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Research Article

Oral Health and Dental Treatment Needs in Thalassemia Major Patients

Sharjeel Chaudhry [1*], Zarmina Ehtesham[2]

[1] Dental Surgeon, Dow University of Health Sciences.

[2] House Officer, Hamdard University.

***Corresponding Author:** Sharjeel Chaudhry, Endocrinology Division, Olive View-UCLA Medical Center, David-Geffen UCLA Medical School, CA, USA.

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Abstract

Abnormalities in haemoglobin is a defining characteristic of hemoglobinopathies, encompassing conditions such as sickle cell anaemia and thalassemia. Thalassemia major, a condition marked by profound anaemia resulting from insufficient haemoglobin production, impacts a significant global population. The objective of this study was to enhance comprehension of the oral health needs specific to individuals with thalassemia major, to improve the provision of healthcare services for this population. A descriptive multicentric cross-sectional study was undertaken including a cohort of 42 individuals diagnosed with severe thalassemia. The assessment of the participants' oral health was conducted with the DMFT/DMFT Index and the OHI-Simplified (OHI-S). The research revealed a significant occurrence of dentofacial abnormalities and dental treatment requirements, thereby emphasizing the importance of complete oral health care for those diagnosed with thalassemia. Individuals diagnosed with thalassemia major may present a distinctive facial attribute referred to as "Chipmunk facie" or "Rodent facie," which arises from the enlargement of the maxilla and zygomatic bone. Malocclusion, along with dental caries and oral ulcers, is a prevalent dental and facial abnormality observed within the study population. The findings of this study underscore the imperative of early detection and intervention of oral health concerns among individuals with thalassemia. Regular dental examinations and prompt intervention for dental and facial abnormalities confer advantages to individuals afflicted with thalassemia. The research highlights the importance of enhancing oral health awareness and providing education to the community as a means to enhance the provision of oral health care for those with thalassemia. The integration of dental care into thalassemia management necessitates the collaborative efforts of medical and dental professionals. Notwithstanding the perceptive conclusions drawn from the study, further research employing larger and more diverse sample sizes is necessary to substantiate and advance the obtained findings. The findings of this study will have significant implications for the development of enhanced management procedures and targeted oral health care programs for those diagnosed with thalassemia major, hence offering substantial benefits to this population. By emphasizing the significance of oral health in the context of thalassemia care, we can augment the overall well-being and quality of life of patients.

Key words: oral health; abnormalities; haemoglobin

Introduction

Hemoglobinopathies are a set of hereditary illnesses that lead to structural abnormalities in the heme molecule and globulin chains of haemoglobin. Hemoglobinopathies, such as sickle cell anaemia and thalassemia, are commonly encountered [1]. According to the World Health Organization (WHO), the prevalence of hemoglobinopathies is estimated to impact approximately 5% of the global population [2]. The prevalence of hemoglobinopathies has significantly increased as a result of population migration, particularly in places where these conditions were formerly limited to the Middle East, Asia, and Africa.

Thalassemia major is a hereditary blood illness characterized by a deficiency in haemoglobin production, resulting in the manifestation of severe anaemia. This particular form of hemoglobinopathy is highly frequent, impacting a significant number of individuals on a global scale [7]. Individuals diagnosed with thalassemia major encounter considerable obstacles across various medical domains, including oral health. Dental complications are among the several manifestations of oral health issues associated with thalassemia major. Malocclusion and tooth decay are dental and skeletal problems that are associated with thalassemia and other hemoglobinopathies [3]. The

management and treatment of thalassemia major, which may encompass blood transfusions and iron chelation therapy, might provide additional challenges in terms of oral health concerns and the need for dental care [18].

Thalassemia, a genetic blood condition, is caused by mutations in the genes responsible for the globin proteins located on chromosome 16, as well as the globin chains found on chromosome 11. The presence of this genetic anomaly hinders the production of haemoglobin, resulting in significant impairment of the capacity of erythrocytes to facilitate the transportation of oxygen [4]. Individuals with thalassemia commonly encounter the presence of anaemia, which can manifest in varying degrees of severity, spanning from mild to profound. Thalassemia can be classified into distinct subtypes, namely homozygous, heterozygous, and compound heterozygous, by employing clinical and genetic criteria to determine the specific globin chain that is affected [6].

The enlargement of the maxilla and zygomatic bone is observed due to the hyperplasia of the bone marrow associated with erythropoiesis. This, in turn, has an impact on the development of the teeth and facial structures in individuals with thalassemia. The aforementioned growth leads to the development of unique facial characteristics sometimes referred to as "Chipmunk facie" or "Rodent facie." Additionally, oral manifestations such as malocclusion, dental caries, and other forms of tooth damage may also arise [5,2]. The absence of awareness of the need to maintain optimal oral health may hinder individuals with thalassemia from accessing the necessary dental treatment. The primary objective of this study is to enhance the comprehension of dental treatment requirements and oral health among individuals diagnosed with thalassemia major, with the ultimate goal of improving the efficacy of healthcare systems in meeting their needs [8]. The present study employs a descriptive multicentric cross-sectional design to underscore the significance of oral health management in individuals with thalassemia.

Methodology

A descriptive multicentric cross-sectional study was conducted from July to August 2023, with a sample of 42 persons diagnosed with severe thalassemia. Participants for the non-probabilistic convenience sampling were selected from hospitals and thalassemic care facilities [3]. A structured, self-administered questionnaire was distributed to patients diagnosed with thalassemia major who were seeking treatment at specialized thalassemia care institutions. The questionnaire encompassed various sections inquiring about the participant's biography and dental health, including fundamental details such as name and residence, along with more specific inquiries.

The comprehensive evaluation of the patient's general well-being encompassed various aspects, including an examination of their mouth cavity as well as consideration of their demographic characteristics. The dental and oral health of the participants was evaluated by employing the Decayed Missing Filled Teeth Index (DMFT/dmft Index) for permanent and primary teeth, along with the Oral Hygiene Index—Simplified (OHI—S). The researcher performed an intra-oral examination utilizing a mouth mirror and a curved explorer. Furthermore, the clinical examiner documented any oral symptoms exhibited by the participants.

The data collected was analyzed using SPSS, a statistical software commonly utilized in social science research, with a significance level set at $p < 0.05$. The prevalence of dentofacial abnormalities and treatment demands among patients with Thalassemia major were calculated and organized in a tabular format for ease of reference. This research endeavour aims to enhance our understanding of the distinctive oral healthcare requirements of individuals diagnosed with thalassemia major, as well as to develop effective strategies for improving their dental well-being. The outcomes of this research will provide a valuable contribution to the advancement of enhanced management protocols and specialized oral healthcare programs for individuals diagnosed with thalassemia, ultimately leading to an enhancement in their overall quality of life [17].

Results

The study included a cohort of 42 individuals diagnosed with severe thalassemia. The age of the participants varied from 19 to 42, with an average age of 28.6. The study observed a higher proportion of male participants (57.1%) compared to female participants (42.9%). All participants in the study exhibited a significant presence of thalassemia, with beta-thalassemia being the more predominant form (71.4%) compared to alpha-thalassemia (28.5%). The study sample consisted of individuals with an average age of 16.5 years, and their disease durations varied between 7 and 30 years. Thalassemia has the potential to present itself across many age groups, with the mean age of onset being approximately 8.4 years. Between 40% and 55% of the participants indicated a familial history of thalassemia. The initiation of iron chelation therapy occurred within the age range of 5 to 12 years for the majority of participants, comprising 66.7% of the total sample. A total of 52.4% of the participants opted for deferroxamine as their chelation medication, whilst 47.6% chose deferrasirox for the same purpose. Moreover, a significant proportion of the participants, specifically 61.9%, required blood transfusions. A significant proportion of the participants (71.4%) also reported encountering oral health problems. The dental and oral health of the participants was assessed utilizing the Decayed Missing Filled Teeth Index (DMFT/DMFT Index) for both permanent and primary teeth. The evaluation also involved the utilization of the Oral Hygiene Index—Simplified (OHI—S). The researcher conducted an intra-oral examination using a mouth mirror and a curved explorer, via which oral symptoms were identified in all of the participants. The most commonly reported symptoms were tooth decay (59.5%), gum bleeding (45.2%), and misplaced teeth (38.1%).

Based on the results, it was seen that 28.6% of the participants exhibited a high frequency of dental visits, while 42.9% engaged in dental visits periodically. The remaining 28.6% of participants reported never seeing the dentist. A significant proportion of the participants, specifically 69%, express a sense of assurance in the domain of dental

care. Frequent occurrences of dental and facial abnormalities were observed in individuals diagnosed with thalassemia major. The dentofacial abnormalities that were found to be most commonly observed in the study population included malocclusion (59.5%), gingival bleeding (45.2%), dental caries (40.5%), and oral cavity infections (35.7%). Furthermore, it was shown that 28.6% of the participants experienced facial swelling, while 21.4% exhibited the presence of oral ulcers. A total of 9.5% of the participants exhibited protruding jaws, while 14.3% experienced symptoms such as dry mouth and/or tooth spacing. Additionally, 14.3% of the participants displayed pale gums and/or linings.

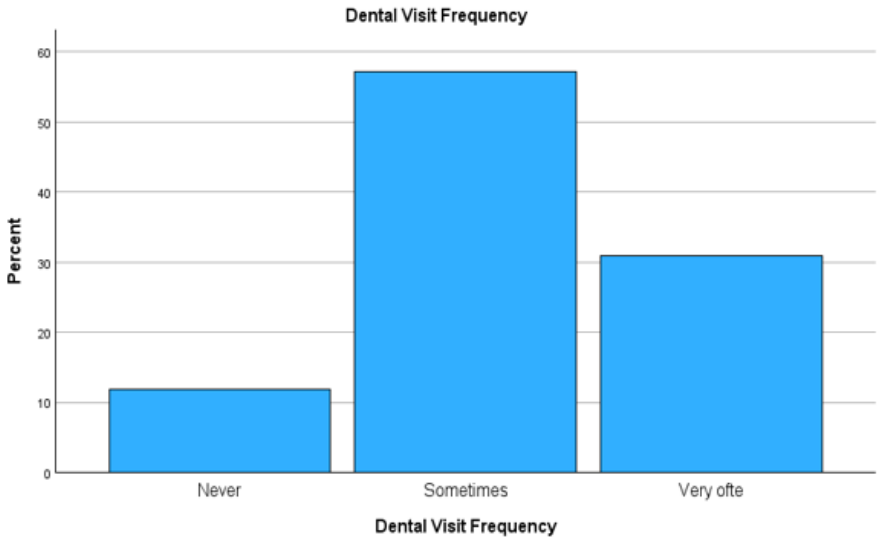


Figure 1 Dental Visit |

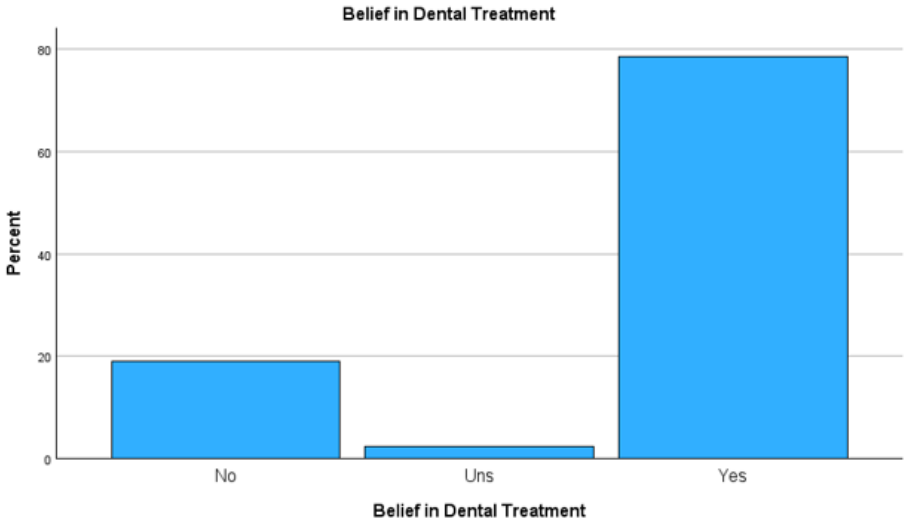
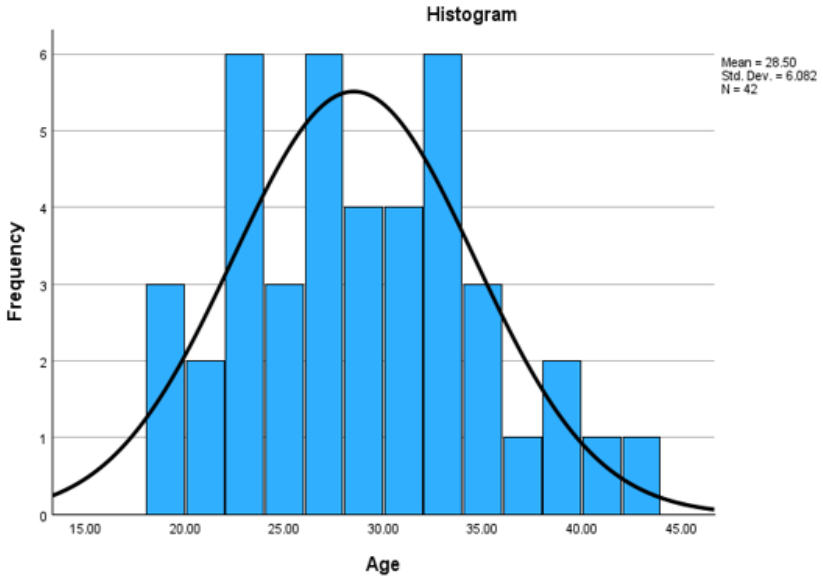


Figure 2 Belief in Dental Treatment



Discussion

The present investigation aimed to examine the oral health status and dental treatment needs of individuals diagnosed with thalassemia major, a hereditary blood condition defined by a deficit in the generation of haemoglobin. Thalassemia major, a condition that has a significant global prevalence, can give rise to many medical consequences, encompassing complications in dental and oral health [8]. The primary objective of the study was to improve dental health and overall quality of life for individuals with thalassemia by gaining a more comprehensive understanding of their oral healthcare requirements and devising effective interventions to meet those needs. The study indicates that individuals diagnosed with thalassemia major exhibit a heightened susceptibility to oral health complications [9]. A significant proportion of the participants indicated suboptimal oral health, with nearly all of them needing dental intervention to address various dentofacial issues. The most often cited oral health concerns among individuals with thalassemia were tooth decay, bleeding gums, and misplaced teeth. Based on previous research [5,7], individuals diagnosed with thalassemia major and other hemoglobinopathies have a significant occurrence of dental and skeletal complications.

The participants in this study were affected by a medical condition referred to as “Chipmunk facie” or “Rodent facie”. This condition is defined by the enlargement of the maxilla and zygomatic bone, which is caused by hyperplasia of the bone marrow in conjunction with erythropoiesis [10]. The observed growth patterns had an impact on the development of teeth and facial structures, hence playing a role in the manifestation of malocclusion and other dental conditions. The presence of dental and facial abnormalities in a significant proportion of participants underscores the critical importance of early oral health care and therapies for individuals with thalassemia. The outcomes of the study provide insights into the motivations behind thalassemia patients' utilization of dental services. Several participants reported that they had never visited a dentist, even though a portion of them did so on an occasional or frequent basis [11]. Patients diagnosed with thalassemia may experience a deterioration in their oral health due to a lack of awareness of the disorder or limited availability of dental care. It is imperative to impart knowledge and instil in this collective the significance of maintaining optimal oral hygiene and adhering to routine dental examinations, accomplished through educational initiatives and upbringing.

The findings of this study hold practical significance for the oral health treatment of individuals with thalassemia. Individuals diagnosed with major thalassemia must be provided with comprehensive medical care, encompassing regular dental evaluations [12]. The implementation of preventive dental care, regular dental examinations, and prompt identification and management of dental and oral health conditions can greatly improve the overall well-being of these individuals. To formulate tailored oral health care regimens, dentists must engage in interdisciplinary collaboration, particularly with medical doctors who specialize in the treatment of individuals affected by thalassemia. Several concerns regarding the study warrant careful consideration. Notwithstanding a generally positive outlook, it is important to note that the generalizability of these findings to the broader thalassemia community may be limited due to the utilization of a cross-sectional research design and the very small sample size employed in this study [13]. To enhance our understanding of the oral health requirements of individuals with thalassemia, it is imperative to conduct longitudinal studies that encompass bigger and more representative samples. By doing so, we can acquire a more comprehensive body of information in this area. To mitigate the possibility of answer bias inherent in self-administered questionnaires, future research endeavours may incorporate clinical examinations or interviews with participants as a means to validate the veracity of reported oral health concerns. The comprehensive findings of this descriptive multi-centre cross-sectional study underscore the significant oral health challenges encountered by individuals diagnosed with thalassemia major [14]. The necessity for a complete oral intervention for individuals with thalassemia is underscored by the presence of dental and facial abnormalities observed in a number of the subjects involved in the study. The findings of this study will make a valuable contribution to enhancing the well-being and overall health of individuals with thalassemia by providing insights that can inform the development of targeted oral healthcare interventions [15]. Further research and enhanced interdisciplinary cooperation between medical professionals and specialists in geriatrics are necessary to adequately address the unique oral health requirements of individuals diagnosed with thalassemia. It is imperative to ensure the proper integration of dental care within thalassemia management guidelines.

Conclusion

This study is descriptive, multicentric, and cross-sectional in nature, and offers significant insights into the oral healthcare needs of individuals diagnosed with thalassemia major. The findings indicate a noteworthy occurrence of dentofacial abnormalities and dental care requirements among individuals with thalassemia, emphasizing the importance of complete oral healthcare for this specific group. Individuals diagnosed with thalassemia major experience challenges in the development of their dental and facial structures as a consequence of the disorder's impact on the generation of haemoglobin. Individuals with thalassemia necessitate specialized care and attention due to their atypical facial characteristics and compromised dental well-being. The findings of this study underscore the imperative of implementing preventive measures and timely intervention to address oral health issues among individuals with thalassemia. Regular dental examinations and prompt treatment have the potential to enhance the quality of life for these individuals. This study highlights the oral health needs of individuals with thalassemia and their families. Enhancing patient accessibility to dental care is crucial in fostering oral health and overall well-being as an essential element of thalassemia management.

The findings of this research will provide valuable assistance in the advancement of improved management protocols and specific oral healthcare initiatives for individuals with thalassemia. By prioritizing the maintenance of their oral health, we can optimize their general well-being and improve their overall quality of life. Subsequent research endeavours should be undertaken to corroborate and expand upon these findings, employing larger and more heterogeneous samples, as well as longitudinal investigations. The collaboration between medical and dental professionals is of utmost importance in effectively integrating dental care into the management of thalassemia and delivering comprehensive care for those diagnosed with thalassemia major. The results of this study provide an opportunity for enhanced comprehension and improved approaches toward addressing the specific oral healthcare needs of individuals diagnosed with thalassemia. Placing oral health as a central aspect in the comprehensive therapy of thalassemia patients' overall well-being has the potential to improve their quality of life.

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