Prevalence and pattern of caries in primary anterior teeth of preschool children: An observational study

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ABSTRACT
Introduction: Primary teeth are prone to caries. Consequences of caries may hamper eruption and function of the succedaneous teeth. The aim of the study is to find the prevalence and patterns of dental caries in maxillary and mandibular primary anterior teeth of preschool children. The study design adopted was an analytical observational study. Methodology: Caries examination was done using the WHO caries detection criteria. Anterior carious tooth surfaces were examined under optimal light source by a single qualified examiner to minimize visual error. The age of children was measured in years. Obtained data were subjected to statistical analysis using SPSS 16 software. A test for significance was done with the help of the Chi-square test. Results: Right maxillary and mandibular canines had more caries prevalence and patterns as compared to their left counterpart of the same arch. Maxillary canines had more prevalence of caries as compared to mandibular canines. Mandibular lateral incisors had about eight times less chance to develop caries as compared to maxillary lateral incisors. Maxillary and mandibular right central incisors had equal caries prevalence and patterns of their counterparts of the same arch, but maxillary central incisors had four times more caries prevalence as compared to mandibular central incisors. Conclusions: Right maxillary and mandibular anterior teeth had more prevalence of caries as compared to their left counterparts. Maxillary anterior teeth had more prevalence of caries as compared to mandibular anterior teeth.

KEYWORDS: Caries patterns, caries prevalence, primary anterior teeth

Introduction
Anterior teeth of preschool children are more susceptible to dental caries due to increased consumption of sugars and reduced exposure of fluoride. It has been testified that caries follow a typical pattern on each tooth surface. All the surfaces of primary tooth are not equally susceptible to caries; therefore, it is important to know the relative tooth susceptibility of maxillary and mandibular anterior teeth. High susceptibility to caries may be due to dental tissue-level deficiency, hygiene, or cariogenic food habits. Anatomy/positions of tooth in the arch also play an important role in plaque accumulation like inaccessible tooth surfaces to hygiene or due to tooth mineralization defect/matrix formation defects; tooth becomes more sensitive to demineralization. Children are unaware of the consequences of unhygienic oral conditions and have a tendency of consuming more cariogenic diet. Parental ignorance and unawareness of the importance of
oral hygiene worsens the oral conditions of children. Dental caries is recognized as a serious community health problem due to its potential for increasing risk of caries in succedaneous tooth. Each primary anterior tooth surface has a specific pinpoint area of caries initiation which has a higher susceptibility to caries as compared to the same surface of the tooth and other tooth surface/surfaces. These caries form a specific pattern on each tooth surface with distinctive caries prevalence and patterns. Most of the prevalence studies are based on the total prevalence of caries at specific age.[3,4] None of the studies of primary teeth regarding caries prevalence were based on the individual tooth assessment. This study revealed the prevalence and patterns of dental caries of each primary anterior maxillary and mandibular tooth.

Methodology

Children (n = 900) participating in the study were 56.7% of males and 43.3% of females. The present study was done to know the prevalence and pattern of dental caries in primary anterior tooth of preschool children. Caries examination was conducted under optimal light source using the WHO caries detection criteria.[3] Exclusion criteria of the study were children suffering from any systemic disease, special care need children, and erupted permanent teeth. Ethical clearance was taken from the institute, and signed written consent was obtained from children’s parents. Caries prevalence and patterns of preschool children, who visited the Faculty of Dental Sciences for caries or other oral/tooth ailments, were examined, and data were recorded. The children were examined under standardized environment by a single qualified examiner under optimal light source to reduce error of observation. Children’s age was measured in years, and ages in years and months was merged with the nearest round off number. Each tooth surface was scored independently. No radiographic examination was done. The Chi-square test was used to compare the study population to age and gender. Student’s t-test was used to compare the data between males and females.

Results

Prevalence and caries pattern in maxillary right primary canines [Table 1]

In preschool children, 90% of maxillary right primary canine had no caries. Only 10% prevalence of caries was detected in maxillary right primary canines with 11 patterns of caries. Mesial caries was seen 4% of maxillary right canines. The incidence of mesial caries was observed to be highest at the age of 4 years, followed by 3, 6, and 5 years. Another common pattern of caries in maxillary right canines was distal caries which were observed in only 1.3%. Other common caries patterns were buccal caries, incisal caries, mesio-buccal caries, and mesio-distobuccal caries which occupied 0.7% each. Preschool children’s maxillary right canines also showed mesio-bucco-incisal, mesio-linguo-distobuccal, and disto-buccal caries patterns which occupied 0.3% each. Mesio-distal caries patterns occupied 1%. No significant difference of carious prevalence and pattern was observed among different ages and genders (P = 0.585 and P = 0.196, respectively).

Prevalence and caries pattern in maxillary right primary lateral incisors [Table 2]

In preschool children, 68% of maxillary right primary lateral incisors had no caries. 32% prevalence of caries was observed in maxillary right primary lateral incisors with 9 patterns of caries. The highest incidence of mesio-linguo-distobuccal caries pattern was observed in maxillary lateral incisors, followed by mesial caries, mesio-buccal caries, buccal caries, and mesio-distobuccal caries. Other common caries prevalence and patterns were mesio-distal caries, mesio-linguo-buccal caries, and disto-buccal caries which occupied 1.7%, 0.7%, and 0.3%, respectively.

Table 1: Age and Gender wise Prevalence & Pattern of Caries in Maxillary Right Primary Canine

| Pattern of caries (Mx.Rt. Pri.canine) % within Age | Age | Total Average% (n=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|-----------------------------------------------|-----|--------------------------------------------------------------------|---------------|
| % within Age                                  | 3 year | 4 year | 5 year | 6 year | Male | Female |
| No caries % within Age                        | 85.3 | 87.7 | 90.2 | 96.1 | 90% | 89.4 | 90.8 |
| Mesial caries % Within age                    | 4.4 | 6.8 | 2.4 | 2.6 | 4% | 4.1 | 3.8 |
| Distal caries % Within Age                    | 1.5 | 1.4 | 2.4 | 0.0 | 1.3 | 2.4 | 0.0 |
| Buccal caries                                 | 2.9 | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 1.5 |
| Incisal caries                                | 1.5 | 1.4 | 0.0 | 0.0 | 0.7 | 0.0 | 1.5 |
| Mesiobuccal caries                            | 1.5 | 0.0 | 1.2 | 0.0 | 0.7 | 0.0 | 1.5 |
| Mesiodistal caries                            | 1.5 | 0.0 | 1.2 | 1.3 | 1.0 | 1.8 | 0.0 |
| Mesiobuccoincisal caries                      | 0.0 | 0.0 | 1.2 | 0.0 | 0.3 | 0.0 | 0.8 |
| Mesiolinguidistobuccal                        | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.6 | 0.0 |
| Disto buccal caries                           | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.6 | 0.0 |
| Mesiodistobuccal caries                       | 1.5 | 0.0 | 1.2 | 0.0 | 0.7 | 0.0 | 1.5 |
| Total %                                       | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Chi square test                               | Chi-Square=27.729, P=0.585 | Chi-square=13.522, P=0.196 |
The percentage of caries prevalence in maxillary right primary lateral incisors was in decreasing order as age increased from 3 to 6 years. A significant correlation was observed between age and prevalence and caries patterns (\(P = 0.001\)). However, no significant difference was observed between prevalence and caries pattern of males and females (\(P = 0.498\)).

**Prevalence and caries pattern in maxillary right primary central incisors [Table 3]**
In preschool children, 59.7% of maxillary right primary central incisors had no caries. 40.3% prevalence of caries was observed in maxillary right primary central incisors with 8 patterns of caries. The percentage of caries prevalence in maxillary right primary central incisors was in decreasing order as age increased from 3 to 6 years. The highest incidence of caries pattern in maxillary right central incisors was observed as mesio-linguo-distobuccal, followed by buccal, mesial, mesio-distal, mesio-buccal, and mesio-incisal categories. A significant correlation was observed between age and prevalence and patterns (\(P = 0.000\)). No significant difference was observed between prevalence and caries pattern of males and females (\(P = 0.852\)).

**Prevalence and caries pattern in maxillary left primary central incisors [Table 4]**
In preschool children, 59.3% of maxillary left primary central incisors had no caries. 40.7% prevalence of caries was observed in maxillary left primary central incisors with 9 caries patterns. The percentage of caries prevalence in maxillary left primary central incisors was in decreasing order as age increased from 3 to 6 years. The highest prevalence and pattern of caries in maxillary left central incisors was exhibited by mesio-linguo-distobuccal, mesial, mesio-distal, buccal, mesio-buccal, mesio-incisal, and mesio-linguo-buccal caries. A significant correlation was observed between age and percentage of caries prevalence and patterns (\(P = 0.000\)). No significant difference was observed between prevalence and caries patterns of males and females (\(P = 0.677\)).

**Prevalence and caries pattern in maxillary left primary lateral incisors [Table 5]**
In preschool children, 68.7% of maxillary left primary lateral incisors had no caries. 31.3% prevalence of caries was observed in maxillary left primary lateral incisors with 9 patterns of caries. The percentage of caries prevalence in maxillary left primary lateral

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**Table 2: Age and Gender wise Prevalence & Pattern of Caries in Maxillary Right Primary lateral incisor**

| Pattern of caries (Mx.Rt. Pri. Lateral incisor) % within Age | Age | Total Average % (n=900) (Pattern & Prevalence of caries in Preschool age) | % within Gender |
|-------------------------------------------------------------|-----|--------------------------------------------------------------------------------|-----------------|
|                                                             | 3 year | 4 year | 5 year | 6 year |                             | Male | Female |
| No caries                                                   | 66.9   | 70.8 |
| Mesial caries                                               | 8.8    | 8.2   | 6.1    | 5.2    | 7.7                         | 6.2  |
| Buccal caries                                               | 4.7    | 3.3   | 3.3    | 4.3    | 4.1                         | 4.6  |
| Mesiodistal caries                                          | 18.1   | 1.5   | 1.5    | 1.7    | 0.7                         | 0.3  |
| Mesiolingual buccal caries                                  | 68.2   | 11.8  | 10.0   | 7.3    | 0.9                         | 0.8  |
| Mesiolingualdistobuccal caries                              | 16.2   | 11.8  | 10.0   | 7.3    | 0.9                         | 0.8  |
| Dietobuccal caries                                          | 4.4    | 4.1   | 4.1    | 3.0    | 0.4                         | 0.4  |
| Mesiodistobuccal caries                                     | 100    | 100   | 100    | 100    | 100                         | 100  |
| Chi square test                                             | Chi-square=51.992, \(P=0.001\) |

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**Table 3: Age and Gender wise Prevalence & Pattern of Caries in Maxillary Right Primary central incisor**

| Pattern of caries (Mx.Rt. Pri. Central incisor) % within Age | Age | Total Average % (n=900) (Pattern & Prevalence of caries in Preschool age) | % within Gender |
|--------------------------------------------------------------|-----|--------------------------------------------------------------------------------|-----------------|
|                                                             | 3 year | 4 year | 5 year | 6 year |                             | Male | Female |
| No caries                                                   | 57.1   | 63.1 |
| Mesial caries                                               | 5.9    | 3.5   | 3.8    | 0.8    | 0.0                         | 0.0  |
| Buccal caries                                               | 4.1    | 0.8   | 0.8    | 0.1    | 0.0                         | 0.0  |
| Mesioinclusal caries                                        | 14.3   | 12.3  | 12.3   | 12.3   | 12.3                        | 12.3 |
| Mesiodistal caries                                          | 8.0    | 7.7   | 7.7    | 7.7    | 7.7                         | 7.7  |
| Mesiolingual -distobuccal caries                            | 100    | 100   | 100    | 100    | 100                         | 100  |
| Chi square test                                             | Chi-square=60.705, \(P=0.000\) |
incisors was in decreasing order as age increased from 3 to 6 years. The highest caries prevalence and pattern was exhibited by mesio-lingu-ventro-buccal caries, followed by mesial, buccal, mesio-buccal, mesio-distal-buccal, and disto-buccal caries patterns. A significant correlation was observed between age and percentage of prevalence and caries patterns ($P = 0.000$). No significant difference was observed between caries prevalence and patterns of males and females ($P = 0.312$).

### Prevalence and caries pattern in maxillary left primary canines [Table 6]

In preschool children, 92.7% of maxillary left primary canines had no caries. 7.3% prevalence of caries was observed in maxillary left primary canines with 9 incisors was in decreasing order as age increased from 3 to 6 years. The highest caries prevalence and pattern was exhibited by mesio-lingu-ventro-buccal caries, followed by mesial, buccal, mesio-buccal, mesio-distal-buccal, and disto-buccal caries patterns. A significant correlation was observed between age and percentage of prevalence and caries patterns ($P = 0.000$). No significant difference was observed between caries prevalence and patterns of males and females ($P = 0.312$).

### Table 4: Age and Gender wise Prevalence% Pattern of Caries in Maxillary left Primary Central incisor

| Pattern of caries (Mx.Lt. Pri. Central incisor) % within Age | Age | Total Average% (%=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|-------------------------------------------------------------|-----|---------------------------------------------------------------------|----------------|
|                                                             | 3 year | 4 year | 5 year | 6 year |                             | Male | Female |
| No caries                                                   | 26.5  | 60.3  | 65.9  | 80.5  | 59.3                          | 56.5 | 63.1   |
| Mesial caries                                               | 7.4   | 6.8   | 4.9   | 6.5   | 6.3                           | 5.9  | 6.9    |
| Buccal caries                                               | 8.8   | 2.7   | 3.7   | 0.0   | 3.7                           | 4.1  | 3.1    |
| Mesio-occlusal caries                                       | 0.0   | 0.0   | 1.2   | 0.0   | 0.3                           | 0.0  | 0.8    |
| Mesio-buccal caries                                         | 10.3  | 2.7   | 1.2   | 1.3   | 3.7                           | 4.1  | 3.1    |
| Mesio-distal caries                                         | 8.8   | 5.5   | 2.4   | 1.3   | 4.3                           | 5.9  | 2.3    |
| Mesio-liguo-buccal caries                                   | 1.5   | 0.0   | 0.0   | 0.0   | 0.3                           | 0.6  | 0.0    |
| Mesio-liguo-distobuccal caries                              | 16.2  | 16.4  | 13.4  | 6.5   | 13.0                          | 14.1 | 11.5   |
| Mesio-distobuccal caries                                    | 20.6  | 5.5   | 7.3   | 3.9   | 9.0                           | 8.8  | 9.2    |
| Total %                                                     | 100   | 100   | 100   | 100   | 100                           | 100  | 100    |

**Chi square=67.099, $P=0.000$**

### Table 5: Age and Gender wise Prevalence & Pattern of Caries in Maxillary left Primary lateral incisor

| Pattern of caries (Mx.Lt. Pri. lateral incisor) % within Age | Age | Total Average% (%=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|-------------------------------------------------------------|-----|---------------------------------------------------------------------|----------------|
|                                                             | 3 year | 4 year | 5 year | 6 year |                             | Male | Female |
| No caries                                                   | 39.7  | 69.9  | 74.4  | 87.0  | 68.7                          | 66.5 | 71.5   |
| Mesial caries                                               | 17.6  | 8.2   | 6.1   | 2.6   | 8.3                           | 9.4  | 6.9    |
| Buccal caries                                               | 10.3  | 4.1   | 2.4   | 0.0   | 4.0                           | 5.3  | 2.3    |
| Mesio-buccal caries                                         | 5.9   | 4.1   | 1.2   | 1.3   | 3.0                           | 2.4  | 3.8    |
| Mesio-distal caries                                         | 0.0   | 2.7   | 2.4   | 1.3   | 1.7                           | 2.4  | 0.8    |
| Mesio-liguo-buccal caries                                   | 2.9   | 0.0   | 0.0   | 0.0   | 0.7                           | 0.0  | 1.5    |
| Mesio-liguo-distobuccal caries                              | 16.2  | 9.6   | 11.0  | 5.2   | 10.3                          | 11.8 | 8.5    |
| Distobuccal caries                                          | 0.0   | 0.0   | 1.2   | 0.0   | 0.3                           | 0.0  | 0.8    |
| Mesio-distobuccal caries                                    | 7.4   | 1.4   | 1.2   | 2.6   | 3.0                           | 2.4  | 3.8    |
| Total %                                                     | 100   | 100   | 100   | 100   | 100                           | 100  | 100    |

**Chi square=58.818, $P=0.000$**

### Table 6: Age and Gender wise Prevalence & Pattern of Caries in Maxillary Left Primary Canine

| Pattern of caries (Mx.Lt. Pri. canine) % within Age | Age | Total Average% (%=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|---------------------------------------------------|-----|---------------------------------------------------------------------|----------------|
|                                                  | 3 year | 4 year | 5 year | 6 year |                             | Male | Female |
| No caries                                        | 96.8  | 93.2  | 92.7  | 97.4  | 92.7                          | 92.9 | 92.3   |
| Mesial caries                                    | 5.9   | 1.4   | 2.4   | 0.0   | 2.3                           | 1.8  | 3.1    |
| Distal caries                                    | 0.0   | 1.4   | 1.2   | 0.0   | 0.7                           | 0.6  | 0.8    |
| Buccal caries                                    | 2.9   | 1.4   | 1.2   | 0.0   | 1.3                           | 1.2  | 1.5    |
| Incisal caries                                   | 0.0   | 1.4   | 0.0   | 0.0   | 0.3                           | 0.6  | 0.0    |
| Mesio-buccal caries                              | 0.0   | 0.0   | 1.2   | 1.3   | 0.7                           | 0.6  | 0.8    |
| Mesio-distal caries                              | 4.4   | 0.0   | 0.0   | 1.3   | 1.3                           | 1.2  | 1.5    |
| Mesio-liguo-distobuccal caries                   | 0.0   | 1.4   | 0.0   | 0.0   | 0.3                           | 0.6  | 0.0    |
| Mesio-distobuccal caries                         | 0.0   | 0.0   | 1.2   | 0.0   | 0.3                           | 0.6  | 0.0    |
| Total %                                          | 100   | 100   | 100   | 100   | 100                           | 100  | 100    |

**Chi square=27.999, $P=0.260$**

**Chi square=3.058, $P=0.931$**
patterns of caries. The percentage of mesial caries was observed to be the highest, followed by buccal caries and mesio-distal caries which had equal incidences (1.3% each). In maxillary left primary canines, distal caries and mesio-buccal caries had prevalence and patterns of 0.7% each, followed by incisal, mesio-lingual-disto-buccal, and mesio-distal-buccal caries, with an incidence of 0.3% each. Caries prevalence in maxillary left primary canines was highest at the age of 3 years which reduced to about half at 4 and 5 years and about 6 times less caries at 6 years. No significant correlation was observed between ages, genders, and percentage of prevalence and caries patterns (P = 0.260 and P = 0.931, respectively).

Prevalence and caries pattern in mandibular left primary canines [Table 7]
In preschool children, 98.3 of mandibular left primary canines had no caries. 1.7% prevalence of caries was detected in mandibular left primary canines with 4 patterns of caries. Here, the highest percentage of caries observed was distal caries, which constituted 1% of the total incidence. Mesial caries and mesio-distal-buccal caries patterns had an equal incidence, i.e., 0.3% each. No significant correlation was observed between age, gender, and percentage of caries prevalence and patterns (P = 0.375 and P = 0.533, respectively).

Prevalence and caries pattern in mandibular left primary lateral incisors [Table 8]
In preschool children, 96.3% of mandibular left primary canines had no caries. Nearly 3.7% prevalence of caries was observed in mandibular left primary lateral incisors with four patterns of caries. In this context, the highest percentage of caries prevalence and pattern was exhibited by mesial caries, which occupied 2% of the total caries incidence. Other common patterns were mesio-distal (1.3%) and buccal caries (0.3%). The incidence of mesial caries was observed to be highest at the age of 4 years followed by 5, 3 and 6 years. The other caries pattern observed was mesio-distal caries whose incidence was highest at the age of 3 years, followed by 5 years. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular left primary lateral incisors (P = 0.143 and P = 0.659, respectively).

Prevalence and caries pattern in mandibular left primary central incisors [Table 9]
In preschool children, 90.7% of mandibular left primary central incisors had no caries. 9.3% prevalence of caries was observed in mandibular left primary central incisors with 8 patterns of caries. The highest percentage of prevalence and patterns was exhibited by mesial caries and mesio-distal caries, which occupied 6% and 1.3%, respectively. Other patterns of caries were distal, buccal, disto-buccal, and mesio-disto-buccal caries, which occupied 0.3% each, and mesio-buccal caries pattern, which occupied 0.7%. The highest incidence of mesial caries occurred at the age of 3 years, followed by 4, 5, and 6 years. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular left primary central incisors (P = 0.185 and P = 0.464, respectively).

Prevalence and caries pattern in mandibular right primary central incisors [Table 10]
In preschool children, 91% of mandibular right primary central incisors had no caries. 9% prevalence of caries was observed in mandibular right primary central incisors with 8 patterns of caries. The highest percentage of prevalence and pattern was exhibited by mesial caries, which occupied 2% of the total caries incidence. Other common patterns were mesio-buccal (1.3%) and disto-buccal caries (0.3%). The incidence of mesial caries was observed to be highest at the age of 4 years followed by 5, 3 and 6 years. The other caries pattern observed was mesio-distal caries whose incidence was highest at the age of 3 years, followed by 5 years. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular right primary central incisors (P = 0.143 and P = 0.659, respectively).

Table 7: Age and Gender wise Prevalence & Pattern of Caries in Mandibular Left Primary Canine

| Pattern of caries (Mn.Lt. Pri.canine) % within Age | 3 year | 4 year | 5 year | 6 year | Total Average % (n=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender | Male | Female |
|--------------------------------------------------|--------|--------|--------|--------|---------------------------------------------------------------|----------------|------|--------|
| No caries                                        | 98.5   | 98.6   | 97.6   | 98.7   | 98.3                                                          | 98.2           | 98.5 |        |
| Mesial caries                                    | 1.5    | 0.0    | 0.0    | 0.0    | 0.3                                                           | 0.0            | 0.8  |        |
| Distal caries                                    | 0.0    | 0.0    | 2.4    | 1.3    | 1.0                                                           | 1.2            | 0.8  |        |
| Mesiodistobuccal caries                          | 0.0    | 1.4    | 0.0    | 0.0    | 0.3                                                           | 0.6            | 0.0  |        |
| Total %                                          | 100    | 100    | 100    | 100    | 100                                                          | 100            | 100  |        |

Chi square test: Chi square=9.707, P=0.375

Table 8: Age and Gender wise Prevalence & Pattern of Caries in Mandibular Left primary lateral incisor

| Pattern of caries (Mn.Lt. Pri. lateral incisor % within Age | 3 year | 4 year | 5 year | 6 year | Total Average % (n=900) (Pattern & Prevalence of caries in Preschool age) | %within Gender | Male | Female |
|------------------------------------------------------------|--------|--------|--------|--------|---------------------------------------------------------------|----------------|------|--------|
| No caries                                                  | 94.1   | 94.5   | 96.3   | 100    | 96.3                                                          | 95.1           | 97.7 |        |
| Mesial caries                                              | 1.5    | 4.1    | 2.4    | 0.0    | 2.0                                                           | 2.4            | 1.5  |        |
| Buccal caries                                              | 0.0    | 1.4    | 0.0    | 0.0    | 0.3                                                           | 0.6            | 0.0  |        |
| Mesiodistal caries                                         | 4.4    | 0.0    | 1.2    | 0.0    | 1.3                                                           | 1.8            | 0.8  |        |
| Total %                                                    | 100    | 100    | 100    | 100    | 100                                                          | 100            | 100  |        |

Chi square test: Chi square=13.456, P=0.143

Chi square test: Chi square=1.601, P=0.659
was observed in mandibular right primary central incisors with 6 patterns of caries. The highest percentage of caries pattern was exhibited by mesial caries, followed by mesio-distal caries and mesio-buccal caries, which occupied 5%, 2.3%, and 1%, respectively. Other common caries pattern was buccal and mesio-distal caries which occupied 0.3% each. The highest incidence of caries patterns was exhibited by mesial caries and mesio-distal caries, which occupied 2% and 0.7%, respectively. Other caries patterns frequently seen were buccal caries and mesio-buccal caries, which occupied 0.3% each. The percentage of caries prevalence in mandibular right primary central incisors was in decreasing order as age increased from 3 to 6 years. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular right primary central incisors ($P = 0.129$ and $P = 0.321$, respectively).

Prevalence and caries pattern in mandibular right primary lateral incisors [Table 11]
In preschool children, 96.7% of mandibular right primary lateral incisors had no caries. 3.3% caries prevalence was observed in mandibular right primary lateral incisors with 5 patterns of caries. The highest incidence of caries patterns was exhibited by mesial caries and mesio-distal caries, which occupied 2% and 0.7%, respectively. Other caries patterns frequently seen were buccal caries and mesio-buccal caries, which occupied 0.3% each. The percentage of caries prevalence in mandibular right primary lateral incisors was in decreasing order as age increased from 3 to 6 years. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular right primary lateral incisors ($P = 0.129$ and $P = 0.321$, respectively).

Table 9: Age and Gender wise Prevalence & Pattern of Caries in Mandibular left primary central incisor

| Pattern of caries (Mn.Lt. Pri.central incisor) % within Age | Age (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|----------------------------------------------------------|----------------------------------------------------|---------------|
|                                                          | 3 year | 4 year | 5 year | 6 year | Total Average % (n=900) |
| No caries                                                | 83.8   | 89.0   | 91.5   | 97.4   | 90.7           |
| Mesial caries                                            | 11.8   | 5.5    | 4.9    | 2.6    | 6.0            |
| Distal caries                                            | 0.0    | 0.0    | 1.2    | 0.0    | 0.3            |
| Buccal caries                                            | 0.0    | 0.0    | 1.2    | 0.0    | 0.3            |
| Mesio-buccal caries                                      | 0.0    | 1.4    | 1.2    | 0.0    | 0.7            |
| Mesiodistal caries                                       | 4.4    | 1.4    | 0.0    | 0.0    | 1.3            |
| Distobuccal caries                                       | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Mesiodisto Buccal caries                                 | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Total %                                                  | 100    | 100    | 100    | 100    | 100            |
| Chi square test                                           | Chi square=26.595, $P=0.185$                      | Chi square=6.668, $P=0.464$ |

Table 10: Age and Gender wise Prevalence & Pattern of Caries in Mandibular Right Primary central incisor

| Pattern of caries (Mn.Rt. Pri.Central incisor) % within Age | Age (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|------------------------------------------------------------|------------------------------------------------------|---------------|
|                                                          | 3 year | 4 year | 5 year | 6 year | Total Average % (n=900) |
| No caries                                                  | 83.8   | 89.0   | 92.7   | 97.4   | 91.0           |
| Mesial caries                                              | 10.3   | 5.5    | 3.7    | 1.3    | 5.0            |
| Buccal caries                                              | 0.0    | 0.0    | 1.2    | 0.0    | 0.3            |
| Mesio-buccal caries                                        | 0.0    | 2.7    | 1.2    | 0.0    | 1.0            |
| Mesiodistal caries                                         | 5.9    | 1.4    | 1.2    | 1.3    | 2.3            |
| Distobuccal caries                                         | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Mesiodisto Buccal caries                                   | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Total %                                                    | 100    | 100    | 100    | 100    | 100            |
| Chi square test                                            | Chi square=21.256, $P=0.129$                        | Chi square=5.851, $P=0.321$ |

Table 11: Age and Gender wise Prevalence & Pattern of Caries in Mandibular Right primary lateral incisor

| Pattern of caries (Mn.Rt. Pri. Lateral incisor) % within Age | Age (Pattern & Prevalence of caries in Preschool age) | %within Gender |
|-------------------------------------------------------------|------------------------------------------------------|---------------|
|                                                          | 3 year | 4 year | 5 year | 6 year | Total Average % (n=900) |
| No caries                                                   | 94.1   | 94.5   | 97.6   | 100    | 96.7           |
| Mesial caries                                               | 5.9    | 1.4    | 1.2    | 0.0    | 2.0            |
| Buccal caries                                               | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Mesio-buccal caries                                         | 0.0    | 1.4    | 0.0    | 0.0    | 0.3            |
| Mesiodistal caries                                          | 0.0    | 1.4    | 1.2    | 0.0    | 0.7            |
| Total %                                                     | 100    | 100    | 100    | 100    | 100            |
| Chi square test                                             | Chi square=15.388, $P=0.223$                        | Chi square=3.380, $P=0.496$ |
Primary lateral incisors ($P = 0.223$ and $P = 0.496$, respectively).

**Prevalence and caries pattern in mandibular right primary canines [Table 12]**

In preschool children, 98% of mandibular right primary canines had no caries. 2% prevalence of caries was observed in mandibular right primary canines with 6 patterns of caries. The highest incidence of caries pattern was observed in distal caries, which occupied 0.7%. Other common patterns were mesial, buccal, mesio-distal, and mesio-disto-buccal caries which occupied 0.3% each. No significant correlation was observed between ages, genders, and percentage of caries prevalence and patterns in mandibular right primary canines ($P = 0.497$ and $P = 0.396$, respectively).

**Discussion**

Primary teeth are prone to dental caries. Caries in primary teeth may hamper eruption and tooth structure formation of succedaneous permanent teeth and oral health status of children. This study was done to know the caries prevalence and patterns in primary anterior teeth which would help us to make a preventive and interceptive program at society level by advising government to make a policy for oral health of children. The present study was done to know each individual anterior tooth’s caries prevalence and caries patterns, and obtained results were compared with their opposite counterpart tooth in the same arch and the opposite arch.

In our study, caries prevalence and patterns were slightly more in primary anterior of males as compared to primary anterior teeth of females. This means that caries have some predilection for sex. The same findings were reported by other authors.\(^6\)\(^-\)\(^8\) The WHO/FDI goals for 2000 revealed that 50% of children in the age group of 5–6 years should be caries free.\(^9\) In our study, the prevalence of caries in primary teeth was observed to be ranging from 2% to 40.7%. The maximum percentage of caries prevalence was in accordance with other researcher’s studies who reported caries prevalence ranging from 17% to 42% in India as well as other countries.\(^10\)\(^-\)\(^14\) However, lower percentage was not not in accordance with the mentioned study because they find out total caries prevalence, while in our study, we considered only anterior teeth. Mandibular incisors are least affected by caries in our study which is in accordance with the previous studies.\(^10\)\(^,\)\(^13\) Maxillary anterior teeth have more prevalence of caries than mandibular anterior teeth. Among all anterior teeth, left mandibular primary canines is least affected by caries in preschool children.

**Conclusions**

1. Caries prevalence and patterns were slightly more in maxillary right canines than left maxillary canines. Left mandibular canines had less caries prevalence than mandibular right canines. As compared to maxillary and mandibular canines regarding caries prevalence and patterns, maxillary canines were more prone to caries development as compared to mandibular canines. Mandibular canines had about five times less chances of caries development as compared to maxillary canines.

2. Maxillary right and left lateral incisors had about equal caries prevalence, approximately 32% and 9 carious patterns. Mandibular right lateral incisors (3.3%) and mandibular left lateral

| Pattern of caries (Mn.Rt. Prc.canine) % within Age | Age | Total Average % ($n=900$) (Pattern & Prevalence of caries in Preschool age) | % within Gender |
|-------------------------------------------------|-----|--------------------------------------------------------------------------------|-----------------|
|                                                  | 3 year | 4 year | 5 year | 6 year | % Male | % Female |
| No caries                                        | 98.5 | 94.5 | 98.8 | 100 | 98.0 | 97.1 | 99.2 |
| Mesial caries                                    | 0.0 | 0.0 | 1.2 | 0.0 | 0.3 | 0.6 | 0.0 |
| Distal caries                                    | 1.5 | 1.4 | 0.0 | 0.0 | 0.7 | 1.2 | 0.0 |
| Buccal caries                                    | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.6 | 0.0 |
| Mesiodistal caries                               | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.0 | 0.8 |
| Mesiodisto buccal caries                         | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.6 | 0.0 |
| Total %                                         | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Chi square test: Chi square=14.377, $P=0.497$; Chi square=5.167, $P=0.396$
incisors (3.7%) had about equal caries prevalence with 5 and 4 caries patterns, respectively. Mandibular lateral incisors had about eight times less chance to develop caries as compared to maxillary lateral incisors.

3. Maxillary right and left central incisors had about equal caries prevalence (40%) with equal number of caries patterns. Mandibular right and left central incisors also had equal caries prevalence (about 9%) with 6 and 8 caries patterns, respectively. Mandibular central incisors had four times less chances of caries development as compared to maxillary central incisors.

4. Maxillary right and left central and lateral incisors had a significant correlation in caries prevalence and ages, but no gender association was reported in the caries prevalence.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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