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ORIGINAL RESEARCH

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Exploring Turkish pediatric dentists' perspectives: knowledge, attitudes and clinical practice regarding molar incisor hypomineralization (MIH)

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Abstract

Background: Molar Incisor Hypomineralisation (MIH) is an important public health problem, especially in pediatric dentistry. This study aimed to evaluate the attitudes and behavior of pediatric dentists in Turkey about MIH diagnosis and treatment. **Methods**: The study included a total of 305 pediatric dentists in Turkey. A 28-item questionnaire was distributed to the study participants via social media. The questionnaire consisted of two sections, the first section elicited the sociodemographic data of the participants, and the second section assessed attitudes, behaviors and clinical experiences related to MIH. The data were collected and then analyzed using descriptive statistical analysis and a chi-square test. **Results**: Concisely, the participants were 85% females and 15% males. Of these, 53.4% were pediatric dentists, 39.4% were specializing in pediatric dentistry, and 7.2% were doctoral students. For post-eruptive breakdown (PEB) treatment, 84.6% preferred stainless steel crowns. **Conclusions**: The study results showed that although Turkish pediatric dentists were familiar with MIH, they wished to have more information about the treatment of MIH and the management of clinical problems.

Keywords

Molar incisal hypomineralization; Knowledge; Pediatric dentists; Questionnaire; Turkey

1. Introduction

Molar Incisor Hypomineralization (MIH) is defined as a qualitative enamel developmental defect of one or more permanent first molar teeth, with or without the permanent incisor teeth. This condition is characterized by hypomineralization, which makes the affected teeth more susceptible to decay and sensitivity [1]. Currently, MIH is a prevalent dental issue, with an estimated global prevalence of 13.5% incisors affected in 36.6% of cases [2] and 27.4% of the cases require therapeutic interventions [3]. The clinical characteristics MIH include white/cream and yellow/brown opacities, which can progress to post-eruptive breakdown (PEB), atypical caries lesions, and atypical restorations [1, 4]. MIH lesions present various challenges for both dentists and patients, including determining of the cavity borders, selecting suitable restoration material, aesthetics, tooth hypersensitivity, difficulties in achieving sufficient pain control and dental concerns [5, 6]. Severe MIH lesions are often associated with significant pain in children, require to multiple dental visits and referrals to specialists [7]. Consequently, as MIH has a negative effect on quality of life through its diagnosis, treatment, and effect on oral health, it is recognized as a major challenge in dental practice [8].

Several of studies have assessed dentists' knowledge, perceptions, and clinical experience in managementing MIH across various countries [7, 9–14]. These findings highlight the need of ongoing professional development the use of the latest, most effective evidence on MIH. Since dentists and especially pediatric dentists are more interested in the diagnosis, treatment, protective mechanism, and follow-up periods of this disease, it is normal to investigate the knowledge levels, attitudes and clinical experiences of these participants. To the best of our knowledge, no study has been conducted on pediatric dentists in Turkey. This study aimed to evaluate the knowledge, perceptions, practices and clinical experience, and attitudes of pediatric dentists in Turkey regarding MIH, as well as the influence of pediatric dentistry residency and specialized/doctoral programs on their education and identify any additional training needs. The null hypothesis was that university-based Turkish pediatric dentists are more confident in managing MIH than others.

2. Material and methods

2.1 Participants and study design

This study employed a cross-sectional design to investigate the knowledge, perceptions, practices, clinical experiences and attitudes of participants in pediatric dentistry specialized programs, doctoral programs and among specialists in Turkey regarding MIH.

2.2 Participants and sample

Approval for the study was granted by the Mersin University Ethics Committee before collection (decision no: 2024/088). All procedures adhered to the principles of the Helsinki Declaration. The study followed the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines [15]. This analytical, observational, cross-sectional study was conducted via a questionnaire prepared on Google Forms. The questionnaire was distributed to Turkish pediatric dentists working in Turkey by one of the researchers (ASÖ) via social (Facebook, Twitter, WhatsApp, Instagram and email) to the maximize respondent participation. Responses from participants who consented to participate and provided complete, anonymous and voluntary answers were included. The questionnaire items which MIH was accepted as a clinical problem by the members of the European Academy of Paediatric Dentistry (EAPD) originated from [16] and developed and modified based on similar studies in the literature [7, 9–14] addressing knowledge, perception, practice, clinical experience and attitude among pediatric dentists in Turkey.

A preliminary study with a limited number of pediatric dentists was conducted to assess the clarity and feasibility of the questionnaire items. Based on the feedback and data from the pilot test, corrections were made before the final version was distributed via Google Forms, as mentioned previously.

2.3 Questionnaire questions

The questionnaire was comprised of five sections. The first section (Items 1–5) pertained to sociodemographic data (age, gender, years of work experience, the institution where the respondent was employed and the area of work). The second section (Items 6–12) assessed knowledge about the MIH, including differential diagnosis and possible etiologic factors. The third section (Items 13–17) assessed about MIH perception, the fourth section (Items 18–22) focused on MIH practice and clinical experience, and the fifth section (Items 23–28) assessed about attitude.

2.4 Sample estimation

The sample size was calculated using the Raosoft Web Survey Program (Raosoft, Inc., Seattle, WA, USA). The calculation determined that at least 234 participants should be included in the study, with a power of 90% and an alpha margin of error of 5%.

2.5 Statistical analysis

Statistical analysis was conducted using the Jamovi software (The Jamovi project, version: 2.3.28, Sydney, NSW, Australia). A descriptive analysis was conducted to compare categorical values, including gender, experience and workplace. Both independent variables and dependent variables were tabulated for pediatric dentists. Pearson's chi-square test was used for these comparions, with the significance level was set at $p < 0.05$. Additionally, binomial logistic regression models were employed to assess the relationship between demographic data and the "Do you have knowledge about the clinical diagnostic criteria used for diagnosing MIH = Yes" *vs.* "Do you have knowledge about the clinical diagnostic criteria used for diagnosing MIH = No/Not sure?".

3. Results

3.1 Demographic data of the participants

A total of 305 pediatric dentists participated in the study. Table 1 presents the demographic attributes of the participants. The majority of participants were female (85%), while 15% were male. Regarding to the participants' professional backgrounds, most participants were pediatric dentists (53.4%), followed by those pursuing specialization in pediatric dentistry (39.4%) and those enrolled in doctoral programs (7.2%). It is noteworthy that approximately half of the participants (50.5%) had less than five years of work experience, while those with over 20 years of experience constituted a small fraction (3.3%). Additionally, 54.1% of participants were employed at state universities, whereas public hospitals had the lowest representation at 8.9%.

TABLE 1. Demographic attributes of the participants involved.

Characteristic	N (%)
Age (yr)	
23–30	189 (61.9%)
31–40	97 (31.9%)
41–50	17 (5.5%)
>50	2 (0.7%)
Gender	
Female	260 (85.0%)
Male	45 (15.0%)
Professional background	
Pediatric Dentist	163 (53.4%)
Specialization Student	120 (39.4%)
Doctoral Student	22 (7.2%)
Experience	
<5 yr	154 (50.5%)
5–10 yr	109 (35.8%)
11–15 yr	24 (7.8%)
16–20 yr	8 (2.6%)
>20 yr	10 (3.3%)
Workplace	
State University	165 (54.1%)
Private Dentistry	83 (27.2%)
Public Hospital	27 (8.9%)
Private University	30 (9.8%)

yr: year.

3.2 Knowledge about MIH

Table 2 presents the participants' knowledge regarding MIH. A significant difference was observed between pediatric dentists with more than 10 years of experience and those with less experience. The former group expressed significantly more confidence in managing the MIH lesion ($p = 0.02$). In contrast, the difference was found in the confidence levels between pediatric dentists employed at universities and those working outside academic institutions, with a significant disparity ($p = 0.01$) indicating that dentists in university settings reported lower levels of confidence. Although the majority of participants (79.7%) reported knowledge of the clinical diagnostic criteria used for MIH, only 67.9% of them confirmed using these criteria in diagnosis. Enamel hypoplasia (87.9%) was identified as the most significant condition for consideration in the differential diagnosis of MIH, while dentinogenesis imperfecta ranked the least with only 28.2%. Female participants were statistically more likely to identify dental caries (37.7%), local defects (72.3%), and white spot lesions (62.7%), as conditions that should be included in the differential diagnosis ($p = 0.02$, $p = 0.01$, $p = 0.02$). The acute medical history of the mother during pregnancy was identified as the most significant etiological factor in the development of MIH, with an estimated prevalence of 89.2%. This was followed by the use of medicines/antibiotics by the mother during pregnancy, with an estimated prevalence of 86.6%. Female participants identified medicines/antibiotics used by the child (76.9%), chronic medical history of the child (58.8%), and premature birth (66.2%) as etiological factors of MIH significantly more frequently than male participants ($p < 0.001$, $p = 0.01$, $p = 0.03$) (Table 2).

3.3 Perceptions of MIH

Table 3 presents the participants' perceptions regarding MIH. Of the participants surveyed, 47.2% reported encountering MIH cases on a monthly basis, while 44.6% encountered such as cases weekly, indicating a relatively high incidence of MIH in dental patients. The majority of participants (45.6%) observed MIH in less than 10% of their patients, followed by 42.0% who reported it in 10%–25% of their patients. The proportion of participants who reporting MIH in less than 10% of cases was significantly higher among males ($p = 0.02$). A substantial proportion of the participants (70.5%) noted an increase in the prevalence of MIH in recent years. The most prevalent type of MIH lesion, as reported by 94.8% of participants, was "yellow-brown opacities". Female participants were significantly more likely to report encountering lesions with the appearance of "white opacities" (75%) and "white opacities and yellow-brown opacities, PEB after eruption" (49.2%) than male participants ($p = 0.02$, $p = 0.01$). The participants indicated that the primary consequence of MIH was aesthetic in nature, with 58% of respondents citing this issue. Conversely, only 9.8% of respondents indicated that ridicule was a significant issue. Female participants reported experiencing difficulty in eating and drinking more frequently than male participants ($p = 0.03$). University-based participants also reported multiple clinic appointments as a more significant problem ($p = 0.01$) (Table 3).

3.4 Practices and clinical experiences of MIH

The practices and clinical experiences of the participants are presented in Table 4. For the restoration of a molar tooth with PEB, 84.6% of the participants preferred stainless steel crowns, whereas only 1% prefer amalgam. Participants with less experienced showed a significant preference for inlay and onlay restorations (7.2% and 15.6%, respectively; $p = 0.04$, $p < 0.001$). A significantly higher proportion of participants in public hospitals expressed a preference for amalgam restoration (7.4%) compared to those in others ($p < 0.001$). When dealing with opacity in molar teeth, fluoride application was the preferred option for 47.5% of the population, while amalgam restoration was the least preferred (0.3%). A significant preference was observed in males (15.6%) for flowable composite resins ($p = 0.04$), while females preferred the resin infiltration restoration system ($p = 0.03$). Furthermore, participants with over a decade of experience demonstrated a strong preference for fissure sealant as a restoration option ($p < 0.001$). In public hospitals, stainless steel crowns were significantly less preferred (7.4%) compared to other options ($p = 0.01$), fissure sealant was less favored by university-based participants (20.5%; $p < 0.001$). The most frequently utilized method for treating opacities in incisal teeth was the application of resin infiltration, accounting for 78% of the responses. Furthermore, the study revealed that the resin infiltration technique was significantly more preferred by females (81.5%) ($p < 0.001$). In contrast, the application of flowable composite resin was significantly more favored by experienced participants (28.6%) ($p = 0.01$). Regarding restorations for teeth affected by MIH, two critical factors have been identified as crucial for making treatment decisions: adhesion (83.0%) and durability (83.3%). Notably, female participants attributed significantly higher importance to adhesion, durability, and patient/family preferences in comparison to male participants (85.4%, 86.2% and 39.2%, respectively; $p = 0.01$, $p < 0.001$, $p = 0.01$). Moreover, long-term restoration success was identified as the most challenging situation encountered when treating MIH, with a rate of 77.4%. Females perceived long-term restoration success and rapid progression of carious lesions as significantly more challenging factors ($p = 0.02$, $p = 0.02$). While 71.1% of less experienced participants identified the application of local anesthesia as a more challenging factor ($p = 0.03$), 45.2% of more experienced participants claimed that the presence of secondary caries was a significant challenge ($p = 0.03$) (Table 4).

3.5 Attitudes among MIH

Table 5 presents the participants' attitudes towards MIH. A total of 92.8% of survey participants reported prior knowledge of MIH. The primary sources of MIH training were university education (66.9%) and specialist training (67.5%). Gender-based analysis revealed that females received significantly more information from university education (69.2%) compared to males ($p = 0.04$). A significantly higher proportion of less experienced participants (69.6%) received knowledge from university education ($p = 0.01$), as compared to experienced participants (50%), who learned predominantly from

TABLE 2. Comparison of participants' answers to questions measuring their level of knowledge about MIH according to demographic characteristics.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Are you familiar with MIH?											
Yes	251 (96.5%)	44 (97.8%)		254 (96.5%)	41 (97.6%)		187 (95.9%)	81 (97.6%)	27 (100.0%)		295 (96.7%)
No	3 (1.2%)	0 (0.0%)	$p = 0.77$	2 (0.7%)	1 (2.4%)	$p = 0.35$	2 (1.0%)	1 (1.2%)	0 (0.0%)	$p = 0.75$	3 (1.0%)
Not sure	6 (2.3%)	1 (2.2%)		7 (2.8%)	0 (0.0%)		6 (3.1%)	1 (1.2%)	0 (0.0%)		7 (2.3%)
Do you think which process the MIH lesion originates from?											
In the first year of life	11 (4.2%)	3 (6.7%)		12 (4.5%)	2 (4.8%)		8 (4.1%)	5 (6.0%)	1 (3.8%)		14 (4.6%)
During pregnancy	29 (11.2%)	9 (20.0%)		34 (12.9%)	4 (9.4%)		26 (13.3%)	10 (12.1%)	2 (7.4%)		38 (12.5%)
In the 3rd year of life	3 (1.2%)	0 (0.0%)	$p = 0.39$	3 (1.1%)	0 (0.0%)	$p = 0.71$	3 (1.5%)	0 (0.0%)	0 (0.0%)	$p = 0.87$	3 (1.0%)
Pregnancy up to first year of life	122 (46.9%)	17 (37.8%)		116 (44.1%)	23 (54.8%)		85 (43.6%)	41 (49.4%)	13 (48.1%)		139 (45.6%)
Pregnancy up to third year of life	95 (36.5%)	16 (35.5%)		98 (37.4%)	13 (31.0%)		73 (37.5%)	27 (32.5%)	11 (40.7%)		111 (36.4%)
Are you confident in diagnosing MIH?											
Yes	199 (76.5%)	34 (75.6%)		194 (73.7%)	39 (92.9%)		137 (70.3%)	71 (85.5%)	25 (92.6%)		233 (76.4%)
No	7 (2.7%)	0 (0.0%)	$p = 0.48$	7 (2.7%)	0 (0.0%)	$p = 0.02$	6 (3.0%)	0 (0.0%)	1 (3.7%)	$p = 0.01$	7 (2.3%)
Not sure	54 (20.8%)	11 (24.4%)		62 (23.6%)	3 (7.1%)		52 (26.7%)	12 (14.5%)	1 (3.7%)		65 (21.3%)
Do you have knowledge about the clinical diagnostic criteria used for diagnosing MIH?											
Yes	207 (79.6%)	36 (80.0%)		205 (77.9%)	38 (90.5%)		153 (78.5%)	69 (83.1%)	21 (77.8%)		243 (79.7%)
No	13 (5.0%)	2 (4.4%)	$p = 0.99$	15 (5.7%)	0 (0.0%)	$p = 0.12$	11 (5.6%)	2 (2.4%)	2 (7.4%)	$p = 0.76$	15 (4.9%)
Not sure	40 (15.4%)	7 (15.6%)		43 (16.4%)	4 (9.5%)		31 (15.9%)	12 (14.5%)	4 (14.8%)		47 (15.4%)
Do you use clinical diagnostic criteria to diagnose MIH?											
Yes	181 (69.6%)	26 (57.8%)		175 (66.5%)	32 (76.2%)		129 (66.2%)	62 (74.7%)	16 (59.3%)		207 (67.9%)
No	30 (11.5%)	7 (15.6%)	$p = 0.29$	31 (11.8%)	6 (14.3%)	$p = 0.19$	24 (12.3%)	9 (10.8%)	4 (14.8%)	$p = 0.52$	37 (12.1%)
Not sure	49 (18.8%)	12 (26.6%)		57 (21.7%)	4 (9.5%)		42 (21.5%)	12 (14.5%)	7 (25.9%)		61 (20.0%)
Which conditions require differential diagnosis with MIH?*											
Amelogenesis imperfekta	157 (60.4%)	32 (71.1%)	$p = 0.17$	163 (62.0%)	26 (61.9%)	$p = 0.99$	127 (65.1%)	44 (53.0%)	18 (66.7%)	$p = 0.14$	189 (62.0%)
Dentinogenesis imperfekta	73 (28.1%)	13 (28.9%)	$p = 0.91$	77 (29.3%)	9 (21.4%)	$p = 0.29$	60 (30.8%)	15 (18.1%)	11 (40.7%)	$p = 0.05$	86 (28.2%)
Enamel hypoplasia	229 (88.1%)	39 (86.7%)	$p = 0.79$	231 (87.8%)	37 (88.1%)	$p = 0.96$	169 (86.7%)	75 (90.4%)	24 (88.9%)	$p = 0.68$	268 (87.9%)
Dental fluorosis	171 (65.8%)	26 (57.8%)	$p = 0.30$	171 (65.0%)	26 (61.9%)	$p = 0.70$	131 (67.2%)	51 (61.4%)	15 (55.6%)	$p = 0.39$	197 (64.6%)

TABLE 2. Continued.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Dental Caries	98 (37.7%)	9 (20.0%)	$p = 0.02$	91 (34.6%)	16 (38.1%)	$p = 0.66$	71 (36.4%)	26 (31.3%)	10 (37.0%)	$p = 0.70$	107 (35.1%)
Local defects	188 (72.3%)	24 (53.3%)	$p = 0.01$	183 (69.6%)	29 (69.0%)	$p = 0.94$	131 (67.2%)	62 (74.7%)	19 (70.4%)	$p = 0.46$	212 (69.5%)
White spot lesion	163 (62.7%)	20 (44.4%)	$p = 0.02$	159 (60.5%)	24 (57.1%)	$p = 0.68$	113 (57.9%)	55 (66.3%)	15 (55.6%)	$p = 0.38$	183 (60.0%)
Not sure	5 (1.9%)	1 (2.2%)	$p = 0.89$	5 (1.9%)	1 (2.4%)	$p = 0.84$	1 (0.5%)	4 (4.8%)	1 (3.7%)	$p = 0.05$	6 (2.0%)
Which factors are associated with the development of MIH?*											
Genetic factors	195 (75.0%)	33 (73.3%)	$p = 0.81$	200 (76.0%)	28 (66.7%)	$p = 0.19$	151 (77.4%)	57 (68.7%)	20 (74.1%)	$p = 0.30$	228 (74.8%)
Environmental factors	183 (70.4%)	25 (55.6%)	$p = 0.05$	182 (69.2%)	26 (61.9%)	$p = 0.35$	132 (67.7%)	54 (65.1%)	22 (81.5%)	$p = 0.27$	208 (68.2%)
Acute medical history of the mother during pregnancy	235 (90.4%)	37 (82.2%)	$p = 0.10$	236 (89.7%)	36 (85.7%)	$p = 0.44$	170 (87.2%)	76 (91.6%)	26 (96.3%)	$p = 0.26$	272 (89.2%)
Acute medical history of the child	185 (71.2%)	28 (62.2%)	$p = 0.23$	183 (69.6%)	30 (71.4%)	$p = 0.81$	125 (64.1%)	66 (79.5%)	22 (81.5%)	$p = 0.10$	213 (69.8%)
Medicines/antibiotics used by the mother during pregnancy	229 (88.1%)	35 (77.8%)	$p = 0.06$	228 (86.7%)	36 (85.7%)	$p = 0.86$	171 (87.7%)	69 (83.1%)	24 (88.9%)	$p = 0.55$	264 (86.6%)
Medicines/antibiotics used by the child	200 (76.9%)	23 (51.1%)	$p < 0.001$	192 (73.0%)	31 (73.8%)	$p = 0.91$	134 (68.7%)	66 (79.5%)	23 (85.2%)	$p = 0.06$	223 (73.1%)
Chronic medical history of the mother during pregnancy	190 (73.1%)	27 (60.0%)	$p = 0.07$	187 (73.1%)	30 (71.4%)	$p = 0.97$	137 (70.3%)	57 (68.7%)	23 (85.2%)	$p = 0.23$	217 (71.1%)
Chronic medical history of the child	153 (58.8%)	17 (37.8%)	$p = 0.01$	147 (55.9%)	23 (54.8%)	$p = 0.89$	102 (52.3%)	51 (61.4%)	17 (63.0%)	$p = 0.27$	170 (55.7%)
Fluoride intake	38 (14.6%)	6 (13.3%)	$p = 0.82$	41 (15.6%)	3 (7.1%)	$p = 0.15$	32 (16.4%)	8 (9.6%)	41 (4.8%)	$p = 0.34$	44 (14.4%)
Premature birth	172 (66.2%)	22 (48.9%)	$p = 0.03$	172 (65.4%)	22 (52.4%)	$p = 0.10$	128 (65.6%)	49 (59.0%)	17 (63.0%)	$p = 0.58$	194 (63.6%)
Other factors	126 (48.5%)	21 (46.7%)	$p = 0.82$	135 (51.3%)	12 (28.6%)	$p = 0.01$	97 (49.7%)	39 (47.0%)	11 (40.7%)	$p = 0.66$	147 (48.2%)
Not sure	7 (2.7%)	3 (6.6%)	$p = 0.17$	9 (3.4%)	1 (2.4%)	$p = 0.72$	7 (3.6%)	3 (3.6%)	0 (0.0%)	$p = 0.61$	10 (3.3%)

*$p < 0.05$ = significant difference. *Multiple-choice questions. MIH: Molar Incisor Hypomineralization; yr: year.*

TABLE 3. Comparison of participants' answers to questions measuring their level of perception about MIH according to demographic characteristics.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
How frequently do you notice with MIH during your clinical practice?											
Never	3 (1.2%)	2 (4.4%)		5 (1.9%)	0 (0.0%)		5 (2.6%)	0 (0.0%)	0 (0.0%)		5 (1.6%)
Weekly	112 (43.1%)	24 (53.3%)	$p = 0.19$	118 (44.9%)	18 (42.9%)	$p = 0.80$	96 (49.2%)	29 (35.0%)	11 (40.7%)	$p = 0.18$	136 (44.6%)
Monthly	127 (48.8%)	17 (37.8%)		123 (46.8%)	21 (50.0%)		83 (42.6%)	47 (56.6%)	14 (51.9%)		144 (47.2%)
Yearly	18 (6.9%)	2 (4.4%)		17 (6.4%)	3 (7.1%)		11 (5.6%)	7 (8.4%)	2 (7.4%)		20 (6.6%)
Approximately what percentage of your patients have MIH?											
0%	0 (0.0%)	1 (2.2%)		1 (0.5%)	0 (0.0%)		1 (0.5%)	0 (0.0%)	0 (0.0%)		1 (0.3%)
<10%	113 (43.5%)	26 (57.8%)		115 (43.7%)	24 (57.1%)		86 (44.1%)	37 (44.6%)	16 (59.3%)		139 (45.6%)
10%–25%	112 (43.1%)	16 (35.6%)	$p = 0.02$	114 (43.3%)	14 (33.3%)	$p = 0.60$	80 (41.0%)	39 (47.0%)	9 (33.3%)	$p = 0.55$	128 (42.0%)
>25%	17 (6.5%)	0 (0.0%)		15 (5.7%)	2 (4.8%)		11 (5.6%)	5 (6.0%)	1 (3.7%)		17 (5.6%)
Not sure	18 (6.9%)	2 (4.4%)		18 (6.8%)	2 (4.8%)		17 (8.8%)	2 (2.4%)	1 (3.7%)		20 (6.6%)
Have you noticed an increase in the prevalence of MIH in recent years?											
Yes	188 (72.3%)	27 (60.0%)		188 (71.5%)	27 (64.2%)		128 (65.6%)	66 (79.5%)	21 (77.8%)		215 (70.5%)
No	6 (2.3%)	2 (4.4%)	$p = 0.23$	6 (2.3%)	2 (4.8%)	$p = 0.49$	5 (2.6%)	3 (3.6%)	0 (0.0%)	$p = 0.10$	8 (2.6%)
Not sure	66 (25.4%)	16 (35.6%)		69 (26.2%)	13 (31.0%)		62 (31.8%)	14 (16.9%)	6 (22.2%)		82 (26.9%)
Which MIH lesion(s) do you encounter most in daily clinical practice?*											
White opacities	195 (75.0%)	26 (57.8%)	$p = 0.02$	190 (72.2%)	31 (73.8%)	$p = 0.83$	144 (73.8%)	56 (67.5%)	21 (77.8%)	$p = 0.45$	221 (72.5%)
Yellow-brown opacities	248 (95.4%)	41 (91.1%)	$p = 0.24$	248 (94.3%)	41 (97.6%)	$p = 0.37$	184 (94.4%)	78 (94.0%)	27 (100.0%)	$p = 0.44$	289 (94.8%)
Post-eruptive breakdown	182 (70.0%)	27 (60.0%)	$p = 0.18$	179 (68.1%)	30 (71.4%)	$p = 0.66$	130 (66.7%)	60 (72.3%)	19 (70.4%)	$p = 0.64$	209 (68.5%)
Post-eruptive breakdown and yellow-brown opacities	106 (40.8%)	16 (35.6%)	$p = 0.51$	107 (40.7%)	15 (35.7%)	$p = 0.54$	77 (39.5%)	33 (39.8%)	12 (44.4%)	$p = 0.88$	122 (40.0%)

TABLE 3. Continued.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
White opacities and Yellow-brown opacities	88 (33.8%)	10 (22.2%)	$p = 0.12$	82 (31.2%)	16 (38.1%)	$p = 0.37$	66 (33.8%)	22 (26.5%)	10 (37.0%)	$p = 0.41$	98 (32.1%)
White opacities, Yellow-brown opacities, Post-eruptive breakdown	128 (49.2%)	13 (28.9%)	$p = 0.01$	120 (45.6%)	21 (50.0%)	$p = 0.60$	92 (47.2%)	38 (45.8%)	11 (40.7%)	$p = 0.82$	141 (46.2%)
Which problem(s) do you encounter most frequently in pediatric patients with MIH?*											
Aesthetic concern	154 (59.2%)	23 (51.1%)	$p = 0.31$	149 (56.7%)	28 (66.7%)	$p = 0.22$	113 (57.9%)	47 (56.6%)	17 (63.0%)	$p = 0.84$	177 (58.0%)
Anxiety	49 (18.8%)	8 (17.8%)	$p = 0.87$	45 (17.1%)	12 (28.6%)	$p = 0.08$	39 (20.0%)	14 (16.9%)	4 (14.8%)	$p = 0.72$	57 (18.7%)
Multiple clinic visits	111 (42.7%)	17 (37.8%)	$p = 0.54$	111 (42.2%)	17 (40.5%)	$p = 0.83$	94 (48.2%)	25 (30.1%)	9 (33.3%)	$p = 0.01$	128 (42.0%)
Missing school	50 (19.2%)	5 (11.1%)	$p = 0.19$	47 (17.9%)	8 (19.0%)	$p = 0.85$	42 (21.5%)	8 (9.6%)	5 (15.8%)	$p = 0.06$	55 (18.0%)
Difficulty eating/drinking	115 (44.2%)	12 (26.7%)	$p = 0.03$	110 (41.8%)	17 (40.5%)	$p = 0.87$	83 (42.6%)	32 (38.6%)	12 (44.4%)	$p = 0.79$	127 (41.6%)
Be ridiculed	26 (10.0%)	4 (8.9%)	$p = 0.82$	25 (9.5%)	5 (11.9%)	$p = 0.63$	23 (11.8%)	6 (7.2%)	1 (3.7%)	$p = 0.27$	30 (9.8%)
Difficulty cooperating	107 (41.2%)	13 (28.9%)	$p = 0.12$	105 (39.9%)	15 (35.7%)	$p = 0.60$	80 (41.0%)	30 (36.1%)	10 (37.0%)	$p = 0.72$	120 (39.3%)
Requirement for general anesthesia	37 (14.2%)	6 (13.3%)	$p = 0.87$	35 (13.3%)	8 (19.0%)	$p = 0.32$	30 (15.4%)	10 (12.0%)	3 (11.1%)	$p = 0.69$	43 (14.1%)

*$p < 0.05$ = significant difference. *Multiple-choice questions. MIH: Molar Incisor Hypomineralization; yr: year.*

TABLE 4. Comparison of participants' answers related to practice and clinical experience about MIH according to demographic characteristics.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Which is your preferred material for restoring molar teeth with post-eruptive breakdown?*											
Compomer	6 (2.3%)	3 (6.7%)	$p = 0.11$	9 (3.4%)	0 (0.0%)	$p = 0.22$	9 (4.6%)	0 (0.0%)	0 (0.0%)	$p = 0.07$	9 (3.0%)
Composite resin	152 (58.5%)	24 (53.3%)	$p = 0.52$	148 (56.3%)	28 (66.7%)	$p = 0.21$	107 (54.9%)	53 (63.9%)	16 (59.3%)	$p = 0.38$	176 (57.7%)
Flowable composite resin	14 (5.4%)	3 (6.7%)	$p = 0.73$	15 (5.7%)	2 (4.8%)	$p = 0.80$	11 (5.6%)	5 (6.0%)	1 (3.7%)	$p = 0.90$	17 (5.6%)
Stainless steel crown	224 (86.2%)	34 (75.6%)	$p = 0.07$	224 (85.2%)	34 (81.0%)	$p = 0.48$	165 (84.6%)	68 (81.9%)	25 (92.6%)	$p = 0.41$	258 (84.6%)
Silver diamine fluoride	17 (6.5%)	1 (2.2%)	$p = 0.26$	16 (6.1%)	2 (4.8%)	$p = 0.74$	12 (6.2%)	6 (7.2%)	0 (0.0%)	$p = 0.37$	18 (5.9%)
Inlay	22 (8.5%)	4 (8.9%)	$p = 0.92$	19 (7.2%)	7 (16.7%)	$p = 0.04$	20 (10.3%)	5 (6.0%)	1 (3.7%)	$p = 0.33$	26 (8.5%)
Onlay	47 (18.1%)	9 (20.0%)	$p = 0.76$	41 (15.6%)	15 (35.7%)	$p < 0.001$	36 (18.5%)	18 (21.7%)	2 (7.4%)	$p = 0.25$	56 (18.4%)
Glass ionomer cement	55 (21.2%)	8 (17.8%)	$p = 0.61$	50 (19.0%)	13 (31.0%)	$p = 0.08$	47 (24.1%)	13 (15.7%)	3 (11.1%)	$p = 0.10$	63 (20.7%)
Resin modified glass ionomer cement	46 (17.7%)	5 (11.1%)	$p = 0.27$	42 (16.0%)	9 (21.4%)	$p = 0.38$	40 (20.5%)	9 (10.8%)	2 (7.4%)	$p = 0.06$	51 (16.7%)
Tooth extraction	36 (13.8%)	3 (6.7%)	$p = 0.18$	32 (12.2%)	7 (16.7%)	$p = 0.42$	28 (14.4%)	5 (6.0%)	6 (22.2%)	$p = 0.05$	39 (12.8%)
Amalgam	2 (0.8%)	1 (2.2%)	$p = 0.36$	3 (1.1%)	0 (0.0%)	$p = 0.49$	1 (0.5%)	0 (0.0%)	2 (7.4%)	$p < 0.001$	3 (1.0%)
Not sure	5 (1.9%)	1 (2.2%)	$p = 0.89$	6 (2.3%)	0 (0.0%)	$p = 0.32$	5 (2.6%)	1 (1.2%)	0 (0.0%)	$p = 0.56$	6 (2.0%)
Which is your preferred material for molar teeth with opacities?*											
Amalgam	1 (0.4%)	0 (0.0%)	$p = 0.68$	1 (0.4%)	0 (0.0%)	$p = 0.69$	1 (0.5%)	0 (0.0%)	0 (0.0%)	$p = 0.75$	1 (0.3%)
Compomer	3 (1.2%)	1 (2.2%)	$p = 0.56$	3 (1.1%)	1 (2.4%)	$p = 0.51$	3 (1.5%)	1 (1.2%)	0 (0.0%)	$p = 0.80$	4 (1.3%)
Composite resin	86 (33.1%)	21 (46.7%)	$p = 0.08$	92 (35.0%)	15 (35.7%)	$p = 0.93$	69 (35.4%)	31 (37.3%)	7 (25.9%)	$p = 0.55$	107 (35.1%)
Flowable composite resin	17 (6.5%)	7 (15.6%)	$p = 0.04$	21 (8.0%)	3 (7.1%)	$p = 0.85$	20 (10.3%)	1 (1.2%)	3 (11.1%)	$p = 0.05$	24 (7.9%)
Stainless steel crown	77 (29.6%)	16 (35.6%)	$p = 0.42$	83 (31.6%)	10 (23.8%)	$p = 0.31$	60 (30.8%)	31 (37.3%)	2 (7.4%)	$p = 0.01$	93 (30.5%)
Silver diamine fluoride	46 (17.7%)	4 (8.9%)	$p = 0.14$	40 (15.2%)	10 (23.8%)	$p = 0.16$	34 (17.4%)	13 (15.7%)	3 (11.1%)	$p = 0.69$	50 (16.4%)
Glass ionomer cement	43 (16.5%)	7 (15.6%)	$p = 0.87$	40 (15.2%)	10 (23.8%)	$p = 0.16$	37 (19.0%)	10 (12.0%)	3 (11.1%)	$p = 0.27$	50 (16.4%)

TABLE 4. Continued.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Resin modified glass ionomer cement	48 (18.5%)	4 (8.9%)	$p = 0.11$	46 (17.5%)	6 (14.3%)	$p = 0.61$	38 (19.5%)	12 (14.5%)	2 (7.4%)	$p = 0.22$	52 (17.0%)
Temporary restoration material	8 (3.1%)	2 (4.4%)	$p = 0.63$	7 (2.7%)	3 (7.1%)	$p = 0.13$	5 (2.6%)	3 (3.6%)	2 (7.4%)	$p = 0.41$	10 (3.3%)
Fissure sealant	77 (29.6%)	9 (20.0%)	$p = 0.19$	65 (24.7%)	21 (50.0%)	$p < 0.001$	40 (20.5%)	34 (41.0%)	12 (44.4%)	$p < 0.001$	86 (28.2%)
Resin infiltration	96 (36.9%)	9 (20.0%)	$p = 0.03$	92 (35.0%)	13 (31.0%)	$p = 0.61$	67 (34.4%)	24 (28.9%)	14 (51.9%)	$p = 0.09$	105 (34.4%)
Fluoride	129 (49.6%)	16 (35.6%)	$p = 0.08$	120 (45.6%)	25 (59.5%)	$p = 0.09$	83 (42.6%)	46 (55.4%)	16 (59.3%)	$p = 0.06$	145 (47.5%)
Extraction	5 (1.9%)	3 (6.7%)	$p = 0.07$	6 (2.3%)	2 (4.8%)	$p = 0.35$	5 (2.6%)	2 (2.4%)	1 (3.7%)	$p = 0.93$	8 (2.6%)
Not sure	9 (3.5%)	1 (2.2%)	$p = 0.67$	10 (3.8%)	0 (0.0%)	$p = 0.20$	9 (4.6%)	1 (1.2%)	0 (0.0%)	$p = 0.21$	10 (3.3%)
Which is your preferred material for incisors with opacities?*											
Compomer	5 (1.9%)	2 (4.4%)	$p = 0.30$	7 (2.7%)	0 (0.0%)	$p = 0.28$	6 (3.1%)	0 (0.0%)	1 (3.7%)	$p = 0.26$	7 (2.3%)
Composite resin	129 (49.6%)	28 (62.2%)	$p = 0.12$	134 (51.0%)	23 (54.8%)	$p = 0.65$	103 (52.8%)	44 (53.0%)	10 (37.0%)	$p = 0.29$	157 (51.5%)
Flowable composite resin	43 (16.5%)	5 (11.1%)	$p = 0.36$	36 (13.7%)	12 (28.6%)	$p = 0.01$	38 (19.5%)	7 (8.4%)	3 (11.1%)	$p = 0.05$	48 (15.7%)
Stainless steel crown	6 (2.3%)	1 (2.2%)	$p = 0.97$	7 (2.7%)	0 (0.0%)	$p = 0.28$	5 (2.6%)	2 (2.4%)	0 (0.0%)	$p = 0.70$	7 (2.3%)
Silver diamine fluoride	10 (3.8%)	1 (2.2%)	$p = 0.59$	10 (3.8%)	1 (2.4%)	$p = 0.65$	8 (4.1%)	1 (1.2%)	2 (7.4%)	$p = 0.27$	11 (3.6%)
Glass ionomer cement	7 (2.7%)	2 (4.4%)	$p = 0.52$	9 (3.4%)	0 (0.0%)	$p = 0.22$	8 (4.1%)	0 (0.0%)	1 (3.7%)	$p = 0.18$	9 (3.0%)
Resin modified glass ionomer cement	9 (3.5%)	2 (4.4%)	$p = 0.74$	10 (3.8%)	1 (2.4%)	$p = 0.65$	9 (4.6%)	1 (1.2%)	1 (3.7%)	$p = 0.38$	11 (3.6%)
Resin infiltration	212 (81.5%)	26 (57.8%)	$p < 0.001$	202 (76.8%)	36 (85.7%)	$p = 0.20$	146 (74.9%)	69 (83.1%)	23 (85.2%)	$p = 0.20$	238 (78.0%)
Microabrasion	107 (41.2%)	12 (26.7%)	$p = 0.07$	104 (39.5%)	15 (35.7%)	$p = 0.64$	81 (41.5%)	26 (31.3%)	12 (44.4%)	$p = 0.23$	119 (39.0%)
Not sure	12 (4.6%)	2 (4.4%)	$p = 0.96$	13 (4.9%)	1 (2.4%)	$p = 0.46$	11 (5.6%)	3 (3.6%)	0 (0.0%)	$p = 0.37$	14 (4.6%)
Which are the most important factors for you when choosing a restoration material for a tooth with MIH?*											
Adhesion	222 (85.4%)	31 (68.9%)	$p = 0.01$	219 (83.3%)	34 (81.0%)	$p = 0.71$	164 (84.1%)	63 (75.9%)	26 (96.3%)	$p = 0.05$	253 (83.0%)
Durability	224 (86.2%)	30 (66.7%)	$p < 0.001$	218 (82.9%)	36 (85.7%)	$p = 0.65$	166 (85.1%)	67 (80.7%)	21 (77.8%)	$p = 0.48$	254 (83.3%)
Ease of application	128 (49.2%)	22 (48.9%)	$p = 0.97$	128 (48.7%)	22 (52.4%)	$p = 0.66$	90 (46.2%)	46 (55.4%)	14 (51.9%)	$p = 0.35$	150 (49.2%)

TABLE 4. Continued.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Remineralization capacity	150 (57.7%)	19 (42.2%)	$p = 0.05$	144 (54.8%)	25 (59.5%)	$p = 0.56$	111 (56.9%)	44 (53.0%)	14 (51.9%)	$p = 0.77$	169 (55.4%)
Patient/family preference	102 (39.2%)	8 (17.8%)	$p = 0.01$	98 (37.3%)	12 (28.6%)	$p = 0.28$	65 (33.3%)	34 (41.0%)	11 (40.7%)	$p = 0.42$	110 (36.1%)
Sensitivity	144 (55.4%)	22 (48.9%)	$p = 0.42$	145 (55.1%)	21 (50.0%)	$p = 0.54$	116 (59.5%)	40 (48.2%)	10 (37.0%)	$p = 0.05$	166 (54.4%)
Research results	99 (38.1%)	12 (26.7%)	$p = 0.14$	93 (35.4%)	18 (42.9%)	$p = 0.35$	75 (38.5%)	28 (33.7%)	8 (29.6%)	$p = 0.56$	111 (36.4%)
Aesthetic	158 (60.8%)	24 (53.3%)	$p = 0.35$	155 (58.9%)	27 (64.3%)	$p = 0.51$	115 (59.0%)	47 (56.6%)	20 (74.1%)	$p = 0.26$	182 (59.7%)
Patient comfort	123 (47.3%)	20 (44.4%)	$p = 0.72$	123 (46.8%)	20 (47.6%)	$p = 0.92$	91 (46.7%)	37 (44.6%)	15 (55.6%)	$p = 0.61$	143 (46.9%)
Experience	88 (33.8%)	8 (17.8%)	$p = 0.05$	80 (30.4%)	16 (38.1%)	$p = 0.32$	62 (31.8%)	24 (28.9%)	10 (37.0%)	$p = 0.72$	96 (31.5%)
Not sure	4 (1.5%)	2 (4.4%)	$p = 0.19$	6 (2.3%)	0 (0.0%)	$p = 0.32$	5 (2.6%)	1 (1.2%)	0 (0.0%)	$p = 0.56$	6 (2.0%)
Which are the difficult conditions that you face while treating MIH?*											
Diagnosis	21 (8.1%)	4 (8.9%)	$p = 0.85$	24 (9.1%)	1 (2.4%)	$p = 0.14$	21 (10.8%)	4 (4.8%)	0 (0.0%)	$p = 0.07$	25 (8.2%)
Aesthetic	106 (40.8%)	13 (28.9%)	$p = 0.13$	108 (41.1%)	11 (26.2%)	$p = 0.07$	80 (41.0%)	25 (30.1%)	14 (51.9%)	$p = 0.08$	119 (39.0%)
Long-term success of restoration	207 (79.6%)	29 (64.4%)	$p = 0.02$	203 (77.2%)	33 (78.6%)	$p = 0.84$	146 (74.9%)	66 (79.5%)	24 (88.9%)	$p = 0.23$	236 (77.4%)
Correct determination of cavity boundaries	153 (58.8%)	23 (51.1%)	$p = 0.33$	149 (56.7%)	27 (64.3%)	$p = 0.35$	114 (58.5%)	45 (54.2%)	17 (63.0%)	$p = 0.68$	176 (57.7%)
Application of local anesthesia	184 (70.8%)	26 (57.8%)	$p = 0.08$	187 (71.1%)	23 (54.8%)	$p = 0.03$	141 (72.3%)	52 (62.7%)	17 (63.0%)	$p = 0.22$	210 (68.9%)
Restoration material preference	102 (39.2%)	14 (31.1%)	$p = 0.30$	97 (36.9%)	19 (45.2%)	$p = 0.30$	82 (42.1%)	24 (28.9%)	10 (37.0%)	$p = 0.12$	116 (38.0%)
Restoration application stages	72 (27.7%)	8 (17.8%)	$p = 0.16$	66 (25.1%)	14 (33.3%)	$p = 0.26$	53 (27.2%)	19 (22.9%)	8 (29.6%)	$p = 0.69$	80 (26.2%)
Deproteinization	32 (12.3%)	3 (6.7%)	$p = 0.27$	29 (11.0%)	6 (14.3%)	$p = 0.54$	25 (12.8%)	8 (9.6%)	2 (7.4%)	$p = 0.59$	35 (11.5%)
Acid application preference	37 (14.2%)	6 (13.3%)	$p = 0.87$	40 (15.2%)	3 (7.1%)	$p = 0.16$	34 (17.4%)	6 (7.2%)	3 (11.1%)	$p = 0.07$	43 (14.1%)
Adhesive agent preference	50 (19.2%)	5 (11.1%)	$p = 0.19$	50 (19.0%)	5 (11.9%)	$p = 0.27$	40 (20.5%)	9 (10.8%)	6 (22.2%)	$p = 0.13$	55 (18.0%)
Rapid progression of carious lesion	119 (45.8%)	12 (26.7%)	$p = 0.02$	114 (43.3%)	17 (40.5%)	$p = 0.73$	84 (43.1%)	35 (42.2%)	12 (44.4%)	$p = 0.98$	131 (43.0%)
Presence of secondary caries	84 (32.3%)	11 (24.4%)	$p = 0.29$	76 (28.9%)	19 (45.2%)	$p = 0.03$	59 (30.3%)	25 (30.1%)	11 (40.7%)	$p = 0.53$	95 (31.1%)
Not sure	3 (1.2%)	3 (6.7%)	$p = 0.01$	5 (1.9%)	1 (2.4%)	$p = 0.84$	4 (2.1%)	2 (2.4%)	0 (0.0%)	$p = 0.73$	6 (2.0%)

*$p < 0.05$ = significant difference. *Multiple-choice questions. MIH: Molar Incisor Hypomineralization; yr: year.*

TABLE 5. Comparison of participants' answers to questions related to their attitude about MIH according to demographic characteristics.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Do you receive any information about MIH?											
Yes	243 (93.5%)	40 (88.9%)		242 (92.0%)	41 (97.6%)		179 (91.8%)	78 (94.0%)	26 (96.3%)		283 (92.8%)
No	7 (2.7%)	1 (2.2%)	$p = 0.33$	8 (3.0%)	0 (0.0%)	$p = 0.38$	7 (3.6%)	1 (1.2%)	0 (0.0%)	$p = 0.71$	8 (2.6%)
Not sure	10 (3.8%)	4 (8.9%)		13 (5.0%)	1 (2.4%)		9 (4.6%)	4 (4.8%)	1 (3.7%)		14 (4.6%)
Where did you obtain the information about MIH?*											
University education	180 (69.2%)	24 (53.3%)	$p = 0.04$	183 (69.6%)	21 (50.0%)	$p = 0.01$	147 (75.4%)	43 (51.8%)	14 (51.9%)	$p < 0.001$	204 (66.9%)
Specialized training	177 (68.1%)	29 (64.4%)	$p = 0.63$	176 (66.9%)	30 (71.4%)	$p = 0.56$	111 (56.9%)	70 (84.3%)	25 (92.6%)	$p < 0.001$	206 (67.5%)
Article	82 (31.5%)	15 (33.3%)	$p = 0.81$	76 (28.9%)	21 (50.0%)	$p = 0.01$	61 (31.3%)	27 (32.5%)	9 (33.3%)	$p = 0.96$	97 (31.8%)
Brochure	4 (1.5%)	1 (2.2%)	$p = 0.74$	5 (1.9%)	0 (0.0%)	$p = 0.37$	2 (1.0%)	3 (3.6%)	0 (0.0%)	$p = 0.23$	5 (1.6%)
Internet	28 (10.8%)	4 (8.9%)	$p = 0.70$	29 (11.0%)	3 (7.1%)	$p = 0.45$	23 (11.8%)	6 (7.2%)	3 (11.1%)	$p = 0.52$	32 (10.5%)
Lecture notes or books	81 (31.2%)	14 (31.1%)	$p = 1.00$	84 (31.9%)	11 (26.2%)	$p = 0.46$	74 (37.9%)	15 (18.1%)	6 (22.2%)	$p < 0.001$	95 (31.1%)
Course	17 (6.5%)	5 (11.1%)	$p = 0.27$	20 (7.6%)	2 (4.8%)	$p = 0.51$	15 (7.7%)	4 (4.8%)	3 (11.1%)	$p = 0.50$	22 (7.2%)
Not sure	0 (0.0%)	3 (6.7%)	$p < 0.001$	2 (0.8%)	1 (2.4%)	$p = 0.32$	1 (0.5%)	2 (2.4%)	0 (0.0%)	$p = 0.29$	3 (1.0%)
Would you like to know more about MIH?*											
Etiology	96 (36.9%)	18 (40.0%)	$p = 0.69$	102 (38.8%)	12 (28.6%)	$p = 0.20$	80 (41.0%)	25 (30.1%)	9 (33.3%)	$p = 0.21$	114 (37.4%)
Diagnosis	75 (28.8%)	14 (31.1%)	$p = 0.76$	80 (30.4%)	9 (21.4%)	$p = 0.23$	69 (35.4%)	15 (18.1%)	5 (18.5%)	$p = 0.01$	89 (29.2%)
Treatment	210 (80.8%)	30 (66.7%)	$p = 0.05$	210 (79.8%)	30 (71.4%)	$p = 0.22$	156 (80.0%)	62 (74.7%)	22 (81.5%)	$p = 0.57$	240 (78.7%)
Clinical problems	183 (70.4%)	27 (60.0%)	$p = 0.16$	186 (70.7%)	24 (57.1%)	$p = 0.08$	139 (71.3%)	56 (67.5%)	15 (55.6%)	$p = 0.24$	210 (68.9%)
Not sure	3 (1.2%)	2 (4.4%)	$p = 0.11$	4 (1.5%)	1 (2.4%)	$p = 0.68$	3 (1.5%)	2 (2.4%)	0 (0.0%)	$p = 0.68$	5 (1.6%)
In which permanent teeth, besides the first molars and incisors, are MIH lesions encountered in clinical practice?*											
Canine	66 (25.4%)	8 (17.8%)	$p = 0.27$	66 (25.1%)	8 (19.0%)	$p = 0.40$	59 (30.3%)	12 (14.5%)	3 (11.1%)	$p = 0.05$	74 (24.3%)
Premolars	119 (45.8%)	16 (35.6%)	$p = 0.20$	113 (43.0%)	22 (52.4%)	$p = 0.25$	82 (42.1%)	40 (48.2%)	13 (48.1%)	$p = 0.59$	135 (44.3%)
Permanent 2nd molar	76 (29.2%)	15 (33.3%)	$p = 0.58$	74 (28.1%)	17 (40.5%)	$p = 0.10$	64 (32.8%)	20 (24.1%)	7 (25.9%)	$p = 0.31$	91 (29.8%)
Not sure	58 (22.3%)	11 (24.4%)	$p = 0.75$	65 (24.7%)	4 (9.5%)	$p = 0.03$	40 (20.5%)	22 (26.5%)	7 (25.9%)	$p = 0.50$	69 (22.6%)

TABLE 5. Continued.

	Female N (%)	Male N (%)	*p*-value	≤10 yr N (%)	>10 yr N (%)	*p*-value	University N (%)	Private Dentistry N (%)	Public Hospital N (%)	*p*-value	Total N (%)
Do you notice that these defects in the primary second molar?											
Yes	166 (63.8%)	24 (53.3%)		165 (62.7%)	25 (59.6%)		128 (65.6%)	48 (57.8%)	14 (51.9%)		190 (62.3%)
No	33 (12.7%)	12 (26.7%)	$p = 0.05$	31 (11.8%)	14 (33.3%)	$p < 0.001$	22 (11.3%)	18 (21.7%)	5 (18.5%)	$p = 0.17$	45 (14.8%)
Not sure	61 (23.5%)	9 (20.0%)		67 (25.5%)	3 (7.1%)		45 (23.1%)	17 (20.5%)	8 (29.6%)		70 (23.0%)
Which type of preventive treatment would you prefer for a patient with teeth with MIH?*											
Fluoride varnish	241 (92.7%)	37 (82.2%)	$p = 0.02$	241 (91.6%)	37 (88.1%)	$p = 0.45$	176 (90.3%)	75 (90.4%)	27 (100.0%)	$p = 0.24$	278 (91.1%)
Silver diamine fluoride	100 (38.5%)	16 (35.6%)	$p = 0.71$	101 (38.4%)	15 (35.7%)	$p = 0.74$	80 (41.0%)	25 (30.1%)	11 (40.7%)	$p = 0.22$	116 (38.0%)
CPP-ACP	197 (75.8%)	24 (53.3%)	$p < 0.001$	191 (72.6%)	30 (71.4%)	$p = 0.87$	144 (73.8%)	54 (65.1%)	23 (85.2%)	$p = 0.10$	221 (72.5%)
Fissure sealant	154 (59.2%)	20 (44.4%)	$p = 0.06$	144 (54.8%)	30 (71.4%)	$p = 0.04$	104 (53.3%)	51 (61.4%)	19 (70.4%)	$p = 0.16$	174 (57.0%)
Providing oral hygiene training	234 (90.0%)	36 (80.0%)	$p = 0.05$	231 (87.8%)	39 (92.9%)	$p = 0.34$	173 (88.7%)	71 (85.5%)	26 (96.3%)	$p = 0.31$	270 (88.5%)
Regulation of nutrition	194 (74.6%)	28 (62.2%)	$p = 0.08$	191 (72.6%)	31 (73.8%)	$p = 0.87$	145 (74.4%)	53 (63.9%)	24 (88.9%)	$p = 0.03$	222 (72.8%)
Not sure	4 (1.5%)	1 (2.2%)	$p = 0.74$	5 (1.9%)	0 (0.0%)	$p = 0.37$	3 (1.5%)	2 (2.4%)	0 (0.0%)	$p = 0.68$	5 (1.6%)

*$p < 0.05$ = significant difference. *Multiple-choice questions. MIH: Molar Incisor Hypomineralization; CPP-ACP: Casein phosphopeptide-amorphous calcium phosphate, yr: year.*

articles (p = 0.01). A significant proportion of study participants (75.4% and 37.9%, respectively) at the university reported receiving more information from university education ($p < 0.001$) and lecture notes or books, respectively ($p < 0.001$). In contrast, those at public hospitals (92.6%) indicated that they received more information from specialist training ($p < 0.001$). Furthermore, a considerable proportion of participants (78.7%) expressed an interest in learning more about the treatment aspect of MIH. At the university, a notable proportion of participants (35.4%) expressed a desire to further insight into various diagnoses (p = 0.01). Premolars, along with first molars and incisors, were identified as the teeth with the highest incidence of MIH, following second molar and canine teeth. Among the 44.3% of the participants claimed that premolars were more seen. The majority of participants (62.3%) indicated that MIH lesions may also be found in the Hypomineralized Second Primary Molars (HSPM). Notably, Male practitioners (53.3%) and those with more experience (59.6%) were significantly less likely to affirm this (p = 0.05 and $p < 0.001$, respectively). Furthermore, regarding preventive treatments, most participants (91.1%) preferred fluoride varnish. Female respondents mentioned fluoride varnish (92.7%) and Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) (75.8%) significantly more frequently than their male counterparts (p = 0.02 and $p < 0.001$, respectively). A greater proportion of experienced participants (71.4%) expressed a preference for fissure sealant (p = 0.04), while a larger number of participants (88.9%) in public hospitals indicated a preference for the regulation of nutrition (p = 0.03) (Table 5).

3.6 Binomial logistic regression analysis

A binomial logistic regression analysis was conducted to examine the relationship between the participants' sociodemographic profiles and their knowledge of the clinical diagnostic criteria for diagnosing MIH. The results are presented in Table 6. Gender was found to have no significant effect on the outcome variable (B coefficient = −0.608, p = 0.074), and the experience was found to have a positive but not statistically significant effect (B coefficient = 0.289, p = 0.591). Overall, no demographic attributes were identified as significant predictors of knowledge regarding the clinical diagnostic criteria used for diagnosing MIH (Table 6).

4. Discussion

The null hypothesis was rejected. Given that MIH is a global concern and has become a significant health issue in developing countries [3], it is imperative to address the deficiencies in knowledge that exist in these countries. To the best of our knowledge, this is the first study to measure the levels of knowledge about MIH among pediatric dentists in Turkey. The global prevalence of MIH is reported to vary between 2% and 40% [3], a wide range may be attributed to methodological differences in data collection [17]. The online questionnaire was selected for this study due to its accuracy, ease of application, and potential for greater participation. The questionnaire items were developed with reference to similar studies [7, 9–14]. In the study conducted by Gamboa *et al.* [14] participants aged 40 and under reported higher knowledge scores. This result may suggest that older dentists did not have sufficient knowledge about MIH in dentistry since the diagnostic criteria for MIH have been used since 2001 [18]. Although MIH is included in undergraduate and specialist education curricula in Turkey, it is expected that pediatric dentists would have more knowledge and clinical experience on this subject during their specialist education. In this study, pediatric dentists with more than 10 years of experience expressed significantly greater confidence in managing the MIH lesions (p = 0.02), which is likely associated with increased self-confidence as they examine and treat more pediatric patients. A significant difference was observed between the pediatric dentists working at universities and those working in other workplaces regarding their confidence in diagnosing MIH (p = 0.01). This result may be related to the difficulties in deciding to diagnose and treat MIH, as university-based pediatric dentists are often in the early stages of their specialization training. Gamboa *et al.* [14] reported that the knowledge score of pediatric dentists was significantly higher than that of general dentists. Similarly, the ability of pediatric dentists to distinguish MIH from fluorosis and enamel hypoplasia was also significantly higher [14]. The differential diagnosis of MIH includes conditions such as enamel hypoplasia, fluorosis and amelogenesis imperfecta (AI) [19]. When queried about the differential diagnosis of MIH, the participants reported enamel hypoplasia (87.9%) as the initial option, followed by local defects (69.5%) and fluorosis (64.6%). In the study conducted by Karkoutly *et al.* [9], the majority of study participants expressed difficulty differentiating AI and pediatric dentists reported enamel hypoplasia. Similarly, Hamza *et al.* [12] stated AI and enamel hypoplasia from MIH. This is because the enamel formation of AI depends on the stage of the disorder (hypoplastic, hypomaturity, hypomineralisation) [20]. Since AI is a hereditary genetic disorder, the lesions affect all the teeth, whereas MIH lesions are asymmetrical and are seen in permanent first molars and incisors. These lesions develop quickly and are characterized by an extremely porous substrate. The presence of secondary cavity lesions further complicates the diagnosis of this condition [19]. Enamel hypoplasia is a quantitative enamel defect that is challenging to differentiate from MIH with PEB [21].

In some countries, when children with MIH requiring complex treatment are diagnosed, they are referred to a pediatric dentist [22, 23]. In addition, the clinician's decision and the patient's individual characteristics are often not accounted for in the guidelines [24]. Nevertheless, pediatric dentists bear a greater responsibility in this regard, as they are the primary practitioners involved in the initial diagnosis of the disease and the implementation of MIH diagnosis and treatment methods, as outlined by the EAPD [1].

In a study conducted in Turkey, negative oral health outcomes of the quality of life (OHRQoL) were observed in pediatric patients with MIH [25]. In the study by Karkoutly *et al.* [9], general dentists reported that their patients had complained of dental anxiety and poor appearance, which impact the children's quality of life. Researchers have reported that pediatric dentists are more skilled than general dentists

TABLE 6. Binominal logistic regression analysis for the knowledge about the clinical diagnostic criteria used for diagnosing MIH.

Predictor	B	SE	*Z*	*p*	Odds ratio	95% CI Lower	95% CI Upper
Intercept	0.699	0.173	4.052	<0.001	2.012	1.435	2.821
Age:							
31–40 yr − 23–30 yr	0.049	0.319	0.153	0.878	1.050	0.561	1.964
41–50 yr − 23–30 yr	0.230	0.810	0.284	0.776	1.259	0.257	6.163
Gender:							
Male − Female	−0.608	0.340	−1.789	0.074	0.545	0.280	1.060
Experience:							
>10 yr − ≤10 yr	0.289	0.538	0.537	0.591	1.335	0.465	3.830
Workplace:							
Private Dentistry − University	0.393	0.315	1.248	0.212	1.481	0.799	2.745
Public Hospital − University	−0.319	0.446	−0.715	0.475	0.727	0.303	1.743

B represent the log odds of "Do you have knowledge about the clinical diagnostic criteria used for diagnosing MIH? = Yes" vs. "Do you have knowledge about the clinical diagnostic criteria used for diagnosing MIH? = No/Not sure". CI: Confidence Intervals; SE: Standard Error; yr: year; Z: Z-Value; $p < 0.05$ = significant difference.

and are less likely to perceive anxiety as a problem, but they believe that anxiety is a limiting factor in children's behavior [9]. Jälevik and Klingberg [26] observed that children with MIH exhibited higher levels of dental fear and anxiety than their healthy counterparts. These findings suggest that patients may require multiple clinic visits and a meticulous treatment approach. In the current study, the majority of patients reported aesthetic complaints (58.0%), followed by multiple clinic visits (42.0%) and less anxiety (18.7%). Also, in this study University-based participants reported multiple clinic appointments as a more significant problem ($p = 0.01$).

When selecting the material to be used in treatment, it is essential to consider several factors, including the patient's age, behavior, risk of caries, family expectations, lesion size and severity, the presence of symptoms, the durability and prognosis of the material, aesthetics and cost [27]. In dentistry, significant challenges in the clinical management of teeth affected by MIH have been documented [28]. The participants in the current study indicated that they prioritized durability (83.3%), adhesion (83.0%), and aesthetics (59.7%) when selecting materials. These findings are consistent with those reported in the literature, which also highlight aesthetics, adhesion and durability as key considerations in material selection [10–13]. While there was a significant difference between genders regarding durability and adhesion, ($p < 0.001$ and $p = 0.01$) there was no significant difference regarding aesthetic ($p = 0.35$). In a study conducted with students at the faculty of dentistry in Turkey, the most common problems were diagnosis, adequate restoration and determination of the cavity boundaries of the affected enamel [29].

The treatment of MIH include the utilization of fluoride varnish, CPP-ACP, fissure sealant, microabrasion, resin infiltration, glass ionomer cement (GIC), composite, amalgam, prefabricated crown and extraction [5, 27]. In a study by Gamboa *et al.* [14], pediatric dentists indicated that fissure sealant was their preferred treatment for teeth with MIH, followed by prefabricated crowns, and extractions. Elhennawy and Schwendicke [30] reported the use of GIC, composite, compomer, stainless steel crown and ceramic in the restoration of permanent first molar (PFM) with MIH. In the study by Delgado *et al.* [31], pediatric dentists preferred GIC, performed crown and composite resin. The respondents in the current study indicated a preference for stainless steel crowns (84.6%), composite (57.7%), GIC (20.7%) and amalgam (1%) for the treatment of MIH with PEB. In this study, amalgam was used significantly more often in public hospitals ($p < 0.001$). This result may be related to the fact that amalgam is cheaper than other materials used as a restoration material for PEB teeth. The results of this study are comparable to those of a study conducted by Hamza *et al.* [32], in which 40.6% of students preferred stainless steel crowns and 40% preferred composite. The current study's findings align with those of Karkoutly *et al.* [9], who reported that stainless steel crowns were the most preferred restorative material for PEB in molar teeth. These results support the established fact that the most critical factor in material selection is durability. A subsequent study, conducted at the end of 24 months, reported a success rate of 94.4% for stainless steel crowns in molar teeth with MIH [33]. However, Elhennawy and Schwendicke [30] reported that GIC and amalgam have higher failure rate than composite and preformed crowns.

Given the absence of a consensus on the optimal treatment for MIH, the immediate objective is to alleviate the symptoms [34]. The current study found that the application of composite resin (35.1%) and fluoride (47.5%) was more commonly accepted by participants for the treatment of opacities in molar teeth. Elhennawy and Schwendicke [30] proposed the use of composite resin for the treatment of opacities in molar teeth. Nevertheless, flowable composite resin can be selected to cover severe defects in patients with MIH with low cooperation, as previously documented in the literature [35]. Additionally, it has been proposed that GIC can be

considered as a restoration material in large areas affected by hypomineralization [36]. GIC helps reduce sensitivity and prevents PEB, thereby facilitating a definitive restoration once the tooth has been stabilized [1].

In the field of dentistry, there have been documented instances of significant challenges in the clinical management of teeth affected by MIH, including a lack of resilience in the permanent aesthetics, longevity of restorations, multiple applications of high-dose local anesthesia, a high incidence of failure in adhesive fillings, inadequate cavity design, and an improper material selection [5, 6, 28, 36]. In this study, more than three-quarters of the participants identified long-term restoration success, and more than two-thirds of the participants identified local anesthesia as the most challenging aspect in the treatment of MIH. While a greater proportion of less experienced dentists (71.1%) identified the application of local anesthesia as a more challenging factor (p = 0.03). Female pediatric dentists reported more difficulty with the long-term success of the restoration (p = 0.02). In today's age, with the significant increase in female pediatric dentists transitioning to academic life [37], it is normal to experience such problems. The literature suggests that multiple doses of anesthesia may be used for adequate pain control [6]. The presence of hypomineralization in the enamel of deciduous teeth has been documented in recent literature and has been associated with an increased risk of MIH development [38]. Among the current study participants, 62.3% indicated that they had observed defects in HSPM. The proportion of experienced dentists (59.6%) who provided affirmative responses to this question was significantly lower than that of other participants. This may be attributed to the fact that dentists with more experience tend to examine a greater number of patients in their daily clinical practice. In the study by Gamboa *et al.* [14], 23.3% of the participants reported primary teeth defects and Delgado *et al.* [31] claimed that 83.3% of PDs observed HSPM. Although the presence of HSPM increases the risk of MIH, the absence of HSPM does not rule out the presence of MIH [39]. Literature documented instances of an increased prevalence of HSPM and canine teeth [40]. This approach facilitates more comprehensive monitoring of PFM and incisors in pediatric patients. Subsequently, the clinician may implement prophylactic measures to mitigate PEB, prevent dental caries, and halt the progression of dental caries in affected teeth [14].

For dentists engaged in clinical practice within state hospitals, the establishment of clinical guidelines pertaining to the diagnosis and treatment management of MIH, along with the organization of ongoing training seminars on the utilization and application of the aforementioned guidelines, would be highly beneficial. Given that pediatric dentists see pediatric patients with greater frequency, it is to be expected that they possess a more profound understanding and awareness of this subject. This phenomenon can be attributed to the integration of MIH into the domain of specialized education and the relative ease with which information can be accessed. Pediatric dentists have adequate training and expertise in the diagnosis and treatment of MIH. However, in the study by Karkoutly *et al.* [9], a third of MIH patients were referred by pediatric dentists. This could be attributed to the dentists' limited experience.

One limitation of the study design is that the questionnaires utilized in this study were distributed via social media, and the responses were self-administered. Some participants did not complete the study despite receiving a questionnaire. This study was conducted exclusively with the participation of pediatric dentists who were employed in Turkey. Although the questionnaires were based on the survey and previous studies in the literature, the reliability and validity of this study in Turkish have not been performed. The male and female ratio was another limitation of this study. The number of male pediatric dentists in this study was less than that of females. It is common for young pediatric dentists to participate more in the survey, as it known that they use social media more. Since it is normal to ask a limited number of questions in survey studies, future research could investigate other questions not included in the study and conduct studies directed to general dentistry.

5. Conclusions

Pediatric dentists in Turkey are familiar with MIH lesions. However, while there was no significant difference between them in terms of gender when diagnosing MIH, a significant difference was observed in terms of experience and the institutions they work in. The most preferred restoration material in the treatment of PEB was a stainless steel crown. This result was promising for the management of the MIH. Multiple clinical visits for managing MIH was a problem in the universities. There are notable variations in the prevalence of MIH and the clinical management strategies employed across different countries. The incorporation of contemporary data on MIH in clinical guidelines and its applicability in clinical practice will facilitate the implementation of an appropriate treatment approach for patients. Dental education encompasses a multitude of disciplines, including theoretical, preclinical and clinical education. Consequently, it is recommended that the curriculum of specialty training programs include more extensive theoretical and practical information about MIH. With international training programs, theoretical and practical training from other countries can be learned during specialized/doctoral programs. It may be considered that more materials and diagnosis methods should be bought and improved health services to reduce the patient density in Turkey.

ABBREVIATIONS

AI, Amelogenesis imperfecta; CPP-ACP, Casein phosphopeptide-amorphous calcium phosphate; EAPD, European Academy of Paediatric Dentistry; GIC, Glass ionomer cement; HSPM, Hypomineralized second primary molar; MIH, Molar Incisor Hypomineralization; PEB, Post-eruptive breakdown; PFM, Permanent first molar; yr, year; STROBE, Strengthening the Reporting of Observational studies in Epidemiology; OHRQoL, oral health outcomes of the quality of life; CI, Confidence Intervals; SE, Standard Error.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

AUTHOR CONTRIBUTIONS

ASÖ—wrote the main manuscript, prepared tables, checked the references, reviewed the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research protocol was approved by the Ethics Committee of Mersin University in Turkey (Approval Code: No. 2024/088). The study was applied according with the Declaration of Helsinki. Participants ensured informed consent through an attached informational form before answering the questionnaire. The consent form outlined the study's aim, data security, permissions and voluntary participation.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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