INTRODUCTION

Developmental defects of enamel may be defined as disturbances in hard tissue matrices and in their mineralization during odontogenesis. When this complex sequence of cytological and physico-chemical events is disrupted by genetic or environmental factors, the function of the ameloblast may be disrupted permanently or temporarily.\(^1,2\) This results in the formation of enamel exhibiting qualitative or quantitative defects that may range from a complete absence of enamel to a normal thickness or no change in structure except for a slight abnormality in colour.\(^3\) The type of defect is dependent on the stage of amelogenesis at the time of the disturbance.\(^4\) More recently, as a result of the need for uniform nomenclature, a working group of the Commission on Oral Health Research and Epidemiology of the "Federation Dentaire Internationale" has produced an Epidemiological index of developmental defects of enamel (DDE Index).\(^5,6\) Studies conducted in different parts of the world revealed a prevalence of developmental defects of enamel varying from 0%-60%.\(^7-10\) The differences observed are dependent on the population studied, the teeth examined and the criteria used to diagnose enamel defects; such as whether enamel opacities were included in the diagnosis. Children from developing countries are generally found to display a high incidence of enamel defects while a lower incidence is found in children from developed countries.\(^11\)

In the field of public health, developmental defects in the enamel have taken on a high level of importance for being predictors of dental caries. Populations affected by these changes require as a priority preventive intervention and early treatment. Dental enamel defects are a frequent finding in primary dentition. These defects are generally classified as enamel hypoplasia or enamel hypomineralization. Enamel hypoplasia is a quantitative defect, whereas enamel hypomineralization is a qualitative defect characterized by abnormal enamel translucency and is therefore also known as enamel opacity. In a study in which enamel defects were classified and recorded according to the modified DDE index, its prevalence was 48.5% and boys were more affected.\(^12\) The developmental defects of enamel are changes in deciduous dentition that lead to aesthetic problems, dental sensitivity and may be predictors of caries. In another cross-sectional study, prevalence of DDE was 24.4%. Diffuse opacities were the most common defects (17.9%), followed by hypoplasia (11.1%) and demarcated opacities (6.1%).\(^13\)

In the past levels of enamel hypoplasia were frequently used to study health. The study of Massoni ENAMEL DEFECTS FREQUENCY IN DECIDUOUS TEETH

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ABSTRACT

Developmental defects of the enamel are the result of alterations during amelogenesis due to hereditary, systemic or environmental factors. The present study was done to determine the frequency of developmental defects of enamel in primary teeth at Children Hospital PIMS, Islamabad from February 2011 to January 2012. The study was cross sectional and sample comprised of 300 children, which included 182 (60.7%) males and 118 (39.3%) females. The mean age of the studied population was 3.63±1.05 years. Enamel defects were present in 115 (38.3%) children. Out of 182 males 69 (37.9%) males and out of 118 females, 46 (38.9%) females had enamel defect; thus frequency of enamel defect was not significantly different between the two genders (p=0.852). The mean age of the children with enamel defect was 3.74±1.00 and mean age of children without enamel defect was 3.55±1.06 years respectively. This difference was not statistically significant (p=0.124). Frequency of enamel defect was significantly higher among families with higher income categories (p=0.020). Out of 300 children, 185 (61.7%) had normal enamel, 5 (1%) had only demarcated opacity, 9 (3%) had only diffuse opacity, 80 (26.7%) had only hypoplasia, 3 (1%) had demarcated diffuse opacity, 3 (1%) had demarcated opacity with hypoplasia, 13 (4.3%) had diffuse opacity with hypoplasia and 2 (0.7%) had all three defects. Present study concluded that more than one third of the children had developmental defects of enamel in primary teeth and most frequent lesion was enamel hypoplasia.

Key Words: Enamel defects; enamel hypoplasia; fluorosis; enamel hypomineralization.
hypoplasia in both genders and in young as well as adults using the FDI developmental defects of enamel (DDE) Index. Although males and females were equally affected but females had a higher prevalence of enamel hypoplasia than males. Adults had a higher prevalence of enamel hypoplasia than juveniles. These differences were largely due to different patterns and frequencies of enamel hypoplasia in deciduous teeth compared to permanent teeth. In another study the prevalence of enamel defects was higher (49.6%) in male infants (p<0.001). The most frequent type of defect was diffuse opacity (9.5%) and the most affected surface were the buccal surface (83.3%) and the gingival half (6.7%). In another study 510 children were examined in nursery schools and the prevalence of DDE of any type was found to be 45.4%, with that of demarcated opacities being the highest, followed by hypoplasia. The most frequently affected teeth were primary maxillary anterior teeth, while the least affected teeth were primary mandibular incisors. The mean DMFT was 3.9. A positive association between DDE and caries was also observed in that study. Enamel defects are serious challenges because of their unaesthetic appearance, dental sensitivity and subsequent susceptibility to dental caries. Therefore the aim of this study was to find out the frequency of enamel defect in deciduous teeth.

The findings of this study will provide a clear vision of the distribution of this oral condition and may well contribute to early detection and treatment planning.

**METHODOLOGY**

A cross-sectional study was conducted at Dental Department of Children Hospital, Pakistan Institute of Medical Sciences, Islamabad (PIMS), from 1st February 2011 to 31st January 2012. A total of 300 children were included by using, purposive sampling (non-probability) technique. Co-operative patients between the age groups 2-5 years of both sexes were included. Whereas patients who were uncooperative, having teeth extracted, suffering from any bone disease were excluded. Informed consent was taken from the parents of the patient. The patient's history was taken from parents about any medical illnesses in childhood of the patient or the mother during pregnancy. The socioeconomic status (SES) of the patient was divided into 3 categories. Families with less then 6000 rupees per month were considered in low socioeconomic group, families with monthly income between 6000-10,000 rupees were in middle socioeconomic group and families with more than 10,000 rupees were considered high socioeconomic group.

Clinical examination was carried out under the dental unit light with mouth mirror and a round ended probe. The teeth were cleaned with gauze and dried using triple syringe to see the presence of enamel defects. Only buccal surfaces of the teeth were examined and defects were recorded in history sheets. Data were analysed by using software SPSS 12 version.

Descriptive statistics like mean SD were calculated for quantitative variables like age. Frequencies and percentages were calculated for qualitative variables like enamel defects and its types and gender. For categorical comparisons chi square test was used and for numerical comparisons independent samples t-test was used. A p value of <0.05 was considered statistically significant.

**RESULTS**

Out of 300 children 182 (60.7%) were males and 118 were (39.3%) female (Fig 1), mean age was 3.63±1.05 years. The median and mode ages were 4 and 5 years respectively. In high SES group of children enamel defects were also present in other family members. Study found fathers of 3 (1.0%) children, mothers of 15 (5%) children, and other siblings of 217 (7%) children also had enamel defects (Fig 2). Among the males, 69 out of 182 (37.9%) had enamel defect and among the females, 46 out of 118 (38.9%) had enamel defect; thus frequency of enamel defect was not significantly different between the two genders; p=0.852 (Table 1).

The mean age of the children with enamel defect was 3.74±1.00 years and the mean age of the children without enamel defects was 3.55±1.06 years. This difference was not statistically significant (p=0.124) (Table 2).

Twelve children (22%) out of 54 were from lower socio economic group, 26 (30%) out of 76 children were from middle socioeconomic group and 74 (39.6%) children out of 172 were from high socio-economic group, thus frequency of enamel defect was significantly higher among families with higher income categories (p=0.020) (Table 3). Table 5 shows the summary of enamel defects. Enamel hypoplasia was the most common enamel defect (26.7%) among all defects, diffuse opacity with hypoplasia was second most common defect, 13 (4.3%) children and other siblings of 21(7%) children also had developmental defects of enamel from developed countries. Studies from South Wales and on Chinese children showed the maxillary.
and mandibular incisors were found to be the most frequently detected teeth with a prevalence of 18.7% and 40.8% respectively. In the present study enamel defects were more abundant in maxillary primary incisors and mandibular primary canines while minimum involvement was seen in maxillary primary second molars and mandibular primary lateral incisors.

In the present study only clinical examination for the diagnosis was used, while in other studies photographs for assessments were used and revealed more lesions. In the developed countries cosmetic considerations to improve the appearance of teeth with enamel defects is of major public health concern. However, cosmetic consideration in developing countries is still low so a lot of these unaesthetic lesions are left untreated. In present study there was no cosmetic complaint from patients or parents. Cutress et al established that 23(1%) of children studied had poor appearance from a sample of 1758 as a result of defects other than fluoride. Observations from other studies have also given similar reports. The high figure reported in the present study implies that there is a need for improvement of the oral health awareness as also suggested by Hamadan. Parents should be encouraged to bring their children early and regularly for treatment for maximum benefits especially on preventive oral health care.

In another study by Aminabadi et al the prevalence and the position of enamel defects was studied in primary teeth of 3-5 years old children. They found 55.37% of the children were affected by enamel defects, 23.96% being categorized as hypocalcification and 22.31% as hypoplasia. In the present study the frequency of enamel defects were more in maxillary incisors (central incisors) in maxilla (p<0.05) whereas the mandibular canine were the most commonly effected tooth in mandibular teeth (p<0.05). Enamel hypoplasia was the most commonly found defect in children in present study and similar results were found by Lunardelli.
Present study found deciduous maxillary incisors were the most commonly affected than other teeth which is similar to other studies in which the incisors were the most affected teeth. In some other studies molars were the most affected teeth. In a local study by Khan et al scoring for enamel defects was made from a sample of 1000 color photographs. These photographs were of incisor teeth of 10-year-old children living in an area with water fluoride levels below 0.45 parts per million. On modified Developmental Defects of Enamel (DDE) index, 652 (66.0%) children and 1086 (55.5%) teeth (upper central incisors) were scored as having enamel defects. Diffuse defects were the most common in that study. The frequency was higher perhaps because different method of examination was used.

**CONCLUSION**

More than one third of the children had developmental defects of enamel in deciduous dentition and most frequent lesion was enamel hypoplasia in present study.

**Recommendations**

Present study was based on clinical examination, and only frequency of enamel defects was assessed. Further studies must be carried out to detect enamel defects with the help of other methods e.g. photographic or staining method. Future studies must emphasize on causes of enamel defects and association of any genetic factors in primary teeth in this population.

**REFERENCES**