

Original Research Article

Knowledge, attitude, and practice regarding molar incisor hypomineralization among general dental practitioners in Saudi Arabia

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ABSTRACT

Background: Molar Incisor hypomineralization is an enamel defect caused by a systemic disturbance that could have occurred during child development. It affects one or more permanent molars with or without incisors involvement. Many factors could contribute in presence of MIH, for instance, chronic illnesses during pregnancy or during the first three of childhood. However, the actual etiological factor has not been determined yet. The study aim is to evaluate the knowledge and the perception on MIH among GDPs in KSA.

Methods: This is a descriptive cross sectional study, web-based survey conducted on 500 participants. An online questionnaire was distributed to all GDPs working in KSA. The data analysis done using SPSS version 23 (IBM Crop USA).

Results: We found that the majority of GDPs perceptions were found that 64.7% had the thought that MIH is a public problem next to dental caries. When we assessed the perceptions about diagnosis MIH, it was found that 35.7% not confident and 58.3% showed some confidence in diagnosing the same. The dentists' confidence about treating MIH showed that 49.5% were confident.

Conclusions: We found that the majority of GDPs have a good knowledge. The perception was found that 64.7% had the thought that MIH is a public problem next to dental caries. When we assessed the perceptions about diagnosis MIH, it was found that 58.3% showed some confidence in diagnosing the same. The dentists' confidence about treating MIH showed that 49.5% were confident.

Keywords: Molar hypomineralization, Second primary molar, KSA

INTRODUCTION

Molar Incisor hypomineralization (MIH) is an enamel defect caused by a systemic disturbance that could have occurred during child development. It affects one or more permanent molars with or without incisors involvement.¹ Second primary molars could also be defected by MIH.²⁻⁶ Affected teeth are often malformed if compared

with other teeth.¹⁻³ Many factors could contribute in presence of MIH, for instance, chronic illnesses during pregnancy especially in the third trimester or during the first three of childhood. However, the actual etiological factor has not been determined yet.⁴ There are different clinical manifestations of MIH. Regarding color, MIH could appear as brown, yellow or creamy white demarcated enamel opacities.² With regards of the texture

of the affected enamel, usually, it shows reduced physical and mechanical characteristics. Furthermore, in advanced cases, post-eruptive breakdown may be noticed, which could result in dentine exposure and could increase caries risk.^{2,7} Thus, masticatory difficulties, cold or hot sensitivity and aesthetic concerns are common in MIH cases.⁵ Clinical presentation of MIH may be confused with dental fluorosis.⁸

MIH clinical management is based mainly on the case severity and level of child cooperation with dental treatment.⁹ Patient's and parents' chief complains are the key to approach MIH cases. They could vary from aesthetic complains to functional and psychological complains, with respect to pain and sensitivity issues.⁹ There are some challenges that should be considered in treating MIH cases, such as, anaesthesia difficulties, fast caries formation, bonding failure and marginal chipping.⁴

MIH is not uncommon defect. In Jeddah, Saudi Arabia, study conduct was found a prevalence of MIH of 8.6%.¹⁰ A recent study in Riyadh, Saudi Arabia found the majority of GDPs (76.9%) and specialists (86.3%) had encountered MIH in their practice.⁹ Providing that MIH is often confused with flourosis and hypoplasia, there is a need to have in depth understand and knowledge to diagnose and manage MIH in everyday clinical activities. Multiple studies have evaluated the knowledge toward MIH diagnosis and management. A study was done in Gujarat, India on 142 participants, of which 58 were staff members and 84 were postgraduate students. It was a questionnaire hand-delivered to all 142 participants, and they were asked to fill it within 5 working days. The questionnaire included demographic information, prevalence, incidence, and severity of MIH in Vadodara City. It was found that 43.3% of the respondents could not implement the clinical criteria to diagnose MIH, 92.5% of the respondents recommended to include MIH-associated case studies in the curriculum, 95% of the respondents recommended to conduct awareness programs, and 40.5% of the respondents indicated a lack of knowledge as a barrier for performing MIH management.²

In 2003, the study was done by Weerheijm et al fifty-four dentists (92%) in 30 countries (97%) returned the questionnaire. MIH was stated to occur in all but one country (the Czech Republic). Nearly all the responders (97%) stated that they were familiar with the clinical appearance of MIH and a majority saw it as a clinical problem. Furthermore, a large majority of the responders (90%) considered it important to map the prevalence of MIH in European countries as such data are available to only a limited extent.³

Study done in period of February 2011 to July 2011 in Jeddah, Saudi Arabia. They were MIH showed a prevalence of 8.6%. A total of 267 children (134 males and 133 females) were included in the study. The mean age of the recruited children was 9.4 ± 1.379 years. Of

these, 151 (56.6%) were Saudis (76 M, 75 F) and 116 (43.4%) were non (58 M, 58 F). A total of 23 children were diagnosed with MIH representing an overall prevalence of 8.6%. The condition was found more among males (9.7%) than females (7.5%) and more among Saudis (9.3%) than non-Saudis (7.8%). The sample demographics and their association with the prevalence of MIH are shown in (Table 2). It can be seen that none of the demographic variables was significantly related to the prevalence of MIH.¹²

In 2016, the study was done by Silva et al in Riyadh, Saudi Arabia. A total of 230 (56.5%) dental practitioners and 149 (67.1%) dental students completed the questionnaire. The majority of GDPs (76.9%) and specialists (86.3%) had encountered MIH in their practice. The majority of specialist dentists (56.1%) and GDPs (60.4%) reported that MIH could come second to dental caries as a public health concern.⁹ Recently, another cross-sectional, survey based study was published in 2018. Gambo et al compared the perception and clinical experience toward MIH between GDPs and pediatric dentists in Japan. 255 questionnaire responses were analysed using chi-square and ANCOVA tests. Results showed that pediatric dentists were more confident to manage MIH cases, however, there were 87.8% of participants who admit their need to have a further education and training to on MIH diagnosis and treatment.¹¹

Aim

The study aim is to evaluate the knowledge and the perception on MIH among general dental practitioners in Saudi Arabia.

METHODS

This is a descriptive cross sectional study, web-based survey and conducted on 500 participants. An online-based questionnaire will be distributed through social media to all general dental practitioners working in Saudi Arabia. The data analysis done by using SPSS version 23 (IBM Crop USA). Period of collecting the data was 6 months from January 2020 To June 2020.

Inclusion criteria

Inclusion criterion for current study was general dental practitioners all around Saudi Arabia.

Exclusion criteria

Exclusion criterion for current study was dental students, interns and specialists.

RESULTS

Current study aimed to assess the knowledge, practices, and perceptions regarding molar incisor

hypomineralization (MIH) among dentists working in Saudi Arabia. We had sent the questionnaire to approximately 428 dentists and we received completed responses from 295 dentists, thus giving a response rate of 68.9%. The analysis showed that 50.2% were females and 49.8% were males. The majority of the dentists in our study were (94.9%) were Saudi citizens. It was found that 38% were working in the government sector, 26.1% in the private sector, and remaining were not practicing (35.9%). Only 0.7% had practice for more than 10 years, whereas 5.1% had 5-10 years and 94.2% had less than 5 years of practice (Table 1).

Table 1: Sociodemographic details of participants (n=295).

Parameters		N	%
Gender	Female	148	50.2
	Male	147	49.8
Nationality	Non-Saudi	15	5.1
	Saudi	280	94.9
Sector of practice	Government	112	38
	Private	77	26.1
	Not working	106	35.9
Years in practice	0-5	278	94.2
	5-10	15	5.1
	>10	2	0.7

The responses for knowledge items in the questionnaire were used to calculate the total knowledge score of the participants. There were 9 knowledge questions related to MIH and each correct response was given a score '1' and wrong answers were given a score '0' thus the maximum score one could get was 9. The mean total knowledge score in our study was found to be 4.99±1.59 (minimum: 2; maximum: 9). The total scores were then converted into percentages, which were then categorized into 'good' (>80%), fair (60-80%), and poor (<60%). The analysis showed that 49.5% (N=146) had 'good', 25.1% (N=74) 'fair' and 25.4% (N=75) 'poor' knowledge regarding clinical photography (Figure 1).

When we assessed the relationship of different sociodemographic characters with the knowledge, there were no statistically significant differences seen between two genders (p=0.835), nationality (p=0.311), and years of practice (p=0.693), but there was a significant difference in knowledge observed between dentists working in different sectors. Dentists working in the government sector had reported comparatively more 'good' knowledge than dentists working private sector and also dentists who were not practicing had shown more 'poor' knowledge scores related to MIH (p=0.005) (Table 2). When we asked the etiology of MIH, 77.6% mentioned it as genetic factors, 50.2% had chronic conditions of the mother and/or child, 46.5% as environmental containments, and 30.8% went as antibiotics or medications. Surprisingly, 30.5%

mentioned it as 'fluoride', which was a wrong answer (Figure 2).

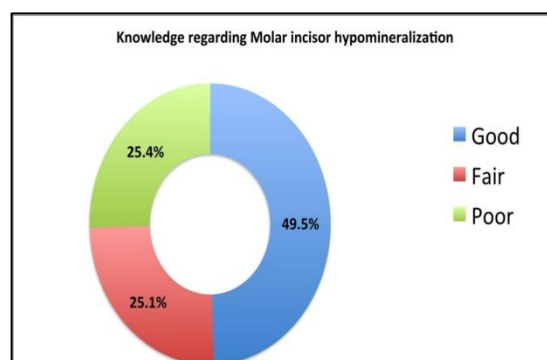


Figure 1: Knowledge regarding molar incisor hypomineralization.

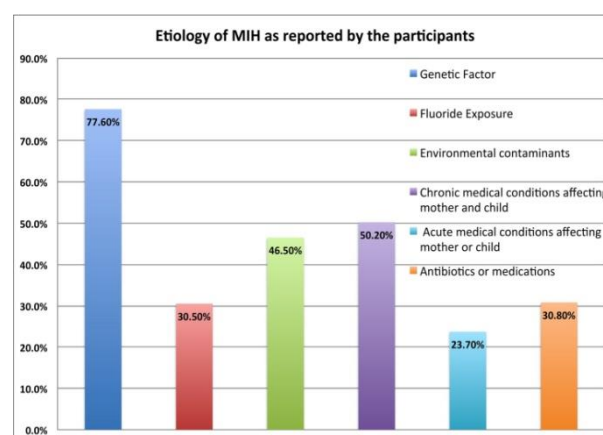


Figure 2: Etiology of MIH as reported by the participants.

In our analysis, we found that 60.7% (N=113) of dentists encountered some forms of MIH in their clinical practice. The attitude and practices related to MIH in these dentists (N=113) are given in (Table 3). The most frequent type of MIH defect seen was 'yellow/brown demarcations' (47.8%) followed by 'white demarcations' (36.3%) and 'post-operative breakdown' (8.0%). It was reported by 46% (N=52) of the dentists that they noticed MIH in primary dentition and 43.4% had the opinion that the incidence of MIH has been increased in the period of the practice. It was reported by 83.2% of dentists that they refer to cases of MIH to pediatric dentists whenever required. The most common preventive treatment used for MIH is fluoride varnish (55.8%), followed by fissure sealant (21.2%), silver diamine fluoride solution (14.2%), and GC Tooth mousse (8.8%) (Table 3). The most common type of treatment used to treat or restore a tooth with MIH was composite restoration (52.2%) followed by preformed crown (44.2%), resin infiltration (38.1%), and microabrasion (29.2%). It was also found that 6.2% of the dentists used amalgam for restoring MIH defect and 6.2% extracted the teeth with this defect (Figure 3).

Table 2: Knowledge regarding MIH and its relationship with sociodemographic details.

Parameters	Knowledge			Total	P value	
	Good	Fair	Poor			
Gender	Female	N	74	35	39	0.835
		%	50.0	23.6	26.4	
	Male	N	72	39	36	
		%	49.0	26.5	24.5	
Nationality	Non-saudi	N	7	6	2	0.311
		%	46.7	40.0	13.3	
	Saudi	N	139	68	73	
		%	49.6	24.3	26.1	
Sector of practice	Government	N	67	25	20	0.005
		%	59.8	22.3	17.9	
	Private	N	40	21	16	
		%	51.9	27.3	20.8	
	Not working	N	39	28	39	
		%	36.8	26.4	36.8	
Years in practice	0-5	N	136	70	72	0.693
		%	48.9	25.2	25.9	
	5-10	N	9	4	2	
		%	60.0	26.7	13.3	
	>10	N	1	0	1	
		%	50.0	0.0	50.0	

Table 3: Practice and attitudes related to MIH in clinical practice.

Parameters	Frequency	%	
Encountered MIH in practice anytime (n=295)	No	179	60.7
	Yes	113	38.3
	Not Sure	3	1.0
Most frequent type of MIH defect seen (N=113)	Post-eruptive breakdown	9	8.0
	White demarcated	41	36.3
	Yellow/brown demarcations	54	47.8
	None of these	9	8.0
Noticed MIH in primary dentition (N=113)	Yes	52	46.0
	No	59	52.2
	Didn't answer	2	1.8
Incidence of MIH increased in the period of practice	Yes	49	43.4
	No	64	56.6
Method of Information regarding MIH (N=113)	Yes, from a lecture	61	54.0
	Yes, from a workshop	8	7.1
	Yes, from an article	30	26.5
	No at all	14	12.4
Refer a child who has signs of MIH to a paediatric dental specialist (N=113)	Yes/whenever required	94	83.2
	No	19	16.8
Preventive treatment used for MIH in clinical practice (N=113)	Fissure sealant	24	21.2
	Fluoride varnish	63	55.8
	Silver diamine fluoride solution	16	14.2
	GC Tooth mousse	10	8.8

The perceptions related to MIH and its clinical relevance are given in (Table 4). It was found that 64.7% had the thought that MIH is a public clinical problem next to dental caries. When we assessed the perceptions about diagnosis MIH, it was found that 35.7% not confident

(unconfident- 33.2%; very unconfident-2.7%) and 58.3% showed some confidence in diagnosing the same. The dentists' confidence about treating MIH showed that 49.5% were confident in some way or other and 43.8% reported unconfident in treating the defect (Table 4). It

was reported by 71.9% of dentists that they need further training treating MIH. When it was asked which particular area of MIH do they need additional training through workshop//lecture/CDE, 62.4% of the dentists demanded training in all three areas (etiology, diagnosis, and treatment) whereas only 9.2% needed training in treatment alone and 12.2% needed in diagnosis only (Table 4).

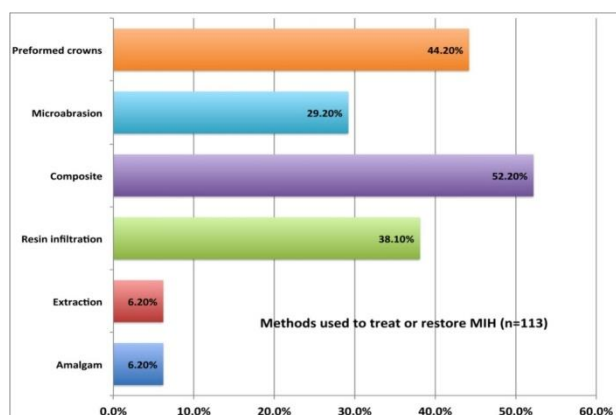


Figure 3: Methods used to treat or restore MIH (n=113).

DISCUSSION

The results of our findings show that knowledge related to MIH was moderate among our study population. The findings from this study will help identify the gap in the understandings, and the data can be applied to improve the diagnosis and management of MIH. Approximately 61% of the dentists in our survey have encountered some clinical forms of MI. A study conducted in Hong Kong has reported that 77.6% have experience with MIH in their practice.¹¹ Another study did all over Europe that included participants from 31 countries found that 97% of the dental care providers were familiar with MIH's clinical appearance.³ In Riyadh, Saudi Arabia, a study done among dentists by Silva et al. in the year 2016 reported that 77% of general dentists and 86% of the specialists had encountered MIH in their practice.⁹ Koch et al first epidemiological study related to MIH in 1987 in Swedish children reported a prevalence of up to 15.4%.⁴ A systematic review done by Jalevik reported a prevalence that ranged from 2.4% to 40.2%.¹² An interesting characteristic of MIH is its variation in clinical features between and within the patients. From a clinician perspective, some judgmental criteria are necessary to confirm the diagnosis of MIH. The criteria for judging MIH that is agreed upon by the European academy of paediatric dentistry is as follows: appropriate teeth to be examined are four first permanent molars (FPM) and eight permanent incisors, demarcated opacities at the occlusal and buccal of enamel crown with normal thickness with white, yellow, creamy or brown, posteruptive enamel breakdown or disintegration, where the loss of enamel is seen with a pre-existing demarcated opacity, FPM and incisors with restorations that are

following the similar extensions as MIH (restorations extended to the buccal or palatal smooth surface), history of extracted FPM with demarcated opacities on other FPM and hypersensitivity that is difficult to anesthetize.^{12,13}

Table 4: Perceptions regarding MIH and its clinical relevance (n=295).

Parameters	N	%
MIH is clinical problem next to dental caries in public health	Yes	191 64.7
	No	77 26.1
	I don't know	27 9.2
Feeling about diagnosing MIH	Very confident	24 8.1
	Confident	148 50.2
	Neutral	17 5.8
	Unconfident	98 33.2
	Very unconfident	8 2.7
Felling about treating MIH	Very confident	19 6.4
	Confident	127 43.1
	Neutral	20 6.8
	Unconfident	117 39.7
	Very unconfident	12 4.1
Need further training treating MIH	Yes	212 71.9
	No	67 22.7
	Not sure	16 5.4
Areas need to be focused in workshops/lecture/ CDE	Etiology	8 2.7
	Diagnosis	36 12.2
	Treatment	27 9.2
	All of the above	184 62.4
	Don't want to attend any	40 13.6

In current study findings, the participants had different views on etiology, even though most believed that genetic factors contribute results in MIH. There is no definitive etiological factor that is regarded as the cause of MIH. Studies have reported that medical problems in the third trimester of pregnancy up to three years of child's life, medication of the child during the first years of life, and exposure to fluorides or toxins like digoxin polychlorinated biphenyls could be contributing factors for MIH.¹⁴⁻¹⁷ It is believed that MIH is not caused by one specific factor but an interplay of different factors.¹⁶ It was found that 46% of the dentists reported that they encountered MIH in primary dentition, which means that they are confused with the lesion's features and pattern. Hypomineralized second primary molars (HSPM) have features common to MIH. There is a need to understand the temporal association between the mineralization of the FPM crowns and that of the second primary molars.^{17,18} Studies have reported the co-occurrence of MIH and HSPM, which indicated that children showing HSPM are at greater risk of suffering MIH.¹⁹⁻²¹

The clinical management of MIH will vary depending on the severity and associated symptoms. The majority of our participants (83%) reported that they would refer the child with MIH to a pediatric dentist if required. The treatment goal for MIH should be to prevent caries development, reduce enamel loss, to restore function and esthetics (incisors). The preventive approach should be based on the presence of posteruptive enamel breakdown (PEB). For molars with PEB, a demineralizing paste (calcium-phosphate) or interim restorations, and for incisors, enamel micro abrasion followed by sealants could be used. Teeth without PEB, topical fluoride application and fissure sealants could be used in the case of molars.^{22,23} In our study, we found that only 21.2% of dentists used fissure sealants, and 70% used fluoride as a treatment for MIH, usually use glass ionomer and composite restorations for both molars and incisors with PEB. In contrast, for teeth without PEB, resin infiltration, or composites could be used.^{24,25}

The study findings show that 59% and 49% of the dentists were confident in diagnosing and treating MIH, respectively. But this confidence was not reflected in their knowledge related to MIH. Simultaneously, 72% of the dentists agreed that they need further training in treating MIH. This shows that the management information is not sufficient in our study population, which could be due to less exposure to the cases of MIH in their practice. As dental care providers, we need to keep ourselves updated about new information and technologies available to handle clinical cases. Attending an interactive workshop could increase confidence in diagnosing and managing such patients.

Limitations

Some of the limitations of our study should be addressed before generalizing the findings. As this was a self-administered questionnaire, it could have subjected to response bias. Secondly, there could be social desirability bias as some participants can over or under report specific details. Thirdly, we didn't classify the dentists based on specialty or degree as the knowledge related to etiology, diagnosis, and management of MIH may have encountered confounding bias. Finally, the immanent limitations of a cross-sectional survey design should be considered before interpreting our findings. There is a need for a broad national survey involving all dentists' specialties to establish baseline data to train the dental students and practicing dentists to diagnose and manage MIH.

CONCLUSION

Current study was aimed to evaluate the knowledge and the perception on MIH among general dental practitioners in Saudi Arabia. We found that a 49.5% had 'good', 25.1% 'fair' and 25.4% 'poor' knowledge. The perceptions were found that 64.7% had the thought that MIH is a public clinical problem next to dental caries.

When we assessed the perceptions about diagnosis MIH, it was found that 35.7% not confident (Unconfident-33.2%; very unconfident-2.7%) and 58.3% showed some confidence in diagnosing the same. The dentists' confidence about treating MIH showed that 49.5% were confident in some way or other and 43.8% reported unconfident in treating the defect.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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