Assessment of caries prevalence among children below 5 years old

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Abstract

Context: In the current scenario of developing countries, dental caries has been a long-standing challenge in the oral health issue and still on the rise. Aim: The aim of the following study is to estimate the caries prevalence in the primary dentition among children below 5 years of age. Materials and Methods: Study population included both boys and girls below 5 years old attending KGF Dental College and Hospital, Karnataka. A simple random sampling method was used. A total of 672 children were examined under headlamp illumination using mouth mirror and probe according to World Health Organization (WHO) criteria. A questionnaire was used to elicit information from the attendants regarding general health, intra oral examination and caries experience was recorded using WHO 1997 proforma. The data were computerized and analyzed applying the Statistical Package for the Social Sciences program. Results: Prevalence of dental caries was 44.34%. Caries prevalence was higher in the boys than the girls and it was statistically significant (P < 0.05). It was also found that primary second molars were the highest carious tooth. Conclusion: The prevalence of dental caries was high among children below 5 years old. The present study was undertaken to obtain baseline data for planning preventive programs. Untreated caries indicates subsequent steps toward preventive and restorative care should be initiated. In order to reduce the caries prevalence, there is a need for continuous monitoring and health education to the children and parents, guardians.

Key words: Age, dental caries, prevalence

INTRODUCTION

Dental caries is progressive destruction of teeth by bacteria. It is one of the most common of all diseases and a major cause of loss of teeth.[1] It has been deep rooted and rising oral health problem among children in the world. Caries at a younger age group leads to several morbid conditions of the oral cavity and also other systems of the human body.[2] Oral health is an integral part of general health.[3] Various general health conditions do have oral manifestations, which in turn increase the risk of oral diseases, for example, diabetes mellitus, cardiovascular diseases etc., The initiation of dental caries depends on oral hygiene practices, age, sex, socioeconomic profile, lifestyle, geographic location, race, food habits and also the distribution varies within the oral cavity.

Dental caries affects 60-90% of children and the vast majority of adults.[4] The world health organization (WHO) suggests five selected age groups for the basic oral health surveys, (i.e., 5 years, 12 years, 17-18 years, 35-44 years and 65-74 years) to assess the severity of the problem, plan intervention activities.[5]
In spite of the success achieved by focusing on the oral health, many issues still remain unsolved particularly among the under privileged in developing countries. History states that caries and periodontal diseases are a major component of the global disease burden. Therefore, keeping in mind the limitation of literature on these issues, the current study was undertaken to obtain information on the oral health requirements of the 5 years old school children attending KGF Dental College and Hospital, Karnataka. This baseline data helps to plan preventive measures, restorative care and recall of the population. As oral health is an integral part of general health focusing on better oral health at a younger age group will have a good impact on their future general health too. Professional care and individual motivation, health education can help overcome these diseases and strive toward a better oral health.

MATERIALS AND METHODS

The study design was a cross-sectional study carried out on children below 5 years attending KGF Dental College and Hospital, Karnataka. The sampling method chosen was simple random. The study was conducted from April to August 2009. Prior permission was obtained from the head of the institution. A pilot study was conducted among 50 children initially to assess the validity and reliability of the proforma and study design. A total of 672 children were taken as a study population. Among them 352 were boys and 320 were girls. Data collection included a clinical examination and structured questionnaire. Informed consent was obtained from the parents or guardians of the child.

Inclusion criteria

The study participants included both boys and girls below 5 years.

Exclusion criteria

- Children above 5 years were not considered
- Children with congenital and systemic illness
- Children who visited the hospital for emergency treatment.

The clinical examination was performed by single investigator under head lamp illumination using probe and mouth mirror. Intra-examiner reliability was assessed by a repeat examination of 15 children selected by a Pedodontist during the pre-test at the institution. Assistance was obtained from their parents and guardians for handling the child during examination among unco-operative, children below 3 years. These patients were examined using only mouth mirror and sterile cotton gauze.

The study population were examined and dental caries were registered using WHO 1997 proforma. The questionnaires and data forms were assessed for quality and consistency. The data were computerized and analyzed applying the Statistical Package for the Social Sciences program.

RESULTS

Out of 672 children examined under this study, 352 were boys and remaining 320 were girls. On the whole 44.34% had caries. Distribution in relation to sex shows that caries experience was higher in boys (47.44%) than in girls (40.94%). This difference was statistically significant ($P < 0.05$) [Table 1].

Caries was present in 26.64% of the maxillary arches and 36.76% of the mandibular arches. Among boys, the mandibular arch had an increase in caries level (38.64%) than the maxillary arch (30.97%) and the difference was significant statistically ($P < 0.05$). Similarly among girls, the mandibular arch depicts more caries prevalence (34.69%) than the maxillary arch (21.88%) and the difference was statistically significant ($P < 0.01$) [Table 2].

Boys had caries prevalence of 40.34% and 40.91% on the right and left sides respectively. Whereas girls had caries of about 34.38% and 35.63% on the right and left sides respectively. This difference was not significant [Table 3].

| Table 1: Prevalence of dental caries among study population |
|-----------------|-----------------|-----------------|-----------------|
|                 | Age (years)     | Sex             | Examined        | Caries N | %   | P value |
| <5 years        | <5 years        | Boys            | 352             | 167      | 47.44 | $<0.05$ |
|                 |                 | Girls           | 320             | 131      | 40.94 | $<0.05$ |
|                 | <5 years        | Total           | 672             | 298      | 44.34 | $<0.05$ |

| Table 2: Distribution of dental caries in relation to dental arch |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | Sex             | Examined        | Maxillary arch caries N | %   | P value |
|                 |                 |                 | Mandibular arch caries N | %   | P value |
| Boys            | 352             | 109             | 30.97            | $<0.05$ | 136 | 38.64 | $<0.01$ |
| Girls           | 320             | 70              | 21.88            | $<0.05$ | 111 | 34.69 | $<0.01$ |
| Total           | 672             | 179             | 26.64            | $<0.05$ | 247 | 36.79 | $<0.01$ |
Caries distribution of anterior and posterior teeth among both the sexes depicts that caries had an increase pattern in the posterior segment than the anterior segment. When the caries prevalence of the anterior teeth was compared among the sexes, boys showed more caries prevalence than girls with a statistically significant difference \((P < 0.01)\) [Table 4].

Comparison of caries between the arches caries occurred more frequently in the posterior teeth. Comparison of caries between the arches in the anterior segment depicts that caries was more in the maxillary arch and the difference was significant statistically \((P < 0.01)\). On the other hand, in the posteriors, caries was more in the mandibular arch. The difference was significant statistically \((P < 0.001)\) [Table 5].

**DISCUSSION**

In the present study, the total number of boys is slightly higher than the total number of girls (52.38% and 47.62% respectively). Out of which, caries was significantly more prevalent in boys than in girls. This suggests that dental caries show some predilection for sex. Same findings were detected by Zerfowski et al.\(^6\) on the other hand, the opposite scenario was shown by Ullah et al. where the age of the children included in the study was 12 years.\(^7\)

Inter arch comparison depicts that caries was on the rise in mandibular arch and in both the sexes it was statistically significant. Jawadekar et al. in their study have reported same findings.\(^8\) Higher caries prevalence in upper arch was reported by Sathe.\(^9\) Caries prevalence in relation to right and left halves of the oral cavity, depicts that dental caries occurs predominantly as a bilateral phenomenon. Similar findings were observed by Dunning.\(^10\) In our study, caries attack was 4-6 times more in the posterior teeth than anterior. Almost same findings were observed by Chawla et al.\(^11\) This is due to complex morphological nature of posterior teeth.\(^12\)

The present study showed that the second primary molar is the tooth with highest caries experience which erupts at a later date. The findings of Pinkham were similar.\(^13\) This difference in individual tooth susceptibility is due to the fissure topography of molars. The pits and fissure in second primary molars are deeper and less completely coalesced.\(^14\) Furthermore, they are positioned posteriorly compared to other teeth, making it difficult in brushing accessibility for the young children and their parents.

In the present study, “Nursing caries” was seen in maxillary primary incisors, maxillary and mandibular primary molars, but mandibular deciduous incisors are almost healthy. The lower incisors are protected by the tongue and the opening of major salivary ducts but upper molar teeth is not protected by the opening of parotid glands.\(^15\) Carious attack was higher in mandibular arch than maxillary arch in the molar teeth.

### Table 3: Dental caries prevalence on right and left side of oral cavity

| Sex      | Examined | Right side caries | Left side caries |
|----------|----------|-------------------|-----------------|
|          | \(N\)    | \(\%\)            | \(N\)           | \(\%\)         |
| Boys     | 352      | 142               | 40.34           | 144            | 40.91         |
| Girls    | 320      | 110               | 34.38           | 114            | 35.63         |
| Total    | 672      | 252               | 37.50           | 258            | 38.39         |

### Table 4: Prevalence of dental caries in relation to type of teeth and sex

| Type of tooth | Boys' examined | Caries examined | Girls examined | Caries examined | Total examined | Caries examined | P value |
|---------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|---------|
| Central incisor | 389           | 109             | 7.80           | 1269           | 53             | 4.1             | <0.001  |
| Lateral incisor | 1404          | 48              | 3.42           | 1278           | 25             | 1.96            | <0.001  |
| Canine        | 1407          | 30              | 2.13           | 1280           | 15             | 1.17            | <0.001  |
| I molar       | 1403          | 255             | 16.74          | 1278           | 161            | 12.60           | <0.001  |
| II molar      | 1400          | 249             | 17.79          | 1275           | 207            | 16.24           | <0.001  |

### Table 5: Prevalence of dental caries in relation to type of tooth

| Type of tooth | Maxillary arch examined | Caries examined | P value |
|---------------|-------------------------|-----------------|---------|
| Central incisor | 1335                     | 156             | 11.69   | <0.001  |
| Lateral incisor | 1340                    | 71              | 5.30    | <0.001  |
| Canine        | 1340                     | 71              | 5.30    | <0.001  |
| I molar       | 1340                     | 71              | 5.30    | <0.001  |
| II molar      | 1340                     | 71              | 5.30    | <0.001  |
Similar findings were found by Sarkar et al.\cite{16}

**CONCLUSION**

The present study depicts that the dental caries experience in primary dentition was 44.34%. Boys were leading in number than the girls. Mandibular molars, maxillary anterior were most affected compared with the mandibular anterior teeth which was least affected. The present study was undertaken to obtain baseline data for planning preventive programs. It is high time to create awareness and focus on the preventive measures in this location.\cite{17,18,19} Untreated caries indicates subsequent steps towards preventive and restorative care should be initiated.\cite{20,21} In order to reduce the caries prevalence, there is a need for continuous monitoring and health education to the children and parents, guardians.

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