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Original Article

Oral Hygiene Habits and Dental Caries Status in Thalassaemic Patients of Larkana: A Cross Sectional Study

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ABSTRACT

Background: Thalassemia, a prevalent blood disorder in Larkana, poses significant challenges to oral health. This study aims to provide a comprehensive overview of the dental caries status and oral hygiene habits in thalassemia patients, addressing a crucial aspect of their overall health management.

Objective: The objective of this study is to assess the status of dental caries and oral hygiene habits among thalassemia patients in Larkana.

Methods: This descriptive cross-sectional study was conducted at the Fatmid Foundation Shaheed Benazir Bhutto Thalassaemia Centre, Larkana, from October 2020 to May 2022. Oral examinations were performed using a mouth mirror and a blunt ball-ended probe with a 0.5 mm end diameter. Dental caries were diagnosed following World Health Organization criteria, and Oral Hygiene Index-Simplified (OHI-S) was employed for oral hygiene assessment. Data collection included demographic details and oral hygiene practices, analyzed using SPSS Version 24.

Results: The study comprised 52% male and 48% female participants, with a mean age of 11.61±4.561 years. Dental caries were observed in 73% of the patients. The Oral Hygiene Index score ($p = .112$) and DMFT Score ($p = .837$) revealed no significant gender differences.

Conclusion: The study concludes that thalassemia patients in Larkana exhibit poor oral hygiene, with a high prevalence of dental caries. These findings underscore the need for targeted oral hygiene education and caries prevention strategies in this patient population.

Keywords: Dental Caries, DMFT, Hygiene Habits, Mouth Mirror, OHI-S, Thalassemia.

INTRODUCTION

Thalassemia, a genetic blood disorder, can be categorized into two primary types: thalassemia minor (heterozygous) and thalassemia major (homozygous), each differentiated by their genetic makeup and clinical manifestations. While thalassemia minor is relatively mild and often clinically unobtrusive, thalassemia major, also known as Cooley's anaemia, presents with more severe symptoms. This condition impairs the body's ability to produce adequate haemoglobin, essential for effective oxygen transport, leading to various complications in sufferers. These include not only diminished levels of blood haemoglobin but also a deficiency in high-quality haemoglobin (1,2).

Oral health, a vital component of overall well-being and life quality, is significantly impacted in thalassemic patients. The primary cause of oral manifestations in thalassemia is excessive compensatory bone marrow hyperplasia, which leads to the expansion of the marrow cavity (3). This condition predisposes individuals to various oral health issues, most notably dental caries and periodontal disease. Several studies have documented the oral and maxillofacial challenges faced by thalassemia patients, highlighting a high incidence of periodontal disease and dental caries in this population (5-7). These dental problems are often exacerbated by poor oral hygiene practices, elevated blood ferritin levels, iron overload, and alterations in saliva's biochemical properties (8).

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The highest prevalence of thalassemia is found in the "Thalassemia Belt," which includes regions of North and West Africa, the Middle East, and parts of the Far East (9). In Pakistan, thalassemia is one of the most common inherited diseases, affecting an estimated 9.8 million people, with a carrier rate of 5-7% (10). A significant challenge in Pakistan is the lack of widespread pre-marital thalassemia screening and counseling, particularly for individuals considering marriage among cousins (11,12).

Furthermore, thalassemia-induced morphological changes in teeth, such as reduced tooth size, particularly in the mesio-distal area, and increased occurrence of pits and fissures, compound the risk of dental caries (13,14). Often, the importance of oral hygiene is overshadowed by the more immediate concerns of managing thalassemia, leading to increased plaque accumulation and further deterioration in oral health. This neglect is compounded by the country's general lack of emphasis on oral health, especially in patients with life-threatening systemic conditions like thalassemia, where parents' focus is often on early-life medical interventions required for the disease. Consequently, the systemic health of these patients is further compromised due to poor dental health.

The current study was thus conducted to assess the oral hygiene habits and dental caries status among thalassemic patients visiting blood transfusion laboratories in Larkana. By understanding the oral health challenges faced by this population, the study aims to contribute to better healthcare provision and the development of targeted health education awareness programs for this demographic.

MATERIAL AND METHODS

This cross-sectional research was meticulously designed and executed between October 2020 and May 2022. The study took place at the Fatmid Foundation Shaheed Benazir Bhutto Thalassemia Centre in Larkana, following the receipt of administrative approval from the laboratory in-charge. Ethical consent was obtained from the relevant University board, ensuring adherence to standard research protocols. An essential aspect of the study was acquiring written informed consent from each participant, upholding ethical standards in patient involvement.

To determine an appropriate sample size, an online epitool sample size calculator was employed. This tool referenced a previous study by Anwaar A et al. (12), using a set of defined parameters: an assumed population standard deviation of 3.2, a confidence level of 0.95, and an acceptable error margin of 0.5. The total sample size was calculated to be 158 participants. In selecting these individuals, a purposive sampling technique was utilized, which allowed for a more targeted and relevant cohort for the study. The study included patients from both genders, aged between 6 and 25 years, who had given their consent to participate. Patients with diabetes or Down syndrome were excluded to maintain the study's focus on thalassemia's specific oral health impacts.

For data collection, each oral examination was conducted with a mouth mirror and a blunt ball-ended probe, featuring a 0.5 mm end diameter. This allowed for precise and gentle examination of the oral cavity. The internationally recognized FDI nomenclature was used to identify each tooth, starting from the posterior teeth and moving systematically. The World Health Organization's diagnostic criteria for dental caries (17) were employed, utilizing the DMFT index to record the number of decaying, missing, and filled permanent teeth.

In addition to clinical examination, the study also sought information regarding demographic variables and oral hygiene practices from the participants. The Simple Oral Hygiene Index (OHI-S) (18) was applied to evaluate the state of oral hygiene among the participants. The OHI-S comprises two components: The Debris and Calculus Indexes. These indexes involve numerical computations reflecting the amount of calculus or debris found on pre-selected tooth surfaces.

For the OHI-S, six tooth surfaces were chosen for assessment: buccal surfaces of the selected upper molars, lingual surfaces of the lower molars, and anterior labial surfaces of the lower left and upper right central incisors. If necessary, central incisors on the opposite side of the midline were used as alternatives. After recording the results for calculus and debris, the index values were calculated by dividing the total number of surfaces scored by the number of debris scores. To obtain an individual score, at least two of the six potential surfaces needed to be evaluated. A group's final score was determined by calculating the average of each individual's score. The Simplified Debris Index (DI-S) measured the average score for an individual or group.

The same procedure was followed for calculating the calculus scores, leading to the Simplified Calculus Index (CI-S). The Simple Oral Hygiene Index was then formulated by adding together the average calculus and debris scores for each individual or group. The OHI-S values range from 0 to 6, with the DI-S and CI-S values ranging between 0 and 3, representing half the score magnitude allowed by the original Oral Hygiene Index.

All responses, including demographic information, questionnaire answers, and index scores, were meticulously recorded in a proforma. Data analysis was performed using SPSS version 24. Qualitative variables, such as gender, type of thalassemia, and caries status, were presented as frequency and percentage. Quantitative variables, including age, DMFT, and OHI-S scores, were presented as Mean ± SD. Statistical significance was determined using chi-square and independent t-tests, with a P-value of < 0.05 considered

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significant. This comprehensive approach ensured the collection of relevant, reliable data for the evaluation of oral hygiene habits and dental caries status in thalassemic patients.

RESULTS

In this study, the distribution of male and female participants was closely balanced, with males constituting 52% and females 48% of the total. The average age of the participants was 11.61 years, with a standard deviation of 4.561. A significant majority, 80% of the participants, reported engaging in daily teeth cleaning practices. Tooth brushing was the predominant method for maintaining oral hygiene, practiced by 70% of the participants, while the use of Miswak, a traditional teeth cleaning twig, was noted in 6% of the cases. Regarding toothpaste usage, 65% of the participants used regular toothpaste, though 10% were unaware of the type of toothpaste they used. It was observed that half of the patients (50%) cleaned their mouths once a day.

Dental caries were a common finding, observed in 73% of the patients. The Oral Hygiene Index (OHI) scores varied slightly between genders, being 2.31±1.25 in males and 1.99±1.31 in females. However, this difference did not reach statistical significance ($p = .112$). In terms of gender distribution, males comprised 66% of the participants, while females made up 34%. Caries were more prevalent in males at 77%, but the association between gender and the prevalence of caries was not statistically significant ($p = .199$).

Furthermore, the DMFT (Decayed, Missing, Filled Teeth) scores were observed to be 1.51±1.76 in males and 1.45±1.14 in females. This difference, similar to the OHI scores, did not show a statistically significant relationship ($p = .837$). These findings suggest that while oral hygiene practices and the prevalence of dental caries varied among the participants, gender did not play a significant role in these variations.

Table-1 Descriptive statistics of demographic characteristics:

Characteristics	Frequency	Percent
Gender		
Male	83	52.5
Female	75	47.5
Mean Age	11.61±4.561	
Cleaning of teeth		
Yes	126	79.7
No	32	20.3
Tool for maintenance of oral hygiene		
Tooth Brushing	111	70.3
Salt Water Rinsing	05	3.2
Miswak	10	6.3
None	32	20.3
Type of toothpaste		
Fluoridated (Regular)	103	65.2
Medicated	7	4.4
Don't Know	16	10.1
None	32	20.3
Frequency of mouth cleaning		
Once a day	79	50.0
Twice a day	42	26.6
Once a Week	4	2.5
None	32	20.3
Total	**158**	**100.0**

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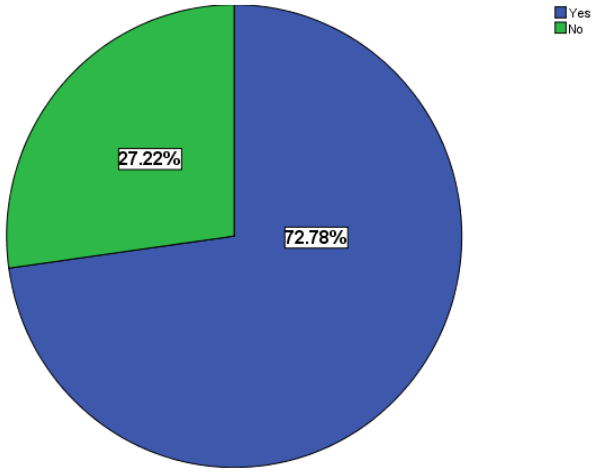

Fig. 1. Descriptive statistics of Caries status

Table-2 Relationship of oral hygiene index score with gender

	Gender	N	Mean	Std. Dev.	Std. Error Mean	P-value
Oral hygiene index score	Male	83	2.31	1.258	.138	0.112
	Female	75	1.99	1.310	.151	

Table-3 Relationship of caries with gender

	Caries		Total	P-value
Gender	Yes	No		
Male	64 (77.1%)	19 (22.9%)	83 (100.0%)	0.199
Female	51(68.0%)	24 (32.0%)	75 (100.0%)	
Total	115 (72.8%)	43 (27.2%)	158 (100.0%)	

Table-4 DMFT score of caries in gender.

	Gender	N	Mean	Std. Deviation	Std. Error Mean	P-value
DMFT Score	Male	83	1.51	1.749	.192	0.837
	Female	75	1.45	1.417	.164	

DISCUSSION

The research conducted in Larkana, Sindh, Pakistan, aimed to evaluate the oral hygiene and dental caries status in thalassemia major patients, a condition known to potentially impact oral health (19,20). The findings of this study revealed that thalassemia patients generally exhibit poor oral hygiene, corroborating the results of previous studies by Anwaar A et al. (12) and Ebeid et al. (21). This trend is likely attributable to the chronic and severe nature of hemoglobinopathies, which may cause patients to prioritize their general health over oral care.

Interestingly, the study noted no significant gender differences in the Oral Hygiene Index scores. This contrasts with the findings of Nabi AT et al. (22), who reported a significant disparity between males and females. These variations might be influenced by educational background and socioeconomic status, which were not the primary focus of the current study.

Thalassemia patients often exhibit oral structural changes, such as maxillary enlargement and malocclusions, which can exacerbate dental caries (23). Additionally, the frequent need for blood transfusions and a compromised immune system in these patients heightens the risk of developing caries. A concerning trend observed was the delayed dental care among these patients, often

waiting until the pain became unbearable. This delay often led to the development of severe caries, resulting in oral abscesses and infections, potentially affecting the head and neck lymph nodes.

In this context, the prevalence of dental caries was higher in male patients (77%) compared to females (68%), aligning with findings from the study by Leonardi R et al. (24) and contradicting Ali RR and Al-Naimi RJ (25), who found a higher incidence of caries in females. These differences might be attributed to varying levels of oral hygiene awareness and practices between genders.

The mean DMFT score was observed to be higher in males, suggesting a possible gender disparity in oral health maintenance. However, it's noteworthy that Ali RR and Al-Naimi RJ (25) found higher mean DMFT scores in females. This discrepancy could be due to females being more attentive to their oral hygiene or due to inherent morphological differences in the dentition of males and females (26).

A limitation of this study is the lack of in-depth exploration into the potential influence of socioeconomic and educational factors on oral health in thalassemia patients. Furthermore, the study's focus on a specific geographical location might limit the generalizability of its findings to broader populations.

One of the key strengths of this study is its comprehensive assessment of oral hygiene and dental caries in a significant sample of thalassemia patients, providing valuable insights into their oral health status. Additionally, the use of standardized indices for evaluating oral hygiene and dental caries lends credibility and comparability to the findings.

The study underscores the need for regular oral check-ups and early diagnosis to prevent the progression of dental issues in thalassemia patients. Adopting a family dentist system, common in developed countries, could be beneficial. This approach involves routine visits by a dental team to the patient's home for oral health screening and education. Specifically, pediatric dentists with specialized training play a crucial role in educating thalassemia patients and their caregivers about the importance of maintaining good oral hygiene and preventing dental caries. This proactive approach could significantly improve the oral health outcomes for thalassemia patients, enhancing their overall quality of life.

CONCLUSION

The study concluded that oral hygiene among Thalassemia patients was suboptimal. A significant number of these patients presented with dental caries, indicating a concerning level of dental health. In light of these findings, it is recommended that patients with Thalassemia receive specialized guidance focused on the prevention of dental caries and the promotion of better oral hygiene practices. Additionally, implementing oral hygiene education programs at transfusion centers could be a strategic approach to improve oral health awareness and practices among these patients. This proactive educational intervention is vital to mitigate further dental deterioration and to manage the oral health aspects of Thalassemia effectively.

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