjects were edentulous as compared to none by Jagadeesan et al\(^20\). Similarly, in the age group of 65-74 years the prevalence of edentulousness was lower as compared to DCI survey \(^22\), but higher as compared to Shah N\(^23\) & all South East Asian countries except Sri Lanka as reported by WHO \(^4\). 21.8% of edentulous subjects had complete dentures which is lower than that reported by Leif AH\(^24\) & Ekanayake L\(^25\).

This study was the first study assessing oral health status and treatment needs of rural population ambala district. CPITN Index was used for recording periodontal status which has a lower sensitivity as compared to CPI Index, the objective of using this index was to assess treatment needs. WHO methodology was used for caries detection and no radiographs were used. Hence the prevalence of caries recorded may be on the lower side.

**CONCLUSION**

Oral hygiene practices of the study population were not satisfactory as many of the subjects not brushing their teeth even once a day. The prevalence of deleterious habits like smoking, chewing tobacco & alcohol was high in males which are detrimental to health. Dental caries experience was significantly related to gender, education status & brushing frequency. Periodontal disease was widespread in the population with poor periodontal status in all age groups. Periodontal disease was found to be significantly related to age, educational status, smoking & alcohol habit. Prosthetic status of the subjects was poor with few subjects having prosthesis. Prosthetic needs were significantly related to educational status. Nearly 90% of subjects needed one or other form of dental treatment. There is a great need of health education programmes to educate and motivate population towards oral health and also to increase awareness of the available facilities Training camps for the anganwadi workers, health workers and school teachers who in turn will help for identification and referral of the population requiring treatment. Mass oral screening programmes can be taken up for risk group in the population to identify and treat premalignant lesions and conditions.

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