

Comparative Assessment of Dental Caries Experience in Thalassemic and Healthy Children Aged 6–12 Years: A Cross-Sectional Study

Dr. Garima Bhatt¹, Dr. Shivaniben Patel², Dr. Vasudha Sodani³, Dr. Keyur Dhruv⁴, Dr. Harsh Shah⁵

¹Postgraduate Student, Department of Pedodontics & Preventive Dentistry, Ahmedabad Dental College & Hospital

²Dental Practitioner, Anand -Vidhyanagar Road Anand, Gujarat

³Professor & Head Department of Pedodontics & Preventive Dentistry, Ahmedabad Dental College & Hospital

⁴Lecturer, Department of Pedodontics & Preventive Dentistry, Ahmedabad Dental College & Hospital

⁵Professor & Head, Department of Public Health Dentistry, Ahmedabad Dental College & Hospital

Corresponding Author

Dr. Garima Bhatt

ABSTRACT

Introduction: Thalassaemia is a hereditary hemoglobin disorder requiring frequent blood transfusions, often leading to systemic complications that may influence oral health. The DMFT/deft index is a standard tool for assessing dental caries experience in children. The aim of the study is to investigate the association between thalassaemia and dental caries burden in pediatric patients. **Materials and Methods:** A comparative cross-sectional study was conducted among 120 children, aged 6–12 years, divided into two groups: Group I: Control Group, Group II: Children diagnosed with thalassaemia. Dental examination was performed and DMFT/deft scores were recorded. The data was collected and analysed statistically. **Results:** The mean DMFT/deft score was significantly higher in thalassaemic children compared to healthy controls ($p < 0.05$). A positive correlation was observed between serum ferritin levels and increased DMFT/deft scores. Factors such as duration of disease, frequent hospital visits and frequency of iron chelation therapy may have contributed to higher caries prevalence. **Conclusion:** Children with thalassaemia exhibit higher DMFT/deft scores compared to healthy children, indicating poor oral health status. Early dental intervention and preventive strategies should be integrated into the comprehensive care of thalassaemic patients.

Keywords:

Thalassaemia, DMFT index, deft index, Dental Caries, Children, Oral Health, Pediatric Dentistry.

How to cite this article: Bhatt G, Patel S, Sodani V, Dhruv K, Shah H. Comparative Assessment of Dental Caries Experience in Thalassaemic and Healthy Children Aged 6–12 Years: A Cross-Sectional Study. *Int J Drug Deliv Technol.* 2026;16(22s): 315-318. DOI: 10.25258/ijddt.16.22s.33

INTRODUCTION:

Thalassaemia is one of the most common inherited hemoglobinopathies worldwide, characterized by defective synthesis of globin chains leading to chronic hemolytic anemia. Globally, approximately 5% of the population carries genes for hemoglobin disorders, with a high concentration in Southeast Asia [1]. The disease burden is particularly high in developing countries, including India, where it poses a significant pediatric health challenge. It is estimated that nearly 10,000–12,000 children with β -thalassaemia major are born annually in India and a substantial proportion require lifelong blood transfusions and chelation therapy [2].

Children affected with thalassaemia major often suffer from multiple systemic complications such as growth retardation, skeletal deformities, iron overload, endocrine dysfunction and altered immune response [3]. These systemic manifestations, along with frequent

hospitalizations and complex medical regimens, can adversely influence oral health. Orofacial changes such as maxillary protrusion, spacing of teeth and malocclusion are commonly observed due to bone marrow hyperplasia [4]. In addition, reduced salivary flow, altered salivary composition and neglect of oral hygiene due to chronic illness may predispose these children to dental diseases.

Comparative Assessment of Dental Caries Experience in Thalassaemic and Healthy Children Aged 6–12 Years: A Cross-Sectional Study

Dental caries continues to be one of the most prevalent chronic diseases in childhood. According to the World Health Organization, 60–90% of school-aged children worldwide are affected by dental caries, making it a major public health concern [5]. The DMFT (Decayed, Missing, Filled Teeth) index is a widely accepted epidemiological tool used to assess caries experience in both primary and permanent dentition. In medically compromised children, such as those with thalassaemia, the burden of dental caries may be significantly higher due to multiple risk factors [6,7].

The present study bridges a critical gap between pediatric medicine and dentistry. Identifying increased caries risk early can guide timely preventive strategies and integrated care. Therefore, the present study aims to assess and compare the caries experience in thalassaemic and healthy children, thereby contributing to improved preventive and therapeutic strategies in pediatric dental care.

The study also highlights an often-overlooked dimension of thalassaemia management and to improve the overall quality of life in affected children.

METHODOLOGY:

A cross-sectional study was conducted among 120 children aged 6–12 years visiting Department of Pedodontics and Preventive Dentistry, Ahmedabad Dental College and Hospital over a period of five months (November 2025- March 2026). A detailed medical history was obtained during the examination, which facilitated the purposive allocation of children into their respective groups.

Children with other systemic diseases, those undergoing orthodontic treatment or those who were uncooperative were excluded from the study. Ethical approval was obtained from the Institutional Ethics Committee [IEADC/151/2026] and written informed consent from parents or guardians along with assent from children was secured prior to participation.

A structured proforma was used to record demographic details including age, gender, oral hygiene practices and dietary habits. For children in the thalassaemia group, additional medical information such as duration of disease, blood group type, frequency of blood transfusions and most recent serum ferritin levels were obtained from medical records.

Clinical oral examination was performed under standardized conditions following strict infection control protocols. Oral hygiene status and dental caries status were assessed using the OHI-S index and the DMFT index for permanent teeth and deft index for primary teeth respectively.

The collected data was entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software.

RESULTS:

A total of 120 children participated in the study, divided into two groups: Control and intervention group. The mean age of participants in control group was 9.12 ± 1.8 years, while in intervention group it was 9.05 ± 1.7 years, with no statistically significant difference ($p > 0.05$) indicating homogeneity. Gender distribution between the groups was comparable and did not show statistical significance ($p > 0.05$) (Table 1).

The mean OHI-S scores in control and thalassaemia groups were comparable, indicating similar oral hygiene status in both the groups.

The mean DMFT score in the thalassaemia group was significantly higher (6.12 ± 1.94) compared to the control group (2.98 ± 1.56) and the difference was found to be statistically highly significant ($p < 0.001$) (Table 2).

Among the individual components, the decayed component contributed the most to the overall caries experience in both groups, with significantly higher values observed in thalassaemic children. The missing and filled components were comparatively lower but still showed statistically significant differences between the groups (Table 3).

The association between ABO blood group and dental caries experience was evaluated in both the thalassaemia (intervention) and control groups. Although variations in mean DMFT scores were observed among different blood groups, no statistically significant association was found between blood group and dental caries in either group. Children belonging to blood groups B and O showed slightly higher mean DMFT scores in the thalassaemia group; however, these differences were not significant on statistical analysis. Similarly, in the control group, the distribution of caries experience across different blood groups did not demonstrate any meaningful variation.

A positive correlation was observed between serum ferritin levels and DMFT/ deft scores in thalassaemic children ($r = 0.42$), indicating that increased iron overload may be associated with higher caries experience (Table 4).

DISCUSSION:

The present study demonstrated a significantly higher dental caries experience in children with Thalassaemia compared to healthy controls, along with a positive correlation between serum ferritin levels and caries experience. These findings highlight the combined influence of systemic and local factors on oral health in thalassaemic children.

Comparative Assessment of Dental Caries Experience in Thalassemic and Healthy Children Aged 6–12 Years: A Cross-Sectional Study

The results of the present study are in accordance with the findings of Mahajan et al. (2024) [1], who reported a statistically significant increase in dental caries prevalence and treatment needs among thalassemic children compared to controls. The study emphasized poor oral hygiene and systemic burden as major contributing factors, which aligns with the increased DMFT scores observed in the present study.

Similarly, Gomber et al (2006) [8] observed that dental caries prevalence was significantly higher in thalassemic children compared to healthy controls, reinforcing the association between thalassemia and increased caries susceptibility. This supports the present findings where thalassemic children exhibited nearly double the caries burden.

Al-Wahadni et al. (2002) [9], reported significantly higher DMFT scores in thalassemia patients compared to controls ($p < 0.0001$), indicating a strong association between thalassemia and dental caries. This similarity strengthens the validity of the present study. Abbasi et al. (2023) [10] reported poor oral health status and reduced quality of life in thalassemia major patients, which was closely associated with increased dental disease burden.

Moosazadeh et al (2024) [11] also demonstrated significantly higher caries experience and poor oral hygiene in transfusion-dependent thalassemia patients, further corroborating the present findings. This highlights the role of frequent hospital visits and neglected oral hygiene in increasing caries risk.

The present study also demonstrated a significant positive correlation between serum ferritin levels and DMFT scores in thalassemic children, indicating that iron overload may contribute to increased caries risk.

The possible mechanisms linking increased ferritin levels to dental caries include altered salivary flow and composition, increased oxidative stress, and compromised immune response, all of which can enhance susceptibility to cariogenic bacteria. In contrast, no significant association was observed between serum ferritin levels and dental caries in the control group, indicating that ferritin acts as a contributing factor primarily in medically compromised individuals.

Furthermore, no significant association was observed between ABO blood group and dental caries or serum ferritin levels in either group, suggesting that caries development is predominantly influenced by environmental and systemic factors rather than genetic determinants such as blood group.

Overall, the findings of the present study are in strong agreement with existing literature and emphasize that children with thalassemia constitute a high-risk group for dental caries. This underscores the need for early preventive strategies, regular dental screening, and

integration of oral healthcare into routine medical management.

CONCLUSION:

Children with Thalassemia demonstrate a markedly higher caries burden, with significantly elevated DMFT scores compared to healthy peers, underscoring their heightened vulnerability during the mixed dentition phase. The positive correlation between serum ferritin levels and caries experience highlights iron overload as a potential systemic contributor to oral disease progression. In contrast, blood group showed no meaningful association, reaffirming the multifactorial nature of dental caries. These findings emphasize the urgent need to integrate preventive dental care into routine thalassemia management to safeguard oral and overall health.

Table 1: Comparison of Demographic Variables

Variable	Thalassemia	Control	p-value
Age (Mean ± SD)	9.12 ± 1.8	9.05 ± 1.7	0.78
Gender (M/F)	54 / 46	52 / 48	0.76

$p > 0.05$ is considered not significant

Age distribution was analyzed using the independent t-test. Gender distribution was compared using the Chi-square test.

Table 2: Comparison of OHI-S and DMFT Scores Between Groups

Parameter	Thalassemia Group Mean ± SD	Control Group Mean ± SD	p-value
OHI-S Score	2.48 ± 0.76	2.12 ± 0.58	> 0.05
DMFT Score	6.12 ± 1.94	2.98 ± 1.56	<0.001*

$p > 0.05$ is considered not significant.

$p < 0.001$ is considered highly statistically significant

The scores were expressed as mean ± standard deviation and analyzed using the independent t-test.

Comparative Assessment of Dental Caries Experience in Thalassemic and Healthy Children Aged 6–12 Years: A Cross-Sectional Study

Table 3: Comparison of DMFT Components

Component	Thalassemia (Mean ± SD)	Control (Mean ± SD)	p-value
Decayed (D/d)	4.72 ± 1.65	2.01 ± 1.32	<0.001*
Missing (M/m)	0.68 ± 0.72	0.32 ± 0.48	0.002*
Filled (F/f)	0.72 ± 0.81	0.65 ± 0.69	0.34

$p < 0.001$ is considered highly statistically significant

The values were expressed as mean ± standard deviation and analyzed using the independent t-test.

Table 4: Correlation Between Serum Ferritin and DMFT (Thalassemia Group)

Variable	Correlation Coefficient (r)	p-value
Serum Ferritin vs DMFT	0.42	0.003*

$p < 0.001$ is considered highly statistically significant

Pearson’s correlation test was used to evaluate the relationship between serum ferritin levels and DMFT scores.

References

1. Mahajan A, Pawar M, Tomer G, Girish PV, Salama MT, Dupare AS. Prevalence of dental caries, oral health status, malocclusion status, and dental treatment needs in thalassemic children: A cross-sectional study. *J Family Med Prim Care*. 2024;13(11):5166–5170.
2. Weatherall DJ, Clegg JB. The thalassaemia syndromes. 4th ed. Oxford: Blackwell Science; 2001.
3. Duggal MS, Bedi R, Kinsey SE, Williams SA. Caries risk in patients with thalassaemia major. *Int Dent J*. 2001;51(1):35–38.

4. Rani ST, Reddy ER, Kiranmai M, Mudusu SP, Srikanth S, Jain S. Comparative evaluation of BMI, dental age, salivary alkaline phosphatase levels, and oral health status in children with β -thalassemia major. *Int J Clin Pediatr Dent*. 2019;12(4):303–306.
5. World Health Organization. Oral health surveys: Basic methods. 5th ed. Geneva: WHO; 2013.
6. Al-Shareeda NA, Al-Marashi AA, Al-Abbasi SW, Kadhum SF. Prevalence of dental caries among β -thalassemia children compared with healthy controls. *Nat Volatiles Essent Oils J*. 2021;8(6).
7. Mukherjee S, Das U, Bhattacharjee S, Datta P. Oral hygiene status and dental caries experience in transfusion-dependent thalassemia patients: an analytical cross-sectional study. *Indian J Public Health Res Dev*. 2024;15(3):366–370.
8. Gomber S, Dewan P. Physical growth patterns and dental caries in thalassemia. *Indian Pediatr*. 2006;43(12):1064–1069.
9. Al-Wahadni AM, Quteish Taani D, Al-Omari MO. Dental diseases in subjects with beta-thalassemia major. *Int J Paediatr Dent*. 2002;30(6):418–422.
10. Abbasi F, Tabesh A, Yavari A, Makaremi R, Bizhani O, Mahmood M. Evaluation of oral health-related quality of life and oral health status in thalassemia major patients: a cross-sectional study. *BMC Oral Health*. 2023;23:493.
11. Moosazadeh M, Elyassi Gorji N, Nasiri P, Malekzadeh Shafaroudi A. Comparison of decayed, missing, and filled teeth index between thalassemia major patients and control group: a systematic review and meta-analysis. *BDJ Open*. 2020;6:23.