Relationship between Molar Incisor Hypomineralization and dental caries at eight-year-old children

Ljiljana Marković Đurić, Olivera Dolić, Marija Obradović, Mirjana Tošić, Maja Ernaut

1Primary Health Care Center, Kneževo, Bosnia and Herzegovina;  
2University of Banja Luka, Faculty of Medicine, Banja Luka, Bosnia and Herzegovina;  
3Primary Health Care Center, Gradiška, Bosnia and Herzegovina;  
4Primary Health Care Center, Srbac, Bosnia and Herzegovina

SUMMARY

Introduction The aim of the present study was to determine the relationship between Molar Incisor Hypomineralization (MIH) and caries in school children from Banja Luka region, Republic of Srpska.

Materials and methods One calibrated dentist evaluated a sample of 529 schoolchildren, eight years old, according to the European Academy of Pediatric Dentistry (EAPD) criteria on MIH presence. Dental caries was assessed using the DMFT (Decayed, Missing, Filled Teeth) criteria.

Results DMFT/dmft was significantly higher in children with MIH than without MIH (p < 0.001). In the MIH group of children, high values of caries indices (%DMFT/%dmft and mean DMFT/dmft) were found.

Conclusion Significant association between MIH and dental caries in eight-year-olds was found.

Keywords: molar incisor hypomineralization; dental caries; children

INTRODUCTION

Oral health is an essential part of the overall health. Regardless the knowledge of dental caries causes, it is still the most widespread disease of civilization and global problem. During the past decades in many developed countries it has been noticed a decline in caries prevalence of children and adolescents. Opposite to reduced prevalence of dental caries, developmental anomalies of enamel are increasingly drawing attention in clinical practice and becoming more prominent public health problem [1].

An increased frequency of structural anomalies of enamel has been noticed in the past years mainly affecting first permanent molars and incisors. For better understanding of these changes and their impact on overall oral health, Karin Werheijm et al. (2001) suggested a single term - Molar Incisor Hypomineralization (MIH), which was accepted at the meeting of the European Academy of Paediatric Dentistry in Athens in 2003 [2]. This condition is characterized by hypomineralization of systemic origin that affects one or more first permanent molars in association with defects of permanent incisors [3].

Beside clinical implications of MIH (thermal, chemical and mechanical hypersensitivity, lack of esthetics - appearance of white, yellow or brown opacity), hypomineralized changes are strong predictors of dental caries. Affected teeth, in particular first permanent molars, are susceptible to dental caries, not only because of enamel porosity, but also increased teeth sensitivity that make effective oral hygiene difficult [4]. Furthermore, low salivary flow rates and low pH have been observed in MIH children, as another factor that could possibly contribute to higher caries risk [5]. In more severe cases, hypersensitivity may be increased to the level that is hard to achieve efficient dental analgesia during preparation. What is even worse is that children with this type of defect require extensive and often repeated restorative treatments. Conservative treatments of these teeth are challenging for both, a patient and a dentist. In many cases, dental fear and anxiety is present which complicate treatment additionally [6, 7]. For these reasons, monitored tooth eruption, adoption of timely and accurate diagnosis of MIH is crucial for proper selection of therapeutic procedures and prevention of further damage.

The aim of the present study was to determine the prevalence of dental caries in children with MIH, and relationship between MIH and caries development in permanent and primary teeth.

MATERIALS AND METHODS

A cross-sectional study was conducted in Banja Luka region, where 540 school children, aged 8 years were screened for MIH and decayed, missing and filled teeth (DMFT). Study was conducted between September 2015 and March 2016. Age of eight was chosen because first permanent molars and incisors erupted recently, so caries prevalence should still be low and therefore lower possibility for caries lesion to mask hypomineralisation [2].
The Ethical Committee of the Institute for Clinical Dentistry of Banja Luka and the Ethical Committee of Public Health Centre, Banja Luka approved the study.

Two stage sampling procedure was adopted for sample selection. In the first stage, 9 schools of all 30 were selected by random sampling. In the second stage, children were recruited, from the selected schools, by proportionate stratified random sampling. Children without parental informed consent signed and children with fixed orthodontic appliances were excluded from the study. A written informed consent was obtained from parents before clinical examination of their children.

One calibrated dentist, using a dental mirror and a probe, examined children in dental chair under artificial light. If necessary, cotton rolls were used to remove any residual debris. The criteria proposed by the European Academy of Pediatric Dentistry (EAPD) were used for the diagnosis of MIH, which included the presence of demarcated opacities, post-eruptive enamel breakdown, atypical restorations and extraction due to MIH of at least one first permanent molar [3]. Tooth lesions that were less than 1 mm in diameter were not included in the study, the opacities that were only observed on the incisors without the involvement of the molars were not diagnosed as MIH. The cases of excessive caries lesions haloed with opacities were diagnosed as MIH.

Dental caries experience was recorded using the WHO (World Health Organization) criteria for diagnosis of decayed (D), missing (M) and filled (F) teeth (DMFT/dmft Index) [8]. The caries prevalence was expressed in statistical coefficients: %DMFT/dmft index and mean DMFT/dmft index. The examination of dental caries included all permanent and primary teeth. According to clinical features of MIH, required treatment needs were presented in five groups: no treatment required, one-surface filling, two- or multi-surface filling, endodontic treatment and tooth extraction.

The data were analyzed using the IBM SPSS Statistics 21.0. A comparison between groups was carried out using the Pearson’s correlations and Mann-Whitney U-test. For all tests the P-value of 0.05 or less was considered statistically significant.

RESULTS

Out of 540 children, nine did not have signed permission by their parents and therefore were not examined. Two children had partially erupted or unerupted all four permanent molars and were excluded as well. Finally, a total of 529 (97.96%) children (254 boys and 275 girls) were included in the study. Analysis of results about the prevalence of dental caries showed DMFT/dmft in permanent and primary teeth was significantly higher in children with MIH than without MIH (p < 0.001) (Table 1). In the examined groups, high values of analyzed parameters for caries prevalence %DMFT/dmft and mean DMFT/dmft were found, but both significantly higher in the group with MIH (Table 2). Table 3 shows evaluation of the need for dental treatment of teeth affected by hypomineralization changes.

DISCUSSION

Our study evaluated the relationship between MIH and dental caries in school children of Banja Luka region, Republic of Srpska. Increased porosity of tooth structure and consequently reduced mechanical resistance of hypomineralized changes pose great risk for dental caries, even in populations with low caries prevalence.

Statistically significant correlation between DMFT (1.41 ± 1.62) and hypomineralized changes was found. This finding is consistent with the research of most au-

---

**Table 1.** Relation of DMFT/dmft median in MIH and non MIH- group

| Compared groups | DMFT KEP (SD) | Median (Medijana) | dmft kep (SD) | Median (Medijana) | p-value |
|-----------------|---------------|------------------|---------------|------------------|----------|
| MIH group       | 2.43 ± 1.70   | 2.0              | 7.40 ± 3.08   | 8.0              | p < 0.001 |
| Non-MIH group   | 1.23 ± 1.54   | 0.0              | 5.52 ± 3.47   | 6.0              |          |
| Total           | 1.41 ± 1.62   | 1.0              | 5.80 ± 3.48   | 6.0              |          |

**Table 2.** Relation of %DMFT/dmft and mean DMFT/dmft in MIH and non-MIH group

| Compared groups | %DMFT/dmft Karijes indeks osoba (KIO) | Mean DMFT/dmft Karijes indeks prosek | p-value |
|-----------------|--------------------------------------|--------------------------------------|----------|
| MIH group       | 80%                                  | 2.3                                  | 7.4      | p < 0.001  |
| Non-MIH group   | 50.3%                                | 1.2                                  | 5.5      |          |
The present study found statistically significant correlation between dmft (5.80 ± 3.48) and hypomineralized changes. This is not consistent with the majority of scientific research, where higher caries experience in permanent teeth with hypomineralized changes was found, but not in primary teeth [5, 13].

Further analysis showed that 80% of our respondents with hypomineralized changes had at least one DMFT, compared to 50% in the group of children without MIH, which clearly implicated increased tendency for caries development in teeth with hypomineralization changes. A study conducted in India in 2015, by Tadikonde et al. demonstrated positive correlation between dental caries and MIH, where the prevalence of caries was 27% in children with MIH [15].

In the present study, mean DMFT/dmft in children with hypomineralized teeth was 2.3, which was statistically significant compared to the group of children without hypomineralization (1.2). Keeping in mind that the study included eight years old children who had small number of permanent teeth recently erupted, this result can be considered very high. This is in accordance with other studies [10, 16]. Kirthiga et al. in their study found that the mean DMFT value in respondents affected with MIH was 3.2, which was significantly higher than the mean DMFT value of controls (0.8) [17].

MIH is associated with structural weakness and tooth hypersensitivity; therefore, there is high chance for performing poor oral hygiene and subsequently more chance for dental caries development. Histological examinations of hypomineralized teeth showed that oral bacteria can get embedded deeper into dentin of affected teeth, which obviously increase risk for dental caries [18].

Since dental treatment of MIH can pose a lot of difficulties, in our study the need for dental treatment of teeth affected by hypomineralized changes was estimated. It was determined that more than 70% of teeth with hypomineralized changes did not require treatment. This result can be interpreted as moderate and in accordance with similar results of other authors [19, 20]. The study conducted in Spain in 2014 recognized the need for treatment in eight-year-old children with MIH in accordance with WHO criteria classifying them as examinations, urgent treatment and necessary treatment—but not urgent. They found that 3.8% of children with MIH required urgent treatment because of the severity of defects, while 27.9% required some type of treatment that was not an emergency [11].

CONCLUSION

Significant association between MIH and caries was found in the current study. Dental caries was more common in hypomineralized teeth, thus playing role in further deterioration of affected teeth. This finding implicates need for increased awareness in regards to hypomineralization, early dental treatment and adequate prevention.

REFERENCES

1. Dietrich G, Sperling S, Hezzer G. Molar incisor hypomineralisation in a group of children and adolescents living in Dresden (Germany). Eur J Paediatr Dent. 2003; 4(3):133–7. [PMID: 14529334]
2. Weerheijm KL. Molar Incisor Hypomineralisation (MIH). Eur J Paediatr Dent. 2003; 4(3):114–20. [PMID: 14529330]
3. Weerheijm KL, Duggal M, Mejare J, Papagianouis L, Koch G, Martens LC, et al. Judgement criteria for molar incisor Hypomineralisation (MIH) in Epidemiologic studies. A summary of the European meeting on MIH held in Athens, 2003. Eur J Paediatr Dent. 2003; 4(3):110–3. [PMID: 14529329]
4. Kilpatrick N. New developments in understanding development defects of enamel: optimizing clinical outcomes. J Orthod. 2009; 36(4):277–82. [DOI: 10.1111/j.1601-0322.2009.00351.x]
5. Grolšel M, Jan J. Molar incisor hypomineralisation and dental caries among children in Slovenia. Eur J Paediatr Dent. 2013; 14(3):241–5. [PMID: 24295012]
6. Jalevnik B, Klingberg G. Treatment outcomes and dental anxiety in 18-year-olds with MIH, comparisons with healthy controls – a longitudinal study. Int J Paed Dent. 2012; 22:85–91. [DOI: 10.1111/j.1365-263X.2011.01161.x]
7. Onat H, Tosun G. Molar incisor hypomineralization. J Pediatr Dent. 2013; 1(3):53–7. [DOI: 10.4103/WKMP-0028.121202]
8. World Health Organization. Oral health surveys. Basic methods. 4th ed. Geneva: WHO; 1997. p. 39–46.
9. da Costa Silva CM, Jeremias F, de Souza JF, Cordeiro Rde C, Santos-Pinto L, Zuanon AC, et al. Molar incisor hypomineralization: prevalence, severity and clinical consequences in Brazilian children. Int J Paediatr. 2010; 20(6):426–34. [DOI: 10.1111/j.1365-263X.2010.01087.x] [PMID: 20738434]

10. Cho SY, Ki Y, Chu V. Molar incisor hypomineralization in Hong Kong Chinese children. Int J Paediatr Dent. 2008; 18(5):348–52. [DOI: 10.1111/j.1365-263X.2008.00927.x] [PMID: 18637048]

11. Garcia-Margarit M, Catalá-Pizarro M, Montiel-Company JM, Almench-Silla JM. Epidemiologic study of molar-incisor hypomineralization in 8-year-old Spanish children. Int J Paediatr Dent. 2014; 24(1):14–22. [DOI: 10.1111/ipd.12020] [PMID: 23317396]

12. Muratbegović A, Marković N, Kobašlija S, Zukanović A. Indeksi oralnog zdravlja i hipomineralizacija kutnjaka i sjekutića kod bo-sanske djece u dobi od 12 godina. Acta Stomatol Croat. 2008; 42(2):155–63. [PMID: 18076849]

13. Jeremias F, de Souza JF, Silva CM, Cordeiro Rde C, Zuanon AC, Santos-Pinto L. Dental caries experience and Molar-Incisor Hypomineralization. Acta Odontol Scand. 2013; 71(3-4):870–6. [DOI: 10.3109/00016357.2012.734412] [PMID: 23351220]

14. Heitmüller D, Thiering E, Hoffmann U, Heinrich J, Mantov D, Kühnisch J, et al. Is there a positive relationship between molar incisor hypomineralisations and the presence of dental caries? Int J Paediatr Dent. 2012; 2:1–9. [DOI: 10.1111/j.1365-263X.2012.01233.x]

15. Tadikonda AN, Acharya S, Pentapati KC. Prevalence of Molar Incisor Hypomineralization and its Relation With Dental Caries in School Children of Udupi District, South India. World J Dent. 2015; 6(3):143–6. [DOI: 10.5005/jp-journals-10015–1330]

16. Preusser SE, Ferring V, Wleklinski C, Wetzell WE. Prevalence and severity of molar-incisor hypomineralization in a region of Germany - a brief communication. J Public Health Dent. 2007; 67(3):148–50. [DOI: 10.1111/j.1752-7325.2007.00040.x] [PMID: 17899899]

17. Kirthiga M, Poornima P, Praveen R, Gayathry P, Manju M, Priya M. Prevalence and severity of molar incisor hypomineralization in children aged 11-16 years of a city in Karnataka, Davangere. J Indian Soc Pedod Prev Dent. 2015; 33(3):213–17. [DOI: 10.4103/0970-4388.160366] [PMID: 26156275]

18. Kemoli AM. Molar incisor hypomineralization (MIH): A possible factor in the high prevalence of dental caries in developing nations. Edorium J Dent. 2015; 2:51–5. [DOI: 10.5348/D01-2015-11-ED-9]

19. Kusku OO, Caglar E, Sandalli N. The prevalence and etiology of molar-incisor hypomineralisation in a group of children in Istanbul. Eur J Paediatr Dent. 2008; 9(3):139–44. [PMID: 18844443]

20. Lygidakis NA, Dimou G, Briseniou E. Molar-incisor-hypomineralisation (MIH). Retrospective clinical study in Greek Children. I. Prevalence and defects characteristics. Eur Arch Paediatr Dent. 2008; 9(4):200–6. [PMID: 19054447]

Received: 06.02.2017 • Accepted: 16.05.2017
Povezanost hipomineralizacije sekutića i kutnjaka sa pojavom karijesa kod osmogodišnjaka

Ljiljana Marković Durić1, Olivera Dolić2, Marija Obradović2, Mirjana Tošić1, Maja Ernaut4

1) JZU Dom zdravlja, Kneževina, Bosna i Hercegovina;
2) Univerzitet u Banjoj Luci, Medicinski fakultet, Banja Luka, Bosna i Hercegovina;
3) JZU Dom zdravlja, Gradiška, Bosna i Hercegovina;
4) JZU Dom zdravlja, Srbac, Bosna i Hercegovina.

KRATAK SADRŽAJ
Uvod Cilj ovog istraživanja je bio utvrditi odnos između pojava hipomineralizacije sekutića i kutnjaka i karijesa školske dece u regiji Banja Luka, Republika Srpska. Materiaj i metode Epidemiološka studija preseka je sprovedena na teritoriji banjalučke regije i uključivala je 540 dece uzrasta osam godina, kod kojih je registrovano prisustvo MIH-a. Studija zdravlja zuba ocenjivano je upotrebom sistema KEP. Rezultati Analiza rezultata prevalencije karijesa je pokazala da je KEP/KEP statistički značajno veći u grupi dece sa MIH-om i Karijes indeks osoba (KIO) i Karijes indeks prosek (KIP). Zaključak Istraživanje pokazuje značajnu povezanost između pojava hipomineralizacije sekutića i kutnjaka i karijesa. Ključne reči: hipomineralizacija sekutića i kutnjaka; karijes; dece;

UVOD
Oralno zdravlje je bitan deo opšteg zdravlja. Bez obzira na poznatu etiologiju, karijes je još uvek najraširenija bolest civilizacije i globalni problem, iako je tokom proteklih godina, kod kojih je registrovano prisustvo MIH-a i Karijes indeks osoba (KIO) i Karijes indeks prosek (KIP). Povezanost hipomineralizacije sekutića i kutnjaka sa pojavom karijesa, karijes indeks osoba (KIO) i karijes indeks prosek (KIP). Ključne reči: hipomineralizacija sekutića i kutnjaka; karijes; dece;

Iz navedenih razloga, rane kontrole, praćenje zuba tokom nicanja, donošenje pravovremene i tačne dijagnoze MIH-a su ključ za pravilan odabir terapijskih postupaka i prevenciju daljnjih oštećenja. Cilj istraživanja je bio utvrditi prevalenciju karijesa kod dece sa MIH-om, te utvrditi postoji li povezanost između pojeve hipomineralizacije promena i karijesa mlečnih i stalnih zuba.

MATERIJAL I METODE
Epidemiološka studija preseka je sprovedena na teritoriji banjalučke regije i uključivala je 540 dece uzrasta osam godina, kod kojih je registrovano prisustvo MIH-a i stanje zdravlja zuba ocenjeno upotrebom KEP sistema. Istraživanje je sprovedeno između marta 2015. i septembra 2016. godine. Uzrast osam godina odabran je zato što se u datom periodu prvi stalni kutnjaci iscrpljavaju praćenjem, u drugoj fazi metodom stratifikovanog uzorka izabrana su deca u Banjoj Luci i Etičkom odborom Zavoda za stomatologiju JZU Dom zdravlja Banja Luka. Pre početka istraživanja roditelji su potpisali saglasnost za učestalost izvođenja karijesa, kao i deca sa fiksnim ortodontskim aparatom. Dece čiji roditelji nisu dali pismeni pristanak isključena su iz odabranih škola. Pre početka istraživanja roditelji su potpisali saglasnost Etičkog odbora JZU Dom zdravlja Banja Luka. Iz navedenih razloga, rane kontrole, praćenje zuba tokom nicanja, donošenje pravovremene i tačne dijagnoze MIH-a su ključ za pravilan odabir terapijskih postupaka i prevenciju daljnjih oštećenja.

Uzorkovanje je sprovedeno kroz dve faze. U prvoj fazi metodom slučajnog izbora od ukupno 30 škola odabran je deo, a u drugoj fazi metodom stratifikovanog uzorka izabrana su deca iz odabranih škola. Pre početka istraživanja roditelji su potpisali informisan pristanak za saglasnost za učesce dece u istraživanju. Deca i roditelji nisu dali svoj pismeni pristanak isključena su iz istraživanja, kao i deca sa fiksnim ortodontskim aparatom, koji ometa adekvatan pregled zuba. Uzmivači dece obavljene su u stomatološkoj stolici, pod veštačkim osvetljenjem, od strane jednog kalibrisanog stomatologa, korišćenjem standardnog stomatološkog ogledalca i sonde. Po potrebi su korišćene pačućne valute za uklanjanje dentalnog biofilma. MIH je klinički dijagnostikovan na osnovu kriterijuma koje je opisao Werheijm...
2003. godine: ograničena zamačenja gledi, posteruptivni prekid gledi, atipična restauracije, ekstrakcija molara zbog MIH-a, retencija, nenicanje molara i sekutića [3]. Lezije zuba koje su bile manje od 1 mm nisu uključivane u studiju; opatciti koji su uočavani samo na sekutićima, bez zamačenja kutnjaka, nisu dijagnostikovani kao MIH. Slučajevi većih karijenskih lezija ovirišeni zamačenjima po ivicama kaviteta dijagnostikovani su kao MIH.

Istaknuto karjesa zuba je registrovano na osnovu KEP/kep indeksa (K – karjes, E – ekstrakcija, P – plomba) u skladu sa kriterijumima Svetске zdravstvene organizacije (SZO) &. Prevalencija karjesa je izražena statističkim koeficijentima: karješ indeksa osoba (KIO), karjes indeks proseka (KIP) i pokazateljem strukture karijenskih, ekstrahovanih i plombiranih zuba (struktu-va KEP). Klinički pregled je obuhvatio sve mlečne i stalne zube.

Distribucija zuba sa MIH-om prema potrebi za tretmanom prikazana je u pet grupa: nije potreban tretman, jednopolovini- ski ispuni, dvojpolovinski ili višepolovinski ispun, endodontski tretman i ekstrakcija zuba.

Za statističku analizu korišćen je softver IBM SPSS Statis-tics 21.0. Za upoređivanje razlika u učestalosti posmatranih parametara prevalencije karjesa, karijes indeks osoba (KIO), karijes indeks proseka (KIP) i pokazateljem strukture karijenskih, ekstrahovanih i plombiranih zuba (struktu-va KEP). Klinički pregled je obuhvatio sve mlečne i stalne zube.

Za statističku analizu korišćen je softver IBM SPSS Statis-tics 21.0. Za upoređivanje razlika u učestalosti posmatranih parametara prevalencije karjesa, karijes indeks osoba (KIO), karijes indeks proseka (KIP), i pokazateljem strukture karijenskih, ekstrahovanih i plombiranih zuba (struktu-va KEP). Klinički pregled je obuhvatio sve mlečne i stalne zube.

REZULTATI

Od ukupno 540 dece uključene u istraživanje, devetoro dece nije dobilo pisanu saglasnost od roditelja, dok dvoje dece nije imalo potpuno iznikla sva četiri prva stalna molara, te su isključeni iz istraživanja. Pregledano je ukupno 529 (97,96%) dece (254 dečaka i 275 devojčica).

Analiza rezultata prevalencije karjesa je pokazala da je KEP/ kep statistički značajno veći u grupi dece sa MIH-om u odnosu na grupu dece bez MIH-a (p < 0,001). (Tabela 1)

U ispitanoj grupi dece utvrđene su visoke vrednosti ispi-tivanih parametara prevalencije karjesa, karjes indeks osoba (KIO) i karjes indeks proseka (KIP). (Tabela 2)

Rezultati u Tabeli 3. pokazuju analizu podataka potrebne za tretmanom zuba zahvaćenih hipomineralizovanim promenama.

DISKUSIJA

Naša studija je imala za cilj da utvrди povezanost između kar-jesa i MIH-a kod dece školskog uzrasta na teritoriji banjalučke režije, u Republici Srpskoj, Zbog povećane poroznosti strukture zuba, u populacijama sa niskom rasprostranjenosti KIP-a. Ovaj nalaz je u suprotnosti sa istraživanjima većine autora koji su utvrdili statističku značajnost povezanosti karijesa i MIH-a kod dece u skladu sa rezultatima ove studije,

Prilikom analize učestalosti KIP u različitim etničkim grupama, u studiji je otkriveno statistički značajno veće KIP u grupi dece sa MIH-om u odnosu na dece bez MIH-a (0,273) [11]. Studija Muratbegovića i saradnike u Indiji, 2015. godine, otkrila je statistički značajnu asocijaciju karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,513) [15].

Istraživanje Tadikonde i saradnika u Indiji, 2015. godine, utvrdilo je statistički značajno veće KIP u grupi dece sa MIH-om u odnosu na dece bez MIH-a (0,8) [17].

U ovom istraživanju utvrđeno je da kod 5,80 ± 3,48% dece sa MIH-om potreban je hitan tretman i neophodan tretman, ali koji nije hitan. Ovaj rezultat je u skladu sa rezultatima drugih studija [19, 20]. Studija sprovedena u Španiji 2014. godine, utvrdila je statistički značajnu asocijaciju karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,43 ± 1,01) [13].

Ovaj nalaz je u skladu sa istraživanjima većine autora koji su utvrdili statistički značajnu asocijaciju karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,273) [11].

Imajući u vidu potenčije koje se javljaju u lečenju dece sa hipomineralizovanim promenama, u studiji je utvrđena i statistički značajna asocijacija karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,273) [11]. U ovom istraživanju je utvrđeno da kod više od 70% zuba sa hipomineralizacijom, u studiji je utvrđen statistički značajni veći KIP indeks (0,89 ± 1,18) kod dece sa hipomineralizovanim promenama, u odnosu na dece bez hipomineralizovanim promenama, gde je KIP indeks iznosio 0,43 ± 1,01 [13].

Analiza rezultata je pokazala da 80% dece sa hipomineralizovanim promenama ima bar jedan KEP u odnosu na 50% u grupi dece bez MIH-a, što se upućuje na povećanu sklonost kod razvoju karjesa kod zuba sa hipomineralizacijom. Studija sprovedena u Indiji, 2015. godine, utvrdila je statistički značajnu asocijaciju karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,513) [15].

KIP u ovoj studiji iznosi 2,3, što je statistički značajno u odnosu na grupu dece bez hipomineralizovanim promenama (1,2).

Ovaj nalaz je u skladu sa rezultatima drugih istraživanja [11]. U ovoj studiji utvrđena statistički značajna asocijacija karijesa i MIH-a kod dece u odnosu na dece bez MIH-a (0,273) [11]. U ovom istraživanju je utvrđeno da kod više od 70% zuba sa hipomineralizovanim promenama, u odnosu na dece bez MIH-a (0,273) [11].

U ovom istraživanju utvrđeno je da kod više od 70% zuba sa hipomineralizovanim promenama, u odnosu na dece bez MIH-a (0,273) [11]. U ovom istraživanju je utvrđeno da kod više od 70% zuba sa hipomineralizovanim promenama, u odnosu na dece bez MIH-a (0,273) [11].

Ovaj nalaz je u skladu sa rezultatima drugih istraživanja [11]. U ovom istraživanju je utvrđeno da kod više od 70% zuba sa hipomineralizovanim promenama, u odnosu na dece bez MIH-a (0,273) [11].
ZAKLJUČAK

Istraživanje je pokazalo da postoji visoka prevalencija karijesa kod dece sa MIH-om, kao i značajna povezanost između MIH-a i karijesa. Veća učestalost karijesa na hipomineralizovanim zubima upućuje na to da kariozno oboljenje igra značajnu ulogu u pogoršanju zdravstvenog stanja zuba zahvaćenih hipomineralizovanim promenama, te da postoji potreba za podizanjem svesti o molarno-incizivnoj hipomineralizaciji, pravovremenom tretmanu i prevenciji karijesa.