ORIGINAL RESEARCH PAPER

Paediatric Dentistry

PREVALENCE OF DEVELOPMENTAL DEFECTS OF ENAMEL IN PEDIATRIC KASHMIRI POPULATION: A HOSPITAL BASED STUDY

KEY WORDS: Demarcated Opacity, Developmental Defects Of The Enamel, Diffuse Opacity, Enamel Hypoplasia

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ABSTRACT

The developmental defects of the enamel (DDE) may be defined as the alteration of enamel that may affect an area of one surface or may be wide spread affecting all the surfaces throughout its full thickness. Aim and Objectives: To determine the prevalence of developmental defects of enamel in children in 3 to 12 year old children of Kashmiri population using modified DDE index. **Materials and Methods:** An epidemiological study was carried out in children visiting the out Patient department of pediatric dentistry of GDC Srinagar using the Modified Developmental Defects of Enamel Index (Modified DDE Index). Three surfaces were examined: buccal, occlusal/incisal and lingual/palatal of all deciduous teeth and permanent teeth. The enamel defects were assessed according to three clinical aspects: hypoplasia of the enamel, diffuse opacities and demarcated. **Results:** A total of 10,600 children were examined using modified DDE index and 1208 patients were found to have DDE. Among these patients 57.1% were males and 42.9% were females. Chi square test value was done and a significant difference was found among DDE of primary and permanent teeth (p=0.0002). **Conclusion:** The study population showed a higher prevalence of DDE in permanent molars and incisors of both males and females which needs special emphasis in our prevention strategy.

INTRODUCTION

Developmental defects of enamel (DDE) can be defined as any alteration resulting from diverse disturbances during the process of odontogenesis. These arise from disturbances in enamel matrix formation or mineralization or maturation with less or deranged amounts of enamel which is caused by an injury to the ameloblast cells.[1] They may be quantitative in nature, manifest as a deficient thickness of enamel or enamel hypoplasia (EH); or else qualitative (hypomineralization), presenting clinically as enamel opacity (EO)-in turn, either demarcated (DEO) or diffuse.[2] Developmental defects in the enamel (DDE) pose clinical importance since they are responsible for esthetic problems, dental sensitivity, dentofacial anomalies and predisposes to dental caries by serving as a platform for retention of dental plaque.[3] The prevalence of DDE ranged from 6.7% to 67.1% in the developed countries and from 27% to 66.2% in the developing countries.[4] Populations affected by these changes require a priority preventive intervention and early treatment. The modified DDE Index is a descriptive index, considered more practical and comparable in epidemiological studies. DDE Index allows for efficient recording of prevalence and severity of enamel defects. [5] The aim of this study was to determine the prevalence of developmental defects of enamel in 3 to 12 year old children in Kashmir.

MATERIAL AND METHODOLOGY

This study was carried out in the OPD of Department of Paediatric and Preventive Dentistry, Govt Dental College and Hospital, Srinagar. The study design was reviewed by Institutional ethical committee of GDC Srinagar. Patient whose first dental visit to OPD of Paediatric dentistry aged 3 to 12 years of age group were included. Patients who had not undergone any treatment for enamel defects. Parents who were willing to take part in study. Missing, unerupted, severely fractured, or grossly carious teeth involving the buccal/labial surface of the teeth were excluded from the study. An epidemiological study was carried out in these children over a period of 7 months in which 10,070 patients were evaluated. The modified developmental Defects of Enamel Index (DDE Index) was used to diagnose and classify changes in the enamel of the deciduous and permanent teeth studied. Prior to each observation, teeth were cleaned with a prophylaxis paste and rinsed with water spray. Teeth dehydration was controlled to avoid shade changes due to humidity loss.

Three surfaces were examined: buccal, occlusal/incisal and lingual/palatal of all deciduous teeth and permanent teeth. The enamel defects were assessed according to three clinical aspects: hypoplasia of the enamel, diffuse opacities and demarcated opacities. A proforma was prepared which contains personal details such as name, gender, and age, and DDE index and later it was copied to an excel sheet. Statistical analysis was done using Chi Square test.

RESULT

Table 1 Shows the Distribution of DDE Among Males and Females..

	Frequency (n)	Percentage (%)
Males	518	57.1%
Females	690	42.9%
Total patients	1208	100%

Table 2 Shows the Percentage Prevalence of Teeth Affected by DDE Among Males and Females

DDE Prevalence	Primary tooth N (%)	Permanent Molars N (%)	Permanent canines N (%)	Permanent premolars N (%)	Permanent Incisors N (%)	Grand Total N (%)
Male	72 (4.05%)	396 (22.29%)	60 (3.37%)	60 (3.37%)	1188 (66.89%)	1776 (53.68%)
Female	92 (6.01%)	358 (23.36%)	36 (2.34%)	72 (4.69%)	974 (63.57%)	1532 (46.31%)

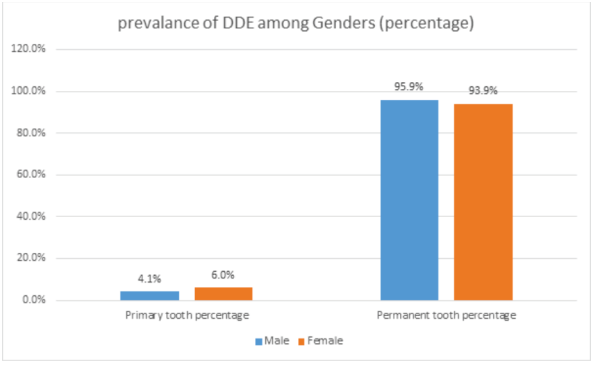
Grand Total	164 (4.9%)	754 (22.7%)	96 (2.9%)	132 (3.9%)	2162 (65%)	3308
Chi square test value = 100.09, p=0.0002* (Significant association)						

Table 1 shows Out of 1208 patients affected with DDE, 57.1% were males and 42.9% were females. Table 2 shows in males 66.89% permanent incisors were affected, 22.29% permanent molars were affected, 3.37% permanent premolars were affected, 3.37% permanent canines were affected and 4% primary teeth were affected. In females, 63.57% permanent incisors were affected, 23.36 % permanent molars were affected, 4.69% permanent premolars were affected, 2.34 % permanent canines were affected and 4.9% primary teeth were affected

Table 3 Primary and Permanent Tooth Percentage Prevalence Among Males and Females

Gender	Primary tooth N (%)	Permanent tooth N (%)	Grand Total N (%)
Male	72 (4.05%)	1704 (95.94%)	1776 (53.68%)
Female	92 (6.01%)	1440 (93.9%)	1532 (46.31%)
Grand Total	164 (4.9%)	3144 (95.04%)	3308

Tables 3 shows 95.94% and 4.05% teeth affected with DDE were permanent teeth and primary teeth in males respectively. 93.9% and 4.9% teeth affected with DDE were permanent teeth and primary teeth in females respectively.



Graph 1: Prevalence of DDE Among Genders

DISCUSSION

This is the first kind of study done in Kashmiri population regarding the developmental defects of enamel.

The males and females affected were 57.1% and 42.9% respectively which does not show a significant difference. In males 66.89% permanent incisors were affected, 22.29% permanent molars were affected, 3.37% permanent premolars were affected, 3.37% permanent canines were affected and 4% primary teeth were affected which shows a significant difference. In females, 63.57% permanent incisors were affected, 23.36 % permanent molars were affected, 4.69% permanent premolars were affected, 2.34 % permanent canines were affected and 4.9% primary teeth were affected which shows a significant association. 95.94% and 4.05% teeth affected with DDE were permanent teeth and primary teeth in males respectively which shows a significant difference. 93.9% and 4.9% teeth affected with DDE were permanent teeth and primary teeth in females respectively.

Basha S et al (2014) conducted a study to examine the prevalence of DDE and associated etiological factors in Karnataka. They found that the prevalence of DDE was 42.19% and it was more in permanent teeth compared to primary teeth similar to our study in which we found 11.5% DDE prevalence in permanent teeth and 0.67% in primary teeth. A significant association of DDE with gender, low socio-economic status and BMI was demonstrated. Also it was more in permanent incisors and molars similar to our study.[3] Gayton et al 2024 found that incisors and molars were more affected than other teeth which is similar to our study. No statistically significant difference of gender was seen which is similar to our study as well. Jalevick et al in 2018 conducted prevalence of DDE was 33.2% (boys 37.1%, girls 29.3%, p = 0.02). Demarcated opacities (DEO), solely, were the most frequent kind of defect, affecting 18%. Five percent (5%) had diffuse opacities (DIO) and 1% had hypoplasias, whereas 7% had teeth with both DEO and DIO. The most frequently affected teeth of DEO, as well as of DIO, were the first permanent molars and maxillary central incisors. These findings are in accordance with our study.

CONCLUSION

The limitations of our study was that it was a hospital based study and needed to include more children from all areas. Focus is needed on etiological factors and treatment of these defects in order to improve esthetics and function. Children with DDE should be identified because tissue loss and dental hypersensitivity increases caries risk, while reduced mechanical properties of hypo mineralized enamel often result in restoration failures. Hence, oral health promotion programs should be aimed at centers and schools for children with DDE and should include the regular use of oral health services, oral hygiene education, and dietary counseling.

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