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Original Article

Prevalence of Molar Incisor Hypomineralisation in municipal school going children in Mumbai

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ABSTRACT

Aim: The epidemiological study was carried out in Mumbai, in order to investigate the prevalence of molar incisor hypomineralisation (MIH) in a group of children from different municipal schools. **Method:** 544 children aged between 7–10 years attending municipal schools were examined for the presence and severity of MIH using criteria given by Weerheijm et al. in 2003. Descriptive analysis for distribution of various defects and comparative data analysis was carried out. **Results:** A total of 544 children were examined out of which 43 (7.90%) had MIH. Amongst these 19 boys and 24 girls had MIH. **Conclusion:** MIH was quite common in municipal school going children in Mumbai. The defects in the molars were mild and girls (8.54%) experienced greater prevalence as compared to boys (7.22%)

Keywords: MIH, Hypoplasia, Enamel Opacities, Enamel defects

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INTRODUCTION

Enamel alterations of great clinical significance affecting the first permanent molars (FPM) were described in four presentations by Beentjes et al., Jalevik et al., Leppaniemi et al. and Weerheijm et al.at Congress of European Academy of Pediatric Dentistry in 2000.These enamel alterations or defects were named 'Hypomineralised permanent first molars', 'idiopathic enamel hypomineralisation in the permanent first molars', 'non fluoride hypomineralisation in permanent first molars' and 'cheese molars'. Although the names differ, these defects were similar in appearance. In 2001, Weerheijm et al. proposed the term Molar Incisor Hypomineralisation (MIH) to describe dysplasia of tooth enamel caused by a disturbance that affects ameloblasts during early maturation stage of amelogenesis.[1] MIH is a clinical condition, in which enamel defects range from demarcated opacities to broken, severely hypomineralised enamel and is seen in one or more of the four permanent first molar and/or incisors.[1] The affected enamel can be white, whitish-yellow or yellowish-brown and the defect usually has a clear border between affected and sound enamel. The etiology of these lesions is not clear and can vary from prenatal, natal and postnatal causes. Any specific infection during the last trimester of pregnancy has been associated with MIH-like lesions. Some authors have attributed such lesions to the mode of delivery like caesarean section or premature birth. Two or more concurrently occurring systemic illness, anti-epileptic drugs, antibiotics, anti-asthmatics and syndromes have also been implicated in post natal etiology of MIH. [2] In a Swedish study, a peak in the prevalence of MIH suggested that an environmental factor had been involved.[4] There was also an association between human exposure to environmental toxicants and MIH.[6] In a Finnish study by Alaluusua, accidental exposure to dioxins was also associated with an increased prevalence of dental enamel defects in subjects exposed in their childhood.[6,7,8,9] The global prevalence of MIH varies between 2.4% to 40.2%. The prevalence of MIH in India has been reported to be between 6.31% -9.46%.[12,13,14,15] The aim of this study was to determine the prevalence of MIH in permanent teeth in a group of 7 to 10 year old children going to municipal schools in Mumbai.

MATERIAL AND METHOD

The study was approved by the institutional ethical committee. Total 544 primary school children aged between 7-10 years had participated in this study. It was a cross sectional study involving children attending the municipal schools of Mumbai city. A stratified random sampling technique was used to select the children. A total of 544 children (274 boys and 270 girls) were examined. Co-operative children aged between 7-10 years irrespective of race or socioeconomic status were included in the study. Children with any communicable or systemic diseases or children with partially erupted upper and lower incisors were excluded from the study.

The children were examined during school hours in their respective classes. Mouth mirrors and explorers were used to examine participants under natural light. The teeth were not dried for examination. The students in each school were examined twice to check for intra-examiner reliability. Defects less than 2 mm were not recorded as per criteria given by Weerheijm et al. in 2003 was used in the study. [3]

RESULTS AND DISCUSSION

Prevalence of MIH was 7.90 % (n=43) in 7 to 10 year old municipal school going children in Mumbai. Out of 43 children affected with MIH, a total of 143 teeth had hypomineralisation. Among which 75 were permanent incisors and 68 were permanent molars. The permanent mandibular molars (n=34) were equally affected as permanent maxillary molars (n=34) where as permanent maxillary incisors (n= 38) were more affected as compared to permanent mandibular incisors (n=22). In the present study, no child was observed with isolated involvement of either mandibular or maxillary arch. In the study, it was noted that the prevalence of MIH was significantly higher in maxillary arch. A total of 38 permanent maxillary central incisors and 22 permanent mandibular central incisors were affected which was found to be statistically significant (p= 0.0455). 7 permanent maxillary lateral incisors and 8 permanent mandibular lateral incisors were affected which was statistically insignificant (p=1). 34 permanent maxillary first molars and 34 permanent mandibular first molars were affected and was statistically non-significant (p=1). In our study, 7.22% of the boys and 8.54% of the girls showed a prevalence of MIH. Although MIH prevalence is different in males and females, the difference is statistically not significant.

The prevalence of MIH varies widely from 2.4% to 40.2%. Balmer et al reported a total prevalence of 40-44%, Soviero et al noted a prevalence of 40.2% while Wogelius et al reported a prevalence of 37.50%. However, Cho et al reported a prevalence of 2.8%, Detrich et al reported a prevalence of 2.4%-11%. [5,16] This variation in prevalence of MIH could be due to difference in methodology and the diagnostic criteria used for the evaluation

of the lesion. In our study, a prevalence of 7.90% of MIH was recorded. An important factor to be considered in the prevalence of MIH is the size of the lesion. The impact of size is crucial, as small demarcated opacities are common and they have been either included or excluded in previous MIH studies. Suckling et al. observed white or yellow demarcated opacities that were less than 2 mm in diameter in 45% of the study population of 9 year old New Zealand children.[10] In another study, where the subjects were aged between 12-14 years, Suckling and Pearce found that 29% of single white demarcated opacities (43% of the affected children) were smaller than 2 mm in diameter.[17] The FDI Working Group on Developmental Defects of Enamel (DDE), 1992 recommended that any single defect less than 1 mm in diameter should not be recorded.[18] In our study we included only lesions equal or larger than 2 mm in diameter. Another important factor to be considered is eruption status of the tooth to be evaluated. Teeth with more than half of the crown visible should be included in the assessment. Although the optimal age for the screening for MIH is 8 years, in our study we included children from 7-10 years of age as the eruption is found to be slightly delayed in Indian population.[11,16] On the basis of the time table of human dental development, it is believed that mineralisation of the first permanent molars begins at birth and the crowns are completed around 3 years while eruption starts around 6 years of age. Mineralisation of the permanent central incisors both for maxilla and mandible begins at around 4 months, the crown completion occurs at 5 years of age and eruption commences at 6-8 years. While mineralisation of the maxillary lateral incisors begins around 11 months, crowns are completed at about 5 years and these teeth erupt at 7-9 years on average. MIH is most likely systemic in origin and therefore due to overlap in the time of development, it is logical that such dental defects occur concomitantly in the incisors and the first molars. In our study permanent maxillary central incisors were affected more than the permanent maxillary lateral incisors. Differences in the developmental time tables may partly explain variations in the prevalence.The presence of fluorosis may have masked the demarcated lesions in some cases, thus lowering their prevalence figures.[8] Our study was conducted in the city of Mumbai which is a non-fluoridated area, thus the lesions could be clearly identified. Although the prevalence of MIH in our study is not as high as in some European countries, few studies carried out in different regions of the Indian subcontinent have reported a prevalence of 6.31% (Mittal et al, Chandigarh), 9.2% (Parikh et al, Gujarat), 9.46% (Bhaskar et al, Udaipur) and 10.48% (Mittal N., Ghaziabad).[12,13,14,15] The present study does not represent the Indian community as a whole. Equivalent studies on Indian population need to be conducted to provide a clear picture of MIH prevalence in India.

CONCLUSION

The present cross sectional study was an unostentatious attempt to determine the prevalence of MIH among municipal school children of Mumbai in the age group of 7 to 10 years.

The following conclusions from this study can be drawn:

1. The prevalence of MIH obtained in this study was 7.90 %.
2. MIH was found to be more frequent in the maxilla than in the mandible.
3. There was no statistically significant difference in prevalence with regard to sex.
4. In this study, no child was observed with isolated involvement of either mandibular or maxillary arch.

Conflict of Interest: Author Sachin Makne and others declare that he has no conflict of interest.

Ethical approval: This article does not contain any studies with animals performed by any of the authors. All procedures performed in studies involving human participants were in accordance with principles of laboratory animal care and the ethical standards of the institutional research committee. Informed consent: Informed consent was obtained from all individual participants parents included in the study.

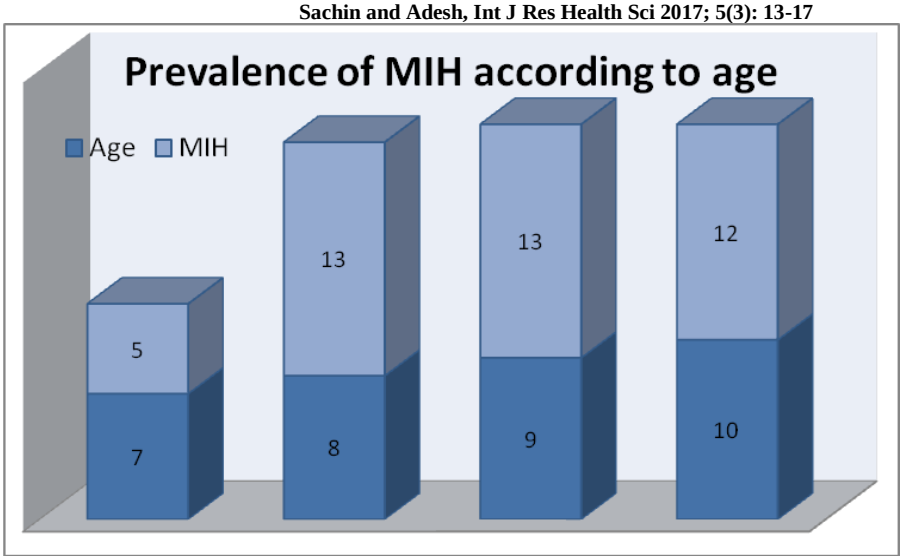

Figure 1: prevalence of MIH according to age

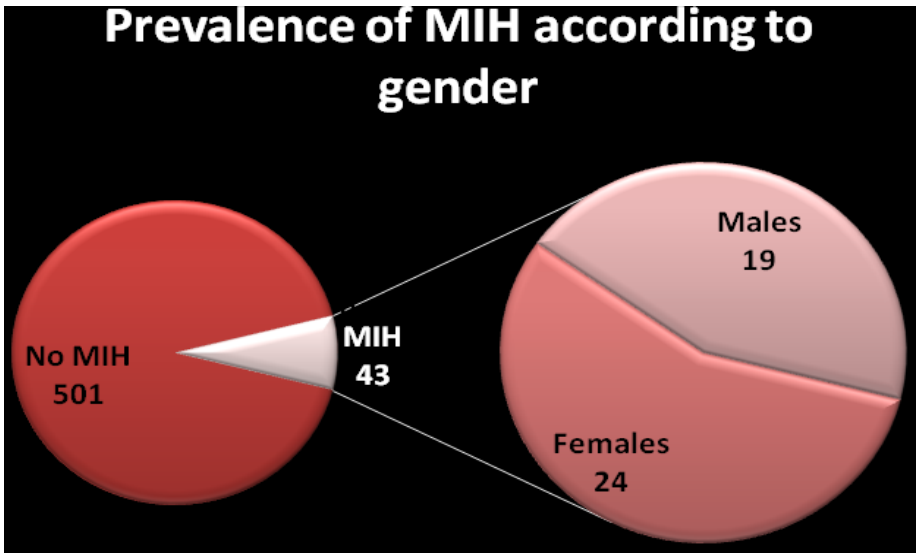

Figure 2: Gender distribution of MIH

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