



The Prevalence and Extent of Molar-Incisor Hypo-Mineralization by Gender in a Group of Iranian Children

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(Received 12 Mar 2019; accepted 26 Mar 2019)

Dear Editor-in-Chief

Molar-Incisor Hypo-mineralization (MIH) is defined as dysplasia of enamel structure caused by defects in ameloblasts during early developmental stages. Clinically, defect in enamel translucency is interpreted as demarcated opacity of white, cream, yellow or brown colors (1, 2). Toothache, increased sensitivity, malformation, increased susceptibility to plaque accumulation are considered as complications of MIH (3, 4). The definitive cause of molar-incisor hypoplasia is unknown, but it can be related to various environmental factors associated with systemic conditions (1, 5).

We aimed to determine the prevalence of MIH by gender in 7-11-year-old children in the city of Yazd, Iran.

The present cross-sectional descriptive-analytical study was approved by the Ethics Committee of Shahid Sadooghi University of Medical Sciences in Yazd (Code no: 173).

Overall, 645 children of 7 to 11 yr old were selected from schools in Yazd using a randomized cluster sampling method, and examined by the same person using a dental explorer and mirror. Children with amelogenesis imperfect, fluorosis, or color change due to tetracycline and children with smaller than 1 mm defects were excluded. Severity and extent of MIH lesions were meas-

ured using modified Developmental Defect Enamel (mDDE) and European Academy of Pediatric Dentistry (EAPD) criteria(1), and its relation with gender was assessed. Based on EAPD criterion, teeth with only white or yellow-brown color change were regarded as mild, those appearing with enamel loss as moderate, and teeth with affected dentin as severe. This criterion categorizes lesions in terms of extent into three groups: lesions ≥ 4.5 mm are considered as large, 3.5 mm lesions as medium, and 2 mm lesions as small. mDDE criterion divides MIH lesions according to color and spread of lesion into demarcated opacity, diffuse opacity, and hypoplasia. Parents were asked about their children history of systemic diseases. Mean data were analyzed using the Chi-square test at significance level of $P < 0.05$.

Of the 645 children examined, 154 (23.8%) had MIH. In both sexes, molars were equally more affected than incisors. The results showed no significant correlation between MIH and type of tooth affected (mandibular or maxillary molars, and mandibular or maxillary incisors) by gender ($P=0.538$) (Table 1). There was a significant correlation between extent and severity and size of MIH lesions by gender ($P < 0.001$). No significant relation was found between gender and color or

spread of hypo-plastic MIH lesions ($P=0.103$). Molar-incisor hypoplasia >4.5 mm and affecting

two-thirds or more of the teeth was significantly more observed in girls ($P<0.001$).

Table 1: Prevalence of MIH by gender

| <i>Prevalence of Hypo-mineralization by gender</i> | | <i>Girls (%)</i> | <i>Boys (%)</i> | <i>Total (%)</i> | <i>P-value</i> |
|--|--------------------|------------------|-----------------|------------------|----------------|
| Lesion size | <2.5mm | 61(25.3) | 72(36.7) | 133(30.4) | 0.001 |
| | 2.5-3.5mm | 29(12.0) | 36(18.4) | 65(14.9) | |
| | >4.5mm | 151(62.7) | 88(44.9) | 239(54.7) | |
| Severity | Mild | 109(45.2) | 137(69.9) | 246(56.3) | 0.000 |
| | Moderate | 40(16.6) | 23(11.7) | 63(14.4) | |
| | Severe | 92(38.2) | 36(18.4) | 128(29.3) | |
| Extent of affected teeth | <1.3 | 75(31.1) | 86(43.9) | 161(36.8) | 0.000 |
| | 1.3-2.3 | 51(21.2) | 54(27.6) | 105(24.0) | |
| | >2.3 | 115(47.7) | 56(28.6) | 171(39.1) | |
| Type teeth affected | Mandibular incisor | 12(5.0) | 8(4.1) | 20(4.6) | 0.538 |
| | Mandibular molar | 104(43.2) | 73(37.2) | 177(40.5) | |
| | Maxillary incisor | 82(34.0) | 78(39.8) | 160(36.6) | |
| | Maxillary molar | 43(17.8) | 37(18.9) | 80(18.3) | |
| Color and spread of lesions | Demarcated opacity | 90(37.3) | 93(47.4) | 183(41.9) | 0.103 |
| | Diffuse opacity | 77(32.0) | 52(26.5) | 129(29.5) | |
| | Hypo-plastic | 74(30.7) | 51(26.0) | 125(28.6) | |

In both sexes, the most common lesions were mild, larger than 4.5 mm lesions, and demarcated opacity form. In all severities, molar-incisor hypoplasia occurred significantly more in girls

($P<0.001$). A review of history of children with MIH provided by parents showed that diarrhea and high fever were the most common diseases affected these children (Table 2).

Table 2: Prevalence of diseases in children with MIH

| <i>Disease</i> | <i>Children with MIH (%)</i> | <i>Disease</i> | <i>Children with MIH (%)</i> |
|----------------|------------------------------|---------------------------------|------------------------------|
| Severe fever | 13(8.44) | Seizure | 5(3.24) |
| Diarrhea | 18(11.68) | Otitis media | 5(3.24) |
| Asthma | 2(1.29) | Urinary infection | 6(3.89) |
| Chicken pox | 2(1.29) | Septic sore throat | 6(3.89) |
| Allergy | 2(1.29) | History of hospitalization | 5(3.24) |
| Heart problem | 1(0.64) | History of specific medications | 6(3.89) |

Molar-incisor hypo-mineralization has a relatively high prevalence in Yazd children. Severity, size and extent of lesions were greater in girls. The difference in the results from various studies (2, 4) regarding the effect of gender on MIH can be attributed to the difference in sample size and also in chronological development of teeth in two sexes. Moreover, greater severity of lesions in girls can be due to their different oral hygiene behaviors. The study population consisted of 7-11-year-old children from Yazd, it appears that long term mild localized stimuli have led to the incidence of demarcated hypo-plastic lesions and relatively large size of ≥ 4.5 mm, with stronger effects in girls than in boys. On the other hand, various diseases and systemic factors may have a role in the incidence of MIH, but MIH cannot be attributed to a definitive cause, and further studies are needed to determine causes in different societies.

Acknowledgements

The authors thank vice chancellor for research and technology, Shahid Sadoughi University of Medical Sciences for its financial support.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Martinez Gomez TP, Guinot Jimeno F, Bellet Dalmau LJ et al (2012). Prevalence of molar-incisor hypomineralisation observed using transillumination in a group of children from Barcelona (Spain). *Int J Paediatr Dent*, 22:100-9.
2. Nooria AJ, Husseinb SA (2014). Molar-incisor hypomineralisation (MIH) among Kurdish children in Sulaimani City, Iraq. *Sulaimani Dent J*, 1:45-50.
3. Bakkal M, Abbasoglu Z, Kargul B (2017). The Effect of Casein Phosphopeptide-Amorphous Calcium Phosphate on Molar-Incisor Hypomineralisation: A Pilot Study. *Oral Health Prev Dent*, 15(2):163-167.
4. Ahmadi R, Ramazani N, Nourinasab R (2012). Molar incisor hypomineralization: a study of prevalence and etiology in a group of Iranian children. *Iran J Pediatr*, 22(2):245-251.
5. Lygidakis N (2010). Treatment modalities in children with teeth affected by molar-incisor enamel hypomineralisation (MIH): a systematic review. *Eur Arch Paediatr Dent*, 11(2):65-74.