Revista Eletrônica
Acervo Saúde
Electronic Journal Collection Health ISSN 2178-2091

Global epidemiology of molar-incisor hypomineralization

Epidemiologia global da hipomineralização molar-incisivo

Epidemiología global de lahipomineralización molar-incisivo

Milena da Silva Lourenço[1], Marcio Santos de Carvalho[1], Deborah Rackel Cladas da Rocha Gaspar[1], Yuri Jivago Silva Ribeiro[1].

ABSTRACT

Objective: Molar-incisor hypomineralization (MIH) is a qualitative enamel defect of unclear etiology affecting one or more permanent molars and sometimes incisors. It poses a clinical challenge, and its true prevalence remains uncertain due to the recent expansion of research. This study aimed to estimate MIH prevalence and associated characteristics through an integrative review. **Methods:** A literature search was conducted in PubMed, SciELO, and LILACS up to January 2024, including 27,781 participants. **Results:** Five studies did not report sex-stratified prevalence. Only two addressed hypomineralized second primary molars (HSPM). Most studies used European Academy of Paediatric Dentistry (EAPD) criteria, while others applied the modified Developmental Defects of Enamel (mDDE) index. Prevalence varied by sample size, sex distribution, geographic location, and publication year. **Final considerations:** MIH shows high global prevalence, with higher rates in countries with limited dental care access. These factors should be considered in treatment planning.

Keywords: Molar-incisor hypomineralization, Prevalence, Enamel defects.

RESUMO

Objetivo: A hipomineralização molar-incisivo (HMI) é um defeito qualitativo do esmalte de etiologia ainda não esclarecida, que afeta um ou mais molares permanentes e, por vezes, incisivos. Representa um desafio clínico, e sua real prevalência permanece incerta devido à recente expansão das pesquisas. Este estudo teve como objetivo estimar a prevalência de HMI e suas características associadas por meio de uma revisão integrativa. **Métodos:** Foi realizada uma busca na literatura nas bases de dados PubMed, SciELO e LILACS até janeiro de 2024, incluindo 27.781 participantes. **Resultados:** Cinco estudos não relataram a prevalência estratificada por sexo. Apenas dois abordaram molares decíduos segundos hipomineralizados (HSPM). A maioria dos estudos utilizou os critérios da European Academy of Paediatric Dentistry, enquanto outros aplicaram o índice modificado de Defeitos de Desenvolvimento do Esmalte (mDDE). A prevalência variou de acordo com o tamanho da amostra, distribuição por sexo, localização geográfica e ano de publicação. **Considerações finais:** A HMI apresenta alta prevalência global, com maiores taxas em países com acesso limitado aos cuidados odontológicos. Esses fatores devem ser considerados no planejamento do tratamento.

Palavras-chave: Hipomineralização molar-incisivo, Prevalência, Defeitos do esmalte.

[1] Department of Dentistry, School of Dentistry of Imperatriz, University CEUMA, Imperatriz – MA.

SUBMETIDO EM: 4/2026 | **ACEITO EM: 5/2026** | **PUBLICADO EM: 7/2026**

RESUMEN

Objetivo: Estimar la prevalencia de la hipomineralización molar-incisivo (HMI) y sus características asociadas mediante una revisión integradora. **Métodos:** Se realizó una revisión integradora de la literatura en las bases de datos PubMed, SciELO y LILACS, incluyendo estudios publicados hasta enero de 2024. En total, fueron analizados 27.781 participantes. **Resultados:** Cinco estudios no reportaron la prevalencia estratificada por sexo y solo dos evaluaron los segundos molares temporales hipomineralizados (HSPM). La mayoría de los estudios utilizó los criterios de la *European Academy of Paediatric Dentistry* (EAPD), mientras que otros aplicaron el índice modificado de Defectos del Desarrollo del Esmalte (mDDE). La prevalencia de la HMI varió según el tamaño de la muestra, la distribución por sexo, la ubicación geográfica y el año de publicación. **Consideraciones finales:** La HMI presenta una alta prevalencia a nivel mundial, con tasas más elevadas en países con acceso limitado a la atención odontológica. Estos factores deben considerarse en la planificación del tratamiento.

Palabras clave: Hipomineralización molar-incisivo, Prevalencia, Defectos del esmalte.

INTRODUCTION

Molar-incisor hypomineralization (MIH) is defined as a qualitative defect of enamel formation with an unclear etiology (WEERHEIJM KL, et al., 2003; ELHENNAWY K, et al., 2017; BANDEIRA LOPES L, et al., 2021; HJERTBERG E, et al., 2025). In 2003, the European Academy of Paediatric Dentistry (EAPD) established the initial terminology to describe this condition, characterized by defects of unknown origin affecting one or more permanent molars and, in some cases, permanent incisors (WEERHEIJM KL, et al., 2003; SOMANI C, et al., 2022). Similar alterations may also be observed in second primary molars, a condition known as hypomineralized second primary molars (HSPM) (ELFRINK ME, et al., 2013; MITTAL N e SHARMA BB, 2015). MIH presents with varying levels of severity, ranging from mild to severe, and its clinical presentation may vary from creamy-white opacities to yellow or brown discolorations, with or without post-eruptive breakdown (PEB) (HJERTBERG E, et al., 2025). In more severe cases, enamel breakdown may occur shortly after tooth eruption, exposing dentin and further aggravating clinical management challenges.

From a clinical perspective, MIH represents a significant challenge due to its direct impact on patient management and treatment outcomes (SHARMA L, 2015). Affected teeth frequently present hypersensitivity, which may impair effective oral hygiene and complicate routine dental procedures such as local anesthesia, rubber dam isolation, and restorative interventions (ZHAO D, et al., 2018). Moreover, the porous and mechanically weakened enamel is highly susceptible to post-eruptive breakdown, leading to rapid loss of tooth structure and an increased risk of caries development (BANDEIRA LOPES L, et al., 2021). Restorative management is often challenging and unpredictable due to compromised bonding to hypomineralized enamel, resulting in higher failure rates and the need for repeated interventions. These factors may negatively influence children's behavior, contributing to dental anxiety as a result of recurrent discomfort and treatment experiences (BANDEIRA LOPES L, et al., 2021). Consequently, MIH is associated with increased treatment complexity and higher healthcare costs, impacting both families and public health systems. In addition, the need for repeated clinical visits may compromise adherence to treatment and increase the psychological burden on pediatric patients.

From a public oral health perspective, MIH has become an important concern, particularly due to its association with dental caries and its potential to increase treatment needs over time, reinforcing the importance of its inclusion in oral health programs (ALMUALLEM Z e BUSUTTIL-NAUDI A, 2018; BANDEIRA LOPES L, et al., 2021). Studies conducted in Europe and worldwide have reported prevalence rates ranging from 3% to 22% and 2% to 40%, respectively. However, these estimates show considerable variability (GARCIA-MARGARIT M, et al., 2014; JÄLEVIK B, 2010), making comparisons difficult. This inconsistency is largely attributed to the lack of standardized diagnostic criteria among clinicians and

researchers (GHANIM A, et al., 2017; ALMUALLEM Z e BUSUTTIL-NAUDI A, 2018; BANDEIRA LOPES L, et al., 2021). To address this issue, the EAPD proposed a diagnostic and classification system aimed at improving the reliability and comparability of epidemiological data. The adoption of standardized criteria is essential not only for research consistency but also for improving clinical diagnosis and guiding treatment decisions in daily practice. Additionally, the implementation of training and calibration programs for examiners may further reduce diagnostic variability across studies.

Previous systematic reviews have estimated the global prevalence of MIH to range between 13.1% and 14.2%, with notable differences across geographic regions (SCHWENDICKE F, et al., 2018; ZHAO D, et al., 2018). However, these reviews included studies published only up to mid-2017, and since then, a substantial number of new epidemiological studies have been published, potentially influencing current prevalence estimates. In addition, important aspects remain insufficiently explored, including the prevalence of moderate to severe cases, the distribution pattern of affected molars and incisors, and the occurrence of hypomineralization in second primary molars. The relationship between MIH and HSPM is particularly relevant, as HSPM may serve as an early clinical indicator of MIH risk in the permanent dentition, highlighting the importance of early diagnosis and monitoring. Furthermore, investigating this association may contribute to the development of predictive models and preventive strategies targeting high-risk individuals, especially in community-based settings.

Given this context, updating the global prevalence of MIH is essential to provide more accurate and contemporary estimates, improve understanding of its distribution and severity, and support the development of preventive and therapeutic strategies. Therefore, considering the growing body of research on MIH prevalence and its clinical implications, the present study aimed to evaluate its global prevalence and associated characteristics through an integrative review, also seeking to identify gaps in the literature and directions for future research, particularly in underrepresented populations and low-resource settings.

METHODS

The objective of this integrative review was to answer the following PECO question: “What is the global prevalence of MIH?”. The PECO framework was defined as follows: epidemiological studies conducted in humans (P, Population); diagnosis of MIH (E, Exposure); absence of MIH (C, Comparison); and prevalence of MIH (O, Outcome). The primary outcome was the global prevalence of MIH and its associated characteristics, including severity and distribution patterns.

The inclusion criteria comprised: (1) observational studies reporting the prevalence of MIH; (2) studies providing a clear definition and diagnostic criteria for MIH, preferably based on recognized standards such as those proposed by the European Academy of Paediatric Dentistry (EAPD); (3) studies including systemically healthy individuals, without conditions known to affect enamel development; and (4) studies including both sexes.

Exclusion criteria included studies focusing on specific subpopulations (e.g., preterm children or individuals with systemic diseases), studies restricted to primary dentition only, case reports, reviews, and studies based on non-representative or convenience samples, as these factors could introduce bias and limit the external validity of findings. Additionally, studies with insufficient methodological detail or unclear reporting of prevalence data were excluded to ensure the robustness and reliability of the analysis.

Search strategy

The electronic search was conducted in the databases PubMed, SciELO (Scientific Electronic Library Online), and LILACS (Latin American and Caribbean Health Sciences Literature). The search covered studies published from January 2018 to December 2024, aiming to update the evidence generated after previous systematic reviews on the topic. No restrictions were applied regarding geographic location.

The search strategy combined controlled vocabulary (when applicable) and free-text terms using Boolean operators, as follows: (“hypomineralization” OR “hypoplasia” OR “opacities” OR “MIH” OR “cheese molars”)

AND (“prevalence” OR “frequency” OR “epidemiology” OR “population” OR “sample”) AND (“molar” OR “molars” OR “incisors”). Filters were applied to include only studies conducted in humans and articles published in English, Portuguese, or Spanish. In addition, a manual search of the reference lists of the included articles was performed to identify potentially relevant studies not captured in the electronic databases.

Study selection

The study selection followed a structured process consisting of identification, screening, and eligibility stages, in accordance with recommended methodological guidelines. Initially, duplicate records were identified and removed. Subsequently, two independent reviewers (ML and YJSR) screened titles and abstracts to identify potentially eligible studies.

Studies considered relevant by at least one reviewer were retrieved for full-text assessment. Full-text articles were independently evaluated according to the predefined eligibility criteria. Any disagreements at any stage of the selection process were resolved through discussion and consensus, with the involvement of a third reviewer (MSC) when necessary. The selection process was documented and summarized using a PRISMA flow diagram, ensuring transparency and reproducibility of the review process.

Data extraction process and data items

Data extraction was performed independently by two reviewers (ML and YJSR) using a standardized and previously piloted data collection form. The following variables were extracted: authors, year of publication, country, study design, sample size, age range, diagnostic criteria adopted, overall prevalence of MIH, severity classification (when available), and the distribution of affected teeth (molars and/or incisors).

Additional variables included sex distribution and the presence of hypomineralized second primary molars (HSPM), when reported. When necessary, corresponding authors were considered for contact to clarify missing or unclear data. To ensure consistency and reliability, discrepancies between reviewers were resolved through discussion and consensus with a third reviewer (MSC).

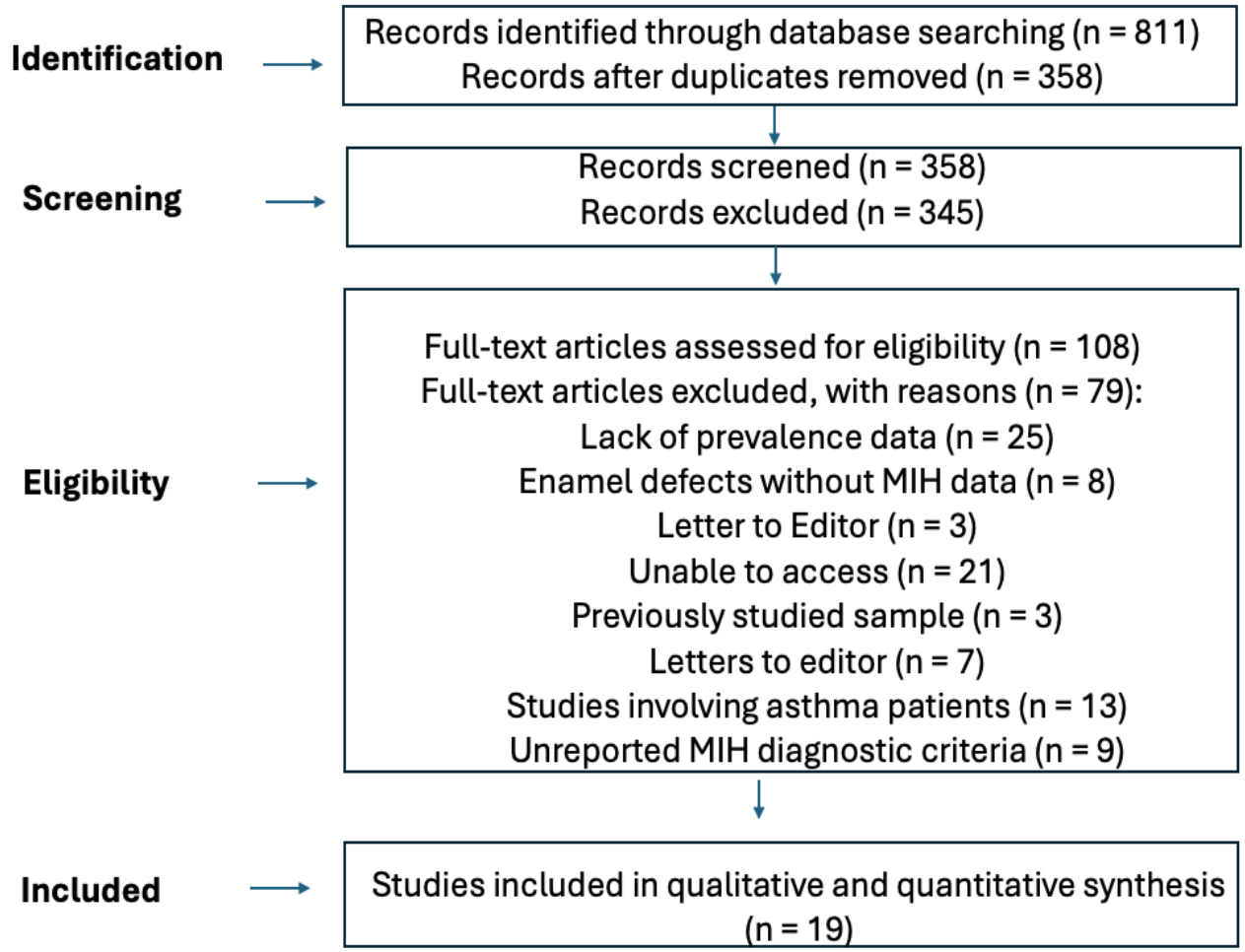
For data synthesis, prevalence estimates were analyzed descriptively and compared across studies according to geographic region, age groups, and diagnostic criteria used. Differences according to sex were also explored when available. Furthermore, the distribution pattern of affected teeth and the occurrence of HSPM were examined to identify possible associations and clinical patterns.

Due to the methodological heterogeneity among included studies—particularly regarding diagnostic criteria, age ranges, and study designs—a qualitative comparative approach was adopted, rather than a quantitative meta-analysis, allowing for a more nuanced interpretation of the findings. In addition, sensitivity analyses were considered to assess the potential influence of individual studies on overall trends, and data consistency was verified to minimize extraction errors and enhance the reproducibility of the review.

RESULTS

The online search retrieved 811 potentially relevant publications. After duplicate removal, 358 records remained for screening, of which 345 were excluded after title and/or abstract evaluation for not meeting the eligibility criteria. A total of 108 full-text articles were assessed for eligibility, and 79 were excluded for the reasons described in the Methods section. As a result, 19 observational studies were included in this integrative review (**Figure 1**).

Figure 1 - Diagram showing the process of excluding and adding studies for the integrative review.



Source: Lourenço MS, et al., 2026.

Characteristics of the studies

The characteristics of the included studies are summarized in **Table 1**. A total of 19 studies were analyzed, comprising data on authorship, year and country of publication, funding, age range, MIH classification, total number of cases with and without MIH, number of affected molars and incisors, combined involvement, and the presence of hypomineralized second primary molars (HSPM). The included studies were published between 2016 and 2021, encompassing a total sample of 27,781 participants.

Five studies did not report MIH prevalence according to sex, limiting subgroup comparisons. Only two studies included data on HSPM, highlighting a significant gap in the literature. Most studies adopted the European Academy of Paediatric Dentistry (EAPD) diagnostic criteria, while others used alternative indices, such as the modified Developmental Defects of Enamel (mDDE) index. These methodological differences may have influenced the reported prevalence rates.

Moreover, prevalence estimates appeared to be influenced by several factors, including sample size, sex distribution, geographic location, and year of publication. Larger and more recent studies tended to report more consistent prevalence values, possibly reflecting improvements in diagnostic standardization and examiner calibration over time.

Table 1 - Characteristics of the included studies.

Author Year/Country	Age range (years)	MIH Classification	Total MIH/without MIH (n)	Female (n)		Male (n)		Affected molars (%)				Affected incisors (%)	Affected molars and incisors (%)
								1	2	3	4		
Abdalla HE, et al. (2021) (Sudan)	8–11	EAPD	568 (114/470)	55	284	59	284	33.3	29.8	23.7	13.2	7.6	12.5
Amend S, et al. (2020) (Germany)	6-12	EAPD	2103 (283/1820)	NR	1005	NR	1098	30.4	24.7	19.4	25.4	48.7	65.2
Buchgraber B, et al. (2018) (Austria)	6-12	EAPD	1111 (78/1033)	40	564	38	547	24.4	16.7	23.1	35.7	NR	NR
Davenport M, et al. (2019) (USA)	7-12	EAPD	375 (36/339)	25	226	11	142	52,8	33,3	5.6	8.3	52.8	52.8
Golden S, et al. (2020) (Brazil)	8-14	EAPD	251 (117/134)	55	116	62	135	NR	NR	NR	NR	NR	NR
Elfrink ME, et al. (2019) (Lebanon)	7-9	EAPD	659 (176/483)	96	NR	80	NR	12.8	19.5	26.8	40.9	45.1	45.1
Farias L,et al. (2020) (Brazil)	8-10	EAPD	471 (46/425)	26	265	20	206	NR	NR	NR	NR	NR	NR
Fatturi AL,et al. (2020) (Brazil)	8	EAPD	731 (88/643)	39	357	49	374	NR	NR	NR	NR	NR	NR
Glodkowska N e Emerich K (2019) (Poland)	7-9	EAPD	1437 (51/1386)	27	726	24	711	3.9	17	21	58	NR	3.2
Goswami M, et al. (2019) (India)	6-12	EAPD	1026 (12/1014)	1	492	11	534	0	16.7	0	83.3	42.9	41.7
Hernández M, et al. (2018) (Spain)	6-14	EAPD	705 (56/649)	34	361	22	344	23.2	35.7	21.4	19.6	92.8	NR
Jurlina D, et al. (2020) (Croatia)	8	EAPD	729 (88/641)	49	356	39	373	NR	NR	NR	NR	NR	6.6
KilinçL,et al. (2019) (Turkey)	9-10	EAPD	1237 (142/1095)	69	NR	73	NR	NR	NR	NR	23.4	NR	NR
Mejía J, et al. (2019) (Colombia)	6-12	EAPD	1075 (120/955)	46	443	74	632	NR	NR	NR	NR	NR	NR
Ordonez-Romero I, et al. (2021) (Ecuador)	7-12	EAPD	249 (23/226)	17	144	6	105	NR	NR	NR	NR	25.6	NR
Portella PD, et al. (2019) (Brazil)	8	EAPD	728 (88/640)	NR	356	NR	372	NR	NR	NR	NR	54.5	NR
Reyes MRT, et al. (2019) (Brazil)	8	EAPD	731 (88/643)	39	357	49	374	NR	NR	NR	NR	6.6	NR
Saitoh M, et al. (2018) (Japan)	7-9	EAPD	4496 (892/3604)	464	2280	428	2216	NR	NR	NR	NR	NR	NR
Wuollet E, et al. (2018) (Finland)	8-12	EAPD	636 (115/521)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NI - No information; EAPD- European Academy of Pediatric Dentistry (Weerheijm et al.)
Source: Lourenço MS, et al., 2026.

In addition to the quantitative synthesis, a more detailed analysis of **Table 1** reveals substantial heterogeneity among the included studies. The investigations were conducted across diverse geographic regions, including Europe, Asia, Africa, and the Americas, which may partly explain the wide variability in MIH prevalence. Countries with different socioeconomic contexts and levels of access to dental care services demonstrated distinct epidemiological patterns, suggesting that environmental exposures, healthcare infrastructure, and diagnostic capacity may influence disease detection and reporting.

The age range of participants varied considerably (6 to 14 years), which is particularly relevant since MIH diagnosis depends on tooth eruption stage. Consequently, prevalence may be underestimated in older individuals due to post-eruptive breakdown or premature tooth loss. Regarding diagnostic criteria, most studies adopted the EAPD classification, while others used alternative indices such as the mDDE. This methodological variation directly impacts prevalence estimates, as broader or less specific criteria may lead to over- or underestimation of cases.

Sex distribution was inconsistently reported, with five studies lacking this information. Among those that did report sex-specific data, no clear predominance between males and females was observed, suggesting that MIH may affect both sexes similarly. The distribution of affected teeth also varied across studies. In general, first permanent molars were more frequently affected than incisors, although some studies reported a considerable proportion of combined involvement. The frequency of incisor involvement (16.6%) underscores the esthetic and psychosocial implications of MIH, particularly in school-aged children, where visible enamel defects may negatively influence self-esteem and social interactions.

Notably, data on hypomineralized second primary molars (HSPM) were scarce, with only two studies addressing this condition, limiting broader inferences about its association with MIH. This gap highlights the need for future investigations exploring early predictors of MIH, particularly longitudinal studies assessing the transition from primary to permanent dentition. Overall, these findings reinforce the presence of significant methodological and clinical heterogeneity among studies, which should be carefully considered when interpreting the results and transitioning to the discussion of global MIH patterns.

DISCUSSION

Molar-incisor hypomineralization (MIH) and its effects on quality of life are associated with unfavorable restorative and therapeutic outcomes, dental anxiety, reduced effectiveness of local anesthesia, and the need for prolonged and costly retreatments (LYGIDAKIS NA, et al., 2022). Consequently, MIH represents a complex and multifaceted challenge for patients, caregivers, and dental professionals (ELHENNAWY K, et al., 2017). A comprehensive understanding of these demarcated qualitative developmental defects is essential from both scientific and clinical perspectives to support appropriate prevention and management strategies. Overall, MIH negatively impacts children's general health, quality of life, and psychosocial well-being (LYGIDAKIS NA, et al., 2010; JÄLEVIK B e KLINGBERG G, 2012), reinforcing its relevance beyond the oral cavity.

The findings of this integrative review indicate a pooled prevalence of MIH of 13.5%, which is consistent with previous systematic reviews reporting estimates between 13.1% and 14.2% (SCHWENDICKE F, et al., 2018; ZHAO D, et al., 2018). Despite this consistency, substantial variability across studies remains evident. This heterogeneity is likely explained by methodological differences, including variations in diagnostic criteria, examiner calibration, sample size, and age groups evaluated. In addition, environmental exposures during early childhood, genetic susceptibility, and socioeconomic determinants may influence MIH distribution, contributing to regional disparities and further supporting its multifactorial etiology. Factors such as perinatal complications, early childhood illnesses, antibiotic use, and exposure to environmental pollutants have also been suggested as potential contributors, although current evidence remains inconclusive (SCHWENDICKE F, et al., 2018).

Compared with earlier reviews, the present study advances current knowledge by incorporating more recent evidence and examining additional variables, such as the distribution of affected teeth and the

occurrence of hypomineralized second primary molars (HSPM) (BANDEIRA LOPES L, et al., 2021; LOPES L, et al., 2021; LYGIDAKIS NA, et al., 2022). The involvement of three molars simultaneously was the least frequent finding, whereas incisors were affected in 16.6% of cases. The prevalence of HSPM among MIH cases was estimated at 1.6%, suggesting a possible association between primary and permanent dentitions. This finding supports the hypothesis that HSPM may serve as an early clinical marker of MIH risk; however, this relationship remains insufficiently explored due to inconsistent reporting and variability in study designs.

From a clinical and public health perspective, the high prevalence of MIH has important implications, particularly in low- and middle-income countries. Limited access to dental care in these settings may delay diagnosis and treatment, increasing the likelihood of post-eruptive breakdown, caries progression, and premature tooth loss (BANDEIRA LOPES L, et al., 2021; LOPES L, et al., 2021). Consequently, affected individuals often require more complex, invasive, and costly interventions, placing an additional burden on healthcare systems. This is especially relevant considering that approximately 27.4% of MIH cases are symptomatic, corresponding to millions of individuals requiring treatment annually, many of whom may remain untreated (SCHWENDICKE F, et al., 2018). In this context, strengthening primary care services and integrating MIH screening into school-based oral health programs may represent effective strategies to reduce disease burden.

Consistent with our findings, Schwendicke F, et al. (2018) reported that populous countries such as India and China contribute substantially to the global burden of MIH, while India and Pakistan account for a large proportion of incident cases. These data highlight the urgent need for early diagnosis, implementation of preventive strategies, and adoption of minimally invasive treatment approaches, particularly in vulnerable and underserved populations.

Methodological aspects were also shown to influence prevalence estimates. Studies adopting the European Academy of Paediatric Dentistry (EAPD) diagnostic criteria reported higher prevalence rates compared to those using alternative definitions, likely due to the broader scope of these criteria, which include both active lesions and their sequelae (ELFRINK ME, et al., 2015; BANDEIRA LOPES L, et al., 2021). However, inconsistent application of these criteria remains a major limitation, directly contributing to heterogeneity across studies. Therefore, greater adherence to standardized diagnostic protocols, along with improved examiner training and calibration, is essential to enhance the reliability and comparability of epidemiological findings. The development of unified reporting guidelines may further contribute to improving study quality and facilitating future meta-analyses.

Finally, some limitations of this review should be acknowledged. Many included studies lacked complete data on key variables, such as severity classification, number of affected teeth, and presence of HSPM, limiting more detailed analyses. Additionally, methodological heterogeneity and potential underreporting—particularly of milder cases and specific tooth involvement—may have influenced the results. Despite these limitations, this review provides an updated synthesis of global MIH prevalence and highlights important gaps in the literature. Future studies with standardized methodologies, robust sampling strategies, and comprehensive reporting are essential to improve understanding of MIH and to support evidence-based clinical practice and public health policies. Furthermore, future multicenter longitudinal studies are recommended to better clarify causal pathways, temporal associations, and the long-term clinical outcomes associated with MIH.

FINAL CONSIDERATIONS

It can be inferred that MIH presents a high global prevalence, impacting approximately 878 million individuals, with an estimated 17.5 million new cases annually (SCHWENDICKE F, et al., 2018; BANDEIRA LOPES L, et al., 2021), which is consistent with the findings of the present study. Higher rates of new MIH cases are observed in certain countries, particularly in regions where access to dental care is limited and preventive programs are less structured. This aspect should be carefully considered when planning dental treatment strategies for affected patients, especially in public health settings. Furthermore, this scenario highlights the need for earlier diagnostic approaches, continuous clinical surveillance, and structured

treatment planning within pediatric dentistry. The incorporation of standardized diagnostic criteria, such as those proposed by the EAPD, may improve early detection and enable more consistent clinical decision-making. Preventive interventions, including remineralization strategies, patient education, and minimally invasive approaches, should be prioritized to reduce disease progression and treatment burden.

Such strategies are particularly crucial in vulnerable populations, where socioeconomic barriers, limited access to specialized care, and delayed diagnosis may exacerbate disease severity and compromise long-term oral health outcomes. In this context, integrating MIH screening into primary care services and school-based oral health programs may contribute to reducing inequalities, optimizing resource allocation, and improving overall child oral health indicators worldwide.

REFERENCES

1. ABDALLA HE, et al. Molar incisor hypomineralization: prevalence, pattern and distribution in Sudanese children. BMC Oral Health. 2021;21:9.
2. ALMUALLEM Z and BUSUTTIL-NAUDI A. Molar incisor hypomineralisation (MIH): An overview. Br Dent J. 2018.
3. AMEND S, et al. Prevalence of molar-incisor hypomineralisation (MIH) among 6–12-year-old children in Central Hesse, Germany. Clin Oral Investig. 2021;25:2093–2100.
4. ARSLANAGIC-MURATBEGOVIC A, et al. Molar incisor hypomineralization: prevalence and severity in six- to nine-year-old Sarajevo children. Eur J Paediatr Dent. 2020;21:243–247.
5. BALMER R, et al. The prevalence of incisor hypomineralisation and its relationship with MIH. Eur Arch Paediatr Dent. 2015;16:265–269.
6. BANDEIRA LOPES L, et al. Molar-incisor hypomineralization: an umbrella review. Acta Odontol Scand. 2021;79:359–369.
7. BUCHGRABER B, et al. Molar incisor hypomineralization: proportion and severity in Austrian children. Clin Oral Investig. 2018;22:757–762.
8. DANTAS-NETA NB, et al. Impact of MIH on oral health-related quality of life. Braz Oral Res. 2016;30:e117.
9. DANTAS-NETA NB, et al. Factors associated with MIH in schoolchildren. Int J Paediatr Dent. 2018;28:570–577.
10. DAVENPORT M, et al. Prevalence of MIH in Milwaukee, USA: a pilot study. Clin CosmetInvestig Dent. 2019;11:109–117.
11. DOURADO DG, et al. MIH in quilombola children: prevalence and associated factors. J Public Health Dent. 2020.
12. ELFRINK ME, et al. Mineral content in teeth with DMH. J Dent. 2013;41:974–978.
13. ELFRINK ME, Ghanim A, Manton DJ, Weerheijm KL. Standardised studies on MIH and HSPM: a need. Eur Arch Paediatr Dent. 2015;16:247–255.
14. ELHENNAWY K, et al. Structural and chemical evaluation of MIH enamel: a systematic review. Arch Oral Biol. 2017;83:272–281.
15. FARIAS L, et al. MIH associated with dental caries in Brazilian children. Braz Oral Res. 2021;35:e13.
16. FATTURI AL, et al. MIH, caries, and socioeconomic factors. Clin Oral Investig. 2020;24:3971–3980.
17. GAMBETTA-TESSINI K, et al. Carious lesions and hypomineralization in children. Aust Dent J. 2018;63:365–373.
18. GARCIA-MARGARIT M, et al. Epidemiologic study of MIH in Spanish children. Int J Paediatr Dent. 2014;24:14–22.
19. GHANIM A, et al. MIH training manual for clinical surveys. Eur Arch Paediatr Dent. 2017;18:225–242.
20. GLODKOWSKA N and EMERICH K. MIH prevalence in Poland. Eur J Paediatr Dent. 2019;20:59–66.
21. GOSWAMI M, et al. MIH prevalence in Delhi. Int J Clin Pediatr Dent. 2019;12:211–214.
22. HJERTBERG E, et al. Desensitization treatment in MIH-affected teeth: a systematic review. Eur Arch Paediatr Dent. 2025;26(1):17-29.

23. HERNÁNDEZ M, et al. Tooth-specific prevalence of MIH. Acta Stomatol Croat. 2018;52:4–11.
24. HUSSAIN G, et al. MIH prevalence in Dubai. J Dent Child. 2018;85:102–107.
25. JÄLEVIK B. Prevalence and diagnosis of MIH: systematic review. Eur Arch Paediatr Dent. 2010;11:59–64.
26. JALEVIK B and KLINGBERG G. Treatment outcomes and dental anxiety in MIH. Int J Paediatr Dent. 2012;22:85–91.
27. JURLINA D, et al. MIH prevalence in Croatia. Int J Environ Res Public Health. 2020;17:E6358.
28. LYGIDAKIS NA, et al. MIH prevalence in Greek children. Eur Arch Paediatr Dent. 2008;9:200–206.
29. LYGIDAKIS NA, et al. Clinical practice guidance for MIH. Eur Arch Paediatr Dent. 2010;11:75–81.
30. MEJÍA J, et al. MIH prevalence in Colombia. J Clin Pediatr Dent. 2019;43:185–189.
31. MITTAL N and SHARMA BB. HSPM prevalence and association with MIH. Eur Arch Paediatr Dent. 2015;16:441–447.
32. ORDONEZ-ROMERO I, et al. MIH distribution in Ecuadorian children. Dent Hypotheses. 2019;10:65.
33. PADAVALA S and SUKUMARAN G. MIH prevalence. Contemp Clin Dent. 2018;9:246.
34. PORTELLA PD, et al. MIH and quality of life. Int J Paediatr Dent. 2019;29:496–506.
35. RAI PM, et al. MIH prevalence in India. Open Access Maced J Med Sci. 2019;7:1042–1046.
36. REYES MRT, et al. Opacity in primary teeth and MIH. Braz Oral Res. 2019;33:e048.
37. Rodrigues FCN, et al. MIH prevalence in Brazil. PesqBras Odontopediatria Clin Integr. 2015;15:271–278.
38. SAITOH M, et al. MIH prevalence in Japan. Environ Health Prev Med. 2018;23:55.
39. SCHWENDICKE F, et al. Global burden of MIH. J Dent. 2018;68:10–18.
40. SOMANI C, et al. An update of treatment modalities in children and adolescents with teeth affected by molar incisor hypomineralisation (MIH): a systematic review. Eur Arch Paediatr Dent. 2022 Feb;23(1):39-64.
41. WUOLLET E, et al. MIH and socioeconomic status. Int J Environ Res Public Health. 2018;15:E1324.
42. ZHAO D, et al. MIH prevalence: evidence from 70 studies. Int J Paediatr Dent. 2018;28:170–179.
43. ZHAO D, et al. MIH prevalence (earlier evidence). Int J Paediatr Dent. 2017.
44. WEERHEIJM KL, et al. MIH diagnostic criteria (EAPD meeting). Eur J Paediatr Dent. 2003;4:110–113.