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Molar incisor hypomineralisation in rural areas

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ABSTRACT

Background: Molar incisor hypomineralisation (MIH) is a qualitative defect of enamel that is associated with the disruption of ameloblastic action during the transitional and maturational stages of amelogenesis. Demarcated opacities, atypical restorations, post-eruptive enamel breakdown, asymmetrical appearance of affected teeth and tooth sensitivity are some clinical features. **Method:** An electronic literature search in PubMed and Science direct was done in September, 2023 using the Population, Concept and Context framework. Search terms and keywords were combined by Boolean operators. Two independent investigators screened titles, abstracts and full text of publications. The inclusion criteria was original (primary) research articles with accessible full text on molar- incisor hypomineralisation of teeth among children in rural areas carried out in Africa continent, published in English and in electronic databases. Original research articles related to molar incisor hypomineralisation of teeth among children in urban, semi-urban or sub-urban areas and hospital based studies were excluded. Review articles, systematic reviews and dissertations related to molar incisor hypomineralisation were also excluded during screening. **Results**: One article with accessible full text was included as it was assessed to meet the aim of the review. The study was a cross-sectional study and it was carried out in Kenya. **Conclusion**: Molar incisor hypomineralisation can affect the quality of life of children with affected teeth associated with tooth sensitivity. The study identified was from one Africa country. More studies from diverse ethnic population in rural areas will add to the existing literature and fill the gaps in knowledge.

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1. INTRODUCTION

Molar incisor hypomineralisation (MIH) is a qualitative defect of enamel affecting at least one of the first permanent molars (FPMs) with or without involvement of at least one of the permanent incisors [1]. The condition is of systemic origin; the aetiology is unknown [2-3] but several factors have been implicated in the aetiology of molar incisor hypomineralisation. It presents as demarcated opacities that vary from creamy-white or yellow to yellowish-brown discolouration [4-5].The yellow/brown defects are considered more severe than the white/creamy opacities[6].The condition is associated with the disruption of ameloblastic action during the transitional and maturational stages of amelogenesis [7]. Affected teeth have high porosity [6] and lower mechanical resistance that cause the teeth to be susceptible to post-eruptive breakdown [6] (PEB)

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when the affected tooth is under occlusal load. Demarcated opacities [4-5], post-eruptive enamel breakdown [6], asymmetrical [8] appearance of affected teeth, atypical restorations [6] and tooth sensitivity [6] are some clinical features. The diagnosis of molar incisor hypomineralisation is clinical and it can be challenging to manage [7]. Epidemiological studies from Africa on molar incisor hypomineralisation of teeth among children had been reported from Libya [9], Kenya [10], Nigeria [11-12], Tunisia[4], Sudan[6] , Egypt[7-8] and other Africa countries. The aim of this article is to review the available studies on molar incisor hypomineralisation of teeth among children in rural areas in Africa.

2. LITERATURE SEARCH METHOD

An electronic literature search in PubMed and Sciencedirect was done in September, 2023 using the Population, Concept and Context framework [13-14].

Population: Children; concept: Molar incisor hypomineralisation of teeth among children in rural areas; context: Studies carried out in Africa continent, published in English language and in electronic databases

The keywords used were molar-incisor hypomineralisation, rural, Sub-Saharan countries, molar hypomineralisation, Africa countries, permanent teeth, molar-incisor hypomineralization , molar hypomineralization, African children and Africa. Search terms and keywords were combined by Boolean operators. The inclusion criteria were original (primary) research articles with accessible full text, related to molar incisor hypomineralisation of teeth among children in rural areas, conducted in Africa, published in English and in electronic databases. Original research articles related to molar incisor hypomineralisation of teeth among children in urban, semi-urban or sub-urban areas and hospital based studies were excluded. Review articles, case report, systematic reviews, thesis, case series, in-vitro studies, viewpoints, books, letters, editorials, dissertations, book chapters, primary study without accessible full text, perspectives, and news related to molar incisor hypomineralisation of teeth were excluded. Original research articles related to enamel hypoplasia , enamel hypomineralisation, enamel defects and developmental defects of enamel without any information on molar incisor hypomineralisation of teeth were also excluded. Original research articles involving teeth (in-vitro studies) were also excluded. Two independent investigators screened titles and abstracts of publications on molar incisor hypomineralisation studies, and potential references to identify which studies met the inclusion criteria of this review. Information was extracted from the full texts of articles regarding the location of the research and the main content. Study data of the included articles were extracted and collated in a table, including study details (author(s), year of publication, study population, study location or country, study objectives, study design) .All identified studies in Africa that met the inclusion criteria with accessible full text were included and if relevant data were missing, the authors of the articles were not contacted for additional information via e-mail. No specified time frame was used during the search, any additional studies in African region identified from the reference lists of published papers were retrieved from the web using Google scholar and Google search engines.

3. RESULTS

Thirty-five articles were identified; one duplicate was removed during screening (figure 1). Abstract and full text was screened using inclusion criteria by two independent investigators. Thirty-three articles were excluded because they did not meet the inclusion criteria. One article with accessible full text was included as it was assessed to meet the aim of the review (table 1). The study was a cross-sectional study and it was carried out in Kenya.

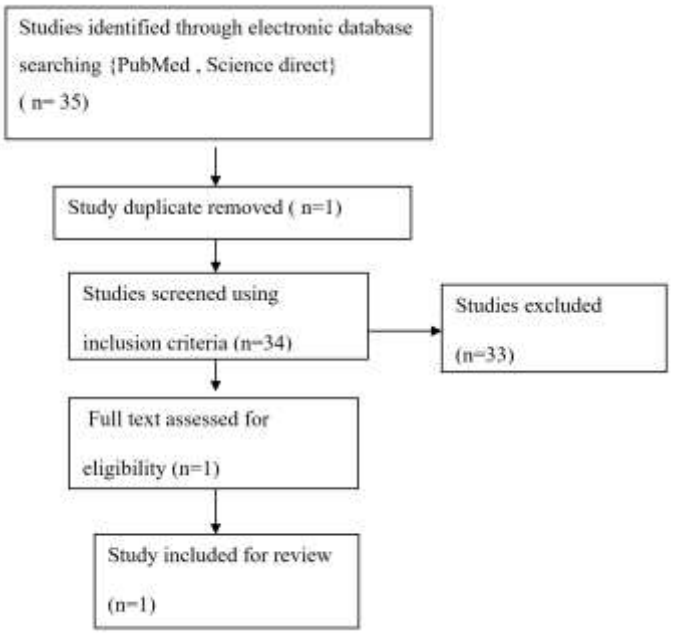

Figure 1. Flowchart of articles process.

4. DISCUSSION

Molar incisor hypomineralisation (MIH) is a qualitative defect of enamel that can lead to various difficulties for both patients and dental professionals [3] in the form of difficulty in achieving anaesthesia with local anaesthetics, bonding to enamel [3], tooth sensitivity, aesthetics concerns and psychological distress. It is considered a serious public health problem [4] with mild or

severe level of clinical presentations. The criteria for the diagnosis of molar incisor hypomineralisation was described by the European Academy of Paediatric Dentistry [4] and the differential diagnosis of molar incisor hypomineralisation includes amelogenesis imperfecta, enamel hypoplasia, white spot lesion, and dental fluorosis.

Table 1. Summary of identified research study on molar incisor hypomineralisation of teeth among children in rural areas within Africa countries.

Author/Year of publication, country	Study population	Study design	Study objective
Kemoli [10] , 2008, Kenya	6 to 8 years old children	Prospective cross-sectional study	To determine the prevalence of molar incisor hypomineralisation and any associated causes of MIH in children from two rural divisions in Kenya

The prevalence of molar incisor hypomineralisation of teeth among the children examined was 13.7% [10] and the diagnostic criteria used was 0, when there were no opacities, dis-colourations (external or internal), carious lesions or other defects and 1 when there were demarcated opacities, post-operative defects of deficiency in the enamel [10], large and extensive restorations on any of the teeth suspected to be as a result of hypomineralisation. Other diagnostic criteria used among African children are enamel defect index [7] and short (MIH short charting form) charting form [8] . Molar incisor hypomineralisation of teeth was seen more in females than males in the rural areas [10] and there was previous history of malaria, measles and illness/poor health among the study participants [10]. The economic and social structure in rural areas is poor and the income of some rural dwellers is irregular [15] with absence of health insurance and universal health coverage. This could lead to poor management of certain illnesses and poor health outcomes [15].

Studies will provide knowledge on the prevalence and clinical methods of improving the quality of life of children in rural areas with tooth sensitivity, aesthetics concerns, post-eruptive enamel breakdown and psychological distress. Africa has about 3000 ethnic groups[13,16-17]. with socio-cultural beliefs and practices . The study identified from one Africa country might not reflects the level of research on molar incisor hypomineralisation of teeth among African children in rural areas. More studies from various countries in Africa will fill the gaps in knowledge from other countries in Africa continent and add to the existing literature.

5. CONCLUSION

Molar incisor hypomineralisation is a condition of systemic origin and several factors have been implicated in the aetiology. It can affect the quality of life of children with affected teeth. The study identified was from one Africa country and reveals the need for more research on molar incisor hypomineralisation of teeth among children in rural areas. More studies from diverse ethnic population in rural areas will add to the existing literature.

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