Caries experience in the permanent dentition of 12 year old schoolchildren of Bhimavaram town, India

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Abstract

Aims: To assess the dental caries experience of 12 year old school children of Bhimavaram town and to evaluate its relation to gender, occupation of father and tooth brushing habits. Methods: The study population for the present cross-sectional study comprised of 574 school children of 12 years age attending the schools in Bhimavaram town, Andhra Pradesh, India. Each subject was assessed for caries using decayed, missing and filled teeth index (DMFT). In addition, each subject was interviewed for socio-demographic data (age, gender, occupation of father) and oral hygiene behavior (method of cleaning teeth and frequency of cleaning teeth). Results: The overall caries prevalence in the study population accounted to 76.5% and there was a significant difference between the genders for caries experience. The mean DMFT of 2.39 in boys was significantly greater than 2.14 among the girls. Similarly, decayed and filled components of DMFT were significantly greater in males than girls. Though there was a gradual increase in the caries experience as the level of occupation deteriorated, the increase was insignificant. Subjects using tooth brush and tooth paste and those cleaning twice or more per day experienced lesser caries than their counterparts, however this was insignificant. Conclusions: Boys had greater caries experience than girls. Occupation of the father, oral hygiene method and frequency of tooth cleaning failed to influence dental caries experience.

Key words: Caries; DMFT; School children; Tooth brushing.

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Introduction

Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, oropharyngeal cancers, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) – related oral disease and orodental trauma are major public health problems worldwide. Among these, dental caries is still a major health problem in most countries as it affects 60-90% of school-age children and a vast majority of adults. (1)

Furthermore, the prevalence of dental caries has been found to be high in many of the industrialized countries while low caries levels have been observed in developing countries (2). However, the last three decades has seen massive improvements in child dental health in most industrialized countries (3). The reasons for this development are complex but may be ascribed to a more sensible approach to sugar consumption, improved oral hygiene practices, fluorides in toothpaste, topical fluoride application, and fluoride rinsing (4). Thus, it has been suggested that dental caries tend to be less prevalent in societies with traditional diets and low sugar consumption (5).

It is well documented that dental caries is a multifactorial disease; in addition to oral hygiene practices and diet, it has been concluded from a systematic review that there exists an inverse relationship between socio economic status and the prevalence of caries among children less than twelve years of age (6). While there have been contradictory reports regarding the influence of oral hygiene behavior on dental caries status, it has been established from a systematic review that a weak evidence that tooth-brushing prevents dental caries (6).

The age group of 12 years old has always been considered as a global monitoring age for dental caries, as it is generally the age at which children leave primary school, and thus in most countries, is the last age at which a reliable sample may be obtained easily through the school system (7). In Asia, the prevalence of dental caries in children is reported to be low to moderate (8). Furthermore, the prevalence of dental caries in India has been found to be 53.8%, which is considered to be low (9). However, there is no data available on dental caries status of 12 year old children from the present study region which would aid in planning oral health services. Hence, this study intended to assess the dental caries experience of 12 year old school children of Bhimavaram town and to evaluate its relation to gender, occupation of father and tooth brushing habits.

Material and methods

The target population of the present cross-sectional study was children in the age of 12 years attending the schools in Bhimavaram town, Andhra Pradesh, India. A representative sample of 574 school children was extracted from the target population by stratified random sampling procedure. Firstly, Bhimavaram town was stratified into four geographic regions and two schools were randomly selected from each region. From the selected schools, all the 12 year old children were included.

Students present during the days of the survey were considered for inclusion while those children whose parents did not give the consent were excluded. Ethical approval was obtained from the institutional ethical committee.

Each subject was assessed for caries using decayed, missing and filled teeth index (DMFT) (10). The criterion for caries assessment was according to the World Health Organisation (WHO) Guidelines, 1997 (7). Clinical examination for dental caries was done by a single examiner (SK) with mouth mirror and community periodontal index (CPI) probe under adequate illumination. The intra-examiner consistency for dental caries
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assessment was 89.6% calculated using kappa statistic.

In addition to clinical examination, each subject was interviewed for socio-demographic data (age, gender, occupation of father) and oral hygiene behavior (method of cleaning teeth and frequency of cleaning teeth). Occupation status of the parents was classified according to the occupation component of Kuppuswamy scale (11).

**Statistical analysis**

Statistical Data collected was subjected to statistical analysis using Statistical Package for Social Sciences (SPSS), version 17.0. Unpaired t test and one way analysis of variance (ANOVA) were used for evaluating the significance of difference between the means of two groups and more than two groups respectively. A probability value of less than 0.05 was considered significant.

**Results**

The overall caries prevalence in the study population accounted to 76.5%. It is evident from table 1 that there was a significant difference between the genders for caries experience. The mean DMFT of 2.39 in boys was significantly greater than 2.14 among the girls. Similarly, decayed and filled components of DMFT were significantly greater in males than girls.

**Table 1**: DMFT and its components in the study population in relation to gender

<table>
<thead>
<tr>
<th></th>
<th>Males (366)</th>
<th>Females (208)</th>
<th>Total (574)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decayed*</td>
<td>2.34±2.28</td>
<td>2.10±1.84</td>
<td>2.26±2.13</td>
</tr>
<tr>
<td>Missing</td>
<td>0.04±0.19</td>
<td>0.03±0.16</td>
<td>0.03±0.18</td>
</tr>
<tr>
<td>Filled*</td>
<td>0.01±0.10</td>
<td>0.00±0.00</td>
<td>0.01±0.085</td>
</tr>
<tr>
<td>DMFT*</td>
<td>2.39±2.34</td>
<td>2.14±1.88</td>
<td>2.30±2.19</td>
</tr>
</tbody>
</table>

Unpaired t test, *p<0.05

Though there was a gradual increase in the caries experience as the level of occupation deteriorated, the increase was insignificant. Children of semi-professional fathers’ had lowest caries experience while those of unskilled had greatest caries experience (table 2).

<table>
<thead>
<tr>
<th></th>
<th>Semi professional (10)</th>
<th>Clerical, Shop- owner, Farmer (232)</th>
<th>Skilled worker (206)</th>
<th>Unskilled (126)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decayed</td>
<td>2.20±1.54</td>
<td>2.18±2.19</td>
<td>2.21±1.95</td>
<td>2.48±2.35</td>
</tr>
<tr>
<td>Missing</td>
<td>0.00±0.00</td>
<td>0.03±0.15</td>
<td>0.03±0.18</td>
<td>0.06±0.23</td>
</tr>
<tr>
<td>Filled</td>
<td>0.00±0.00</td>
<td>0.01±0.00</td>
<td>0.01±0.098</td>
<td>0.00±0.00</td>
</tr>
<tr>
<td>DMFT</td>
<td>2.20±1.54</td>
<td>2.21±2.23</td>
<td>2.25±1.98</td>
<td>2.54±2.45</td>
</tr>
</tbody>
</table>

One way ANOVA, not significant

**Table 2**: Decayed, missing and filled teeth index of 12 year old school children according to their father’s occupation

**Table 3**: DMFT in relation to the method and frequency of cleaning teeth

<table>
<thead>
<tr>
<th>Mode of cleaning teeth</th>
<th>Decayed</th>
<th>Missing</th>
<th>Filled</th>
<th>DMFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tooth brush and paste (566)</td>
<td>1.75±1.58</td>
<td>0.00±0.00</td>
<td>0.00±0.00</td>
<td>1.75±1.58</td>
</tr>
<tr>
<td>Finger (8)</td>
<td>2.26±2.14</td>
<td>0.04±0.00*</td>
<td>0.01±0.084*</td>
<td>2.31±2.19</td>
</tr>
<tr>
<td>Frequency of cleaning</td>
<td>2.28±2.15</td>
<td>0.04±0.18</td>
<td>0.01±0.088*</td>
<td>2.32±2.21</td>
</tr>
<tr>
<td>Once (510)</td>
<td>2.06±1.99</td>
<td>0.03±0.17</td>
<td>0.00±0.00</td>
<td>2.09±2.02</td>
</tr>
<tr>
<td>Twice or more per day (64)</td>
<td>2.06±1.99</td>
<td>0.03±0.17</td>
<td>0.00±0.00</td>
<td>2.09±2.02</td>
</tr>
</tbody>
</table>

*One way ANOVA, p<0.05

Table 3 demonstrates that tooth brush and tooth paste was the mode of cleaning teeth in a large majority (98.6%) of the study population and approximately one tenth (11.2%) of the population reported of cleaning the teeth twice or more per day. Subjects using tooth brush and tooth paste and those cleaning twice or more per day experienced lesser caries than their counterparts, however this was insignificant.

**Discussion**

The data obtained from the present study would help in planning preventive programmes for the present study population. The overall caries prevalence in the study population accounted to 76.5% which is greater than 53.2% that has been observed among 12 year old children of the nation according to national oral health survey which was conducted in 2002 (11). This difference
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could be attributed to the reason that the present study population is representative of the children of Bhimavaram town while the national survey consisted of children representative of the whole nation. The other probable reason might be due to the reduction in dental caries occurrence since 2002.

Boys had significantly greater caries experience than girls. A well-documented finding is that females take preventive oral health actions more often, and consume sugary products less often than their male counterparts (12, 13) which might be a reason for boys exhibiting greater caries experience than girls.

Past studies have reported that in addition to gender, various social influences appear to be important predictors for dental caries. Past literature provides substantial evidence for the poorer oral health of lower-socioeconomic status (SES) groups compared with their higher SES counterparts (14-16).

In the present study, we tried to assess the influence of SES on dental caries but have taken only father’s occupation into consideration as the other components of SES like education and annual income could not be retrieved either from the school records or by the subject interviews. Furthermore, the occupation of the mother was not taken into consideration as all of them were housewives. It was observed that there was a gradual increase in the caries experience as the level of occupation deteriorated but the increase was insignificant. Occupation merely is a measure of prestige, responsibility, physical activity and work exposures (17). A study concluded that higher education may be the best SES predictor for good health than income and occupation (17). This could be a probable reason why dental caries was not related to occupation of the father. However, this is in contrast to previous studies, where parental occupation significantly influenced dental caries levels (18, 19).

In agreement with some earlier studies (8, 20-22), oral hygiene methods and frequency of cleaning were not found to be significantly related to caries occurrence in this study. This is in contrast to a previous study (23) where frequency of tooth brushing was observed to affect caries prevalence.

The reason for dental caries being uninfluenced by tooth cleaning frequency might be due to the reason that it is the quality of tooth brushing which is more important than the frequency. Santos et al., (24) observed that oral hygiene frequency was not associated to oral hygiene quality and they have recommended that further studies concerning the relation between the occurrence of dental caries and oral hygiene habits should consider not only the frequency of toothbrushing but also the quality of tooth cleanliness.

In conclusion, boys had greater caries experience than girls. Occupation of the father, oral hygiene method and frequency of tooth cleaning failed to influence dental caries experience.

References
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