**ORIGINAL ARTICLE**

# Frequency of Molar Incisor Hypomineralization and Associated Risk Factors – A Study from Southern Punjab, Pakistan

*Rabia Zafar[1], Amna Urooj[2], Sehrish Masood[3]*

**ABSTRACT**

**Background and Objective:** The prevalence of molar incisor hypomineralization varies in different regions of the world. This disorder leads to susceptibility to development of complications and hence timely management is mandatory. This study was designed to determine the frequency of molar incisor hypomineralization in children presenting to dental out-patient department of a tertiary care hospital in Pakistan.

**Methods:** It was a cross sectional descriptive study carried out at Ibn- Sina Hospital Multan, Pakistan. A total of 300 subjects including children and adolescents presenting to the outdoors were included. The detailed dental examination was carried out by two expert dentists for diagnosis of molar incisor hypomineralization. Data regarding risk factors was collected by administering a standardized and validated questionnaire to the parents about prenatal and post-natal risk factors.

**Results:** A total of 3.33% children were diagnosed with molar incisor hypomineralization. Male to female ratio was 1:1.3. There was no significant difference with respect to gender. The mean teeth affected per child were 2.1 ± 07. Risk factors found in the study population were asthma, history of typhoid and measles, and frequent antibiotic use.

**Conclusion:** Molar incisor hypomineralization is quite less frequent in general population with no gender predominance. Pre and post-natal factors effect its development that requires timely management strategies by dental specialists.

**KEYWORDS:** Molar, Incisor, Hypomineralization, Prenatal, Postnatal, Enamel, Opacities.

***How to Cite This:***

*Zafar R, Urooj A, Masood S. Frequency of molar incisor hypomineralization and associated risk factors – A study from Southern Punjab, Pakistan*. Biomedica. 2020; 36 (3): 291-5.

1. Rabia Zafar
Assistant Professor, Department of Operative Dentistry, Ibn-e-Sina Hospital, Multan Medical & Dental College, Multan – Pakistan.

2. Amna Urooj
House officer, Dental Department.
Nishtar Medical University & Hospital, Multan – Pakistan.

3. Sehrish Masood
Dental Surgeon. Multan – Pakistan.

Corresponding Author:
Dr. Rabia Zafar:
Assistant Professor, Department of Operative Dentistry, Ibn-e-Sina Hospital, Multan Medical &Dental College, Multan – Pakistan.
Email: rabiazafar2009dent@gmail.com

- Received for publication: 09-04-2020
- First Revision received: 16-07-2020
- Second Revision received: 27-08-2020
- Accepted for publication: 19-09-2020

## INTRODUCTION

Molar incisor hypomineralization is a condition that is mentioned in literature with different names such as idiopathic enamel hypomineralization, idiopathic enamel opacities, non-fluoride opacities and cheese teeth etc. It was firstly named as molar incisor hypomineralization in 2001, suggested by

Weerheijm et al.[1] Molar incisor hypomineralization is defined as a developmental disorder that involves at least one permanent first molar by opacities that are not symmetrical.[2-5] The prevalence of molar incisor hypomineralization varies in different regions of the World and it was found in literature that lowest frequency of molar incisor hypomineralization is in Chinese population.[6] Studies conducted in Germany, Spain, Iran, Brazil and Iraq[7] found prevalence of molar incisor hypomineralization between 10.15 to 21.8%. The prevalence of molar incisor hypomineralization in our neighbouring countries like India and Iran was reported to be 6.31% and 12.7% respectively.[7-10]

The factors involved in etiopathogenesis of molar incisor hypomineralization have been studied by many researchers. Many prenatal and post-natal factors were investigated and found to be involved in its causation. Some of theseinclude low birth weight, chicken pox, hypocalcaemia, oxygenation issues, and fever in early childhood.[3] However, many studies in literature could not find significant relation between these factors and the disorder. Yet a study conducted in Brazil[5] found that oxygenation at birth, pneumonia, asthma, bronchitis, hospitalization and use of antibiotics had significant relation with molar incisor hypomineralization.[3,7,11-13]

Teeth affected by molar incisor hypomineralization are soft and porous and more prone to cavity formation and enamel disintegration. This makes them more susceptible to development of caries, hypersensitivity and more need of dental treatment and in severe cases extraction of the tooth may be needed.[14]

As the prevalence of molar incisor hypomineralization is quite high that usually goes unnoticed and because of this extensive dental management and manoeuvres are needed at the end. Therefore, the objective of the present study was to determine the frequency of molar incisor hypomineralization and associated risk factors in children and adolescents presenting to a tertiary care hospital of Southern Punjab.

## METHODS

This was cross sectional descriptive study conducted in the dental outdoor patient department of Ibn-e-Sina Hospital Multan from 1/11/2019 to 31/01/2020 after taking approval from Ethical Committee of the hospital vide Letter No. ERC-8-120/19. A total of 300 patients, aged 6-20 years, were included in the study. Children with generalized hypoplastic/hypomineralized defects such as amelogenesis imperfect and children with chronic illness were excluded from the study. All children included in the study were instructed to brush the teeth before examination. During examination teeth were kept wet to rule out opacities due to the effect of drying. Examination of permanent molar and incisors was done according to the standard criteria. Children diagnosed with molar incisor hypomineralization were examined by second expert to rule out any bias. To get data about risk factors, parents were administered a validated questionnaire about prenatal and post-natal risk factors.

## STATISTICAL ANALYSIS

Descriptive variables were presented by using frequency and percentages. Statistical package of Social Sciences version 20.0 was used to analyse data. Chi-square test was applied and a P-value of less than or equal to 0.05 was considered significant.

## RESULTS

The study population comprised of 300 children of age 6 to 20 years with mean age of 11 ± 5.5 years. The gender distribution of the study population is shown in the Table-1.

**Table-1:** Gender distribution of Molar incisor hypomineralization

| *Gender* | *Affected* | *Unaffected* | *Total* |
|---|---|---|---|
| Female | 06 (3.5) | 164 (96.4) | 170 (100) |
| Male | 04 (3.07) | 126 (96.93) | 130 (100) |
| Total | 10 (3.33) | 290 (96.66) | 300 (100) |

Out of 300 children, 10 (3.33%) children were diagnosed of having molar incisor hypomineralization. Among these, 4 were males and 6 were females. There was no significant difference with respect to gender (P = 0.122). The mean teeth affected per child were 2.1 ± 07.

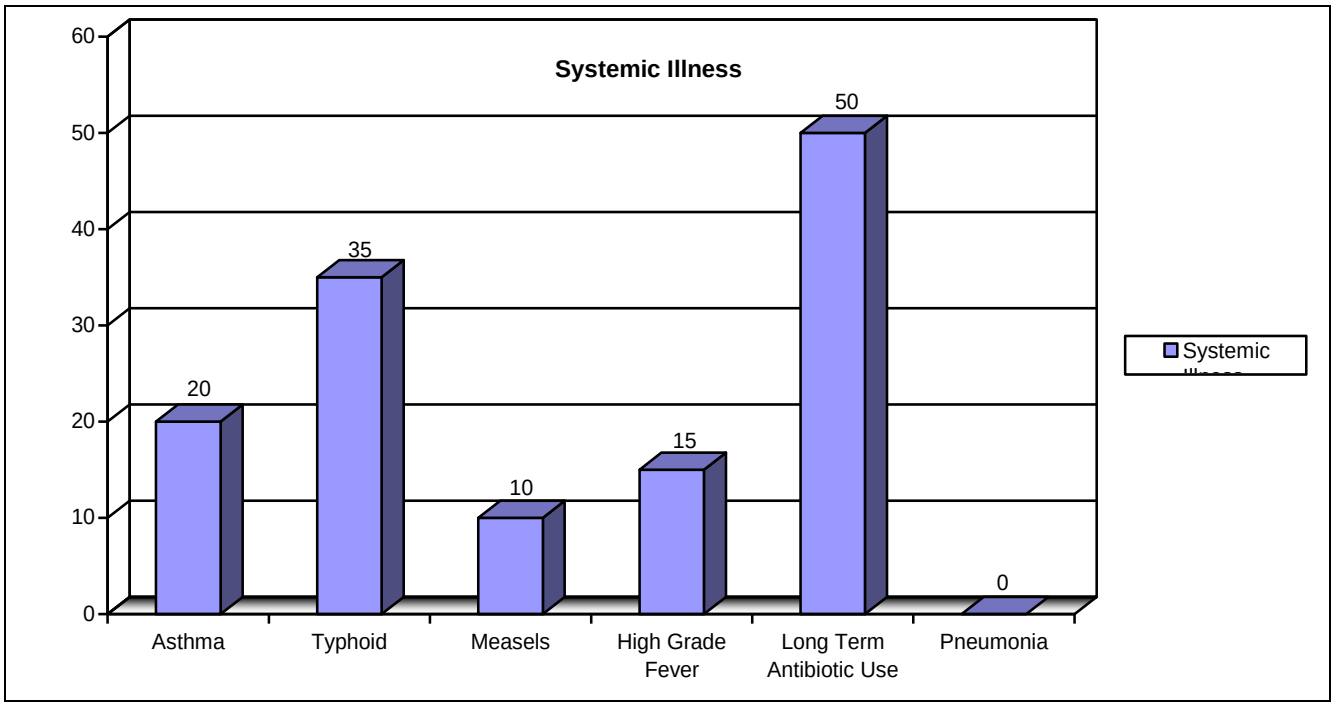


**Fig.1:** History of systemic illness in study population.

Detailed medical history of the patients showed the most common association was with the long-term antibiotic use and none of patients was found to have any history of pneumonia (Fig:1).

History of the mode of delivery showed that majority of the children were born by normal vaginal delivery (220) and only 80 (26.67%) were born by Caesarean section. Study also checked for sweet and cold drink intake and found that majority of the children with molar incisor hypomineralization were taking less than 4 cold drinks per day and greater than 4 spoons of sugar or sweet intake.

## DISCUSSION

Molar incisor hypomineralization is a disease effecting first permanent molar and incisors; it is quite common around the world with global prevalence ranging from 2 – 25%. This regional variation may be due to ethnicity, dietary habits, environmental factors, sampling technique and sample size variation.[8,9,12] Frequency of molar incisor hypomineralization in this study was 3.33% which is less than that reported in neighbouring countries like India and Iran where it was reported to be 13.9% and 12.7% respectively.[12,14]

The mean teeth affected by molar incisor hypomineralization in this study is similar to that of a study reported fromIran.[14]However it is quite lesser than the mean observed in other countries.[4,14]

Gender seems to pose no effect on molar incisor hypomineralization. Majority of studies have shown higher frequency of molar incisor hypomineralization in females as compared to males, though the difference was not statistically significant.[11,12,14,17] In this study, a slight predominance of females was observed which is in conformity with previous studies. As regards the risk factors of molar incisor hypomineralization are concerned, a case control study conducted in Brazil[5] showed a significant relation between asthma and molar incisor hypomineralization while another study[3] did not reveal any relation between the two. Amelogenesis is a sensitive process and requires oxygen and calcium phosphate, so deprivation of oxygen may affect amelogenesis. Other risk factors studied include preterm birth, breast feeding, use of paracetamol and fever were not found to be significantly related to molar incisor hypomineralization while use of antibiotics, pneumonia, illness upto 4years and use of oxygen after birth were related to the disorder. In the

current study, these factors were also recorded and findings were in conformity to previously reported studies.[2,3,7]

## CONCLUSION

Therefore, it can be concluded from the study that molar incisor hypomineralization is quite less frequent in our population as compared to other parts of the world. Children, especially with history of pneumonia, asthma and hospitalization, should be screened regularly for the disorder so that early intervention could be carried out and permanent loss of teeth may be prevented.

## LIMITATIONS OF THE STUDY

As it is a single institution-based study, hence results cannot be generalized. Patients presenting to the private hospital may not be the true representative of the general population of Southern Punjab. Hence larger scale studies in public sector hospitals may be carried out to precisely determine the actual burden of the disorder in our general population.

## ACKNOWLEDGEMENT

The authors acknowledge Dr. Nudrat Fayyaz for her continuous support and help in completing the study.

## CONFLICT OF INTEREST

None to declare.

## GRANT SUPPORT AND FINANCIAL DISCLOSURE

None to disclose.

## REFERENCES

1. Calderara PC, Gerthoux PM, Mocarelli P, Lukinmaa P, Tramacere PL, Alaluusua S. The prevalence of molar incisor hypomineralisation in a group of Italian school children. Eur J Paediatr Dent. 2005; 6 (2): 79-83.
2. Davenport M, Welles AD, Angelopoulou MV, Gonzalez C, Okunseri C, Barbeau L, et al. Prevalence of molar-incisor hypomineralization in Milwaukee, Wisconsin, USA: a pilot study. Clin Cosmet Investig Dent. 2019; 11 (4): 109-17.
3. Giuca MR, Cappe M, Carli E, Lardani L, Pasini M. Investigation of clinical characteristics and etiological factors in children with molar incisor hypomineralization. Int J Dent. 2018; 2018: 1-5.
4. Allazzam SM, Alaki SM, El Meligy OA. Molar incisor hypomineralization, prevalence, and etiology. Int J Dent. 2014; 2014: 1-8.
5. Fragelli CM, Souza JF, Jeremias F, Cordeiro RD, Santos-Pinto L. Molar incisor hypomineralization (MIH): conservative treatment management to restore affected teeth. Braz Oral Res. 2015; 29 (1): 1-7.
6. da Silva FS, Jose M, Ribeiro AP, dos Santos-Pinto LA, de Cassia Loiola Cordeiro R, et al. Are hypomineralized primary molars and canines associated with molar-incisor hypomineralization? Pediatr Dent. 2017; 39 (7): 445-9.
7. Tourino LF, Correa-Faria P, Ferreira RC, Bendo CB, Zarzar PM, Vale MP. Association between molar incisor hypomineralization in schoolchildren and both prenatal and postnatal factors: a population-based study. PLoS One. 2016; 11 (6): 1-10.
8. Mittal NP, Goyal A, Gauba K, Kapur A. Molar incisor hypomineralisation: prevalence and clinical presentation in school children of the northern region of India. Eur Arch Paediatr Dent. 2014; 15 (1): 11-8.
9. Ng JJ, Eu OC, Nair R, Hong CH. Prevalence of molar incisor hypomineralization (MIH) in Singaporean children. Int J Paediatr Dent. 2015; 25 (2): 73-8.
10. Garcia-Margarit M, Catalá-Pizarro M, Montiel-Company JM, Almerich-Silla JM. Epidemiologic study of molar-incisor hypomineralization in 8-year-old Spanish children. Int J Paediatr Dent. 2014; 24 (1): 14-22.
11. López Jordi MD, Alvarez Loureiro L, Salveraglio I, Ortolani AM. Prevalence of molar-incisor hypomineralization (MIH) in children seeking dental care at the Schools of Dentistry of the University of Buenos Aires (Argentina) and University of la Republica (Uruguay). Acta Odontológica Latinoamericana. 2012; 25 (2): 224-30.
12. Mishra A, Pandey RK. Molar incisor hypomineralization: an epidemiological study with prevalence and etiological factors in Indian pediatric population. Int J Clin Pediatr Dent. 2016; 9 (2): 167-71.
13. Almuallem Z, Busuttil-Naudi A. Molar incisor hypomineralisation (MIH)–an overview. Br Dent J. 2018; 225 (7): 601-9.

14. Ahmadi R, Ramazani N, Nourinasab R. Molar incisor hypomineralization: a study of prevalence and etiology in a group of Iranian children. Iran J Pediatr. 2012; 22 (2): 245-51.

***Author's Contribution:***

**RZ:** Conception and design of study, Acquisition and analysis of data, drafting of manuscript.
**AU, SM:** Acquisition and analysis of data, drafting of manuscript.
**ALL AUTHORS:** Approval of the final version of the manuscript to be published.