


Causes of Hospital Admission in β -Thalassemia (CHAT) in Lebanon from 1995 to 2015: a pilot retrospective study from a tertiary care center

Antoine N. Saliba, MD¹; Hassan M. Moukhadder, MD²; Afif Harb, MD³; Hassan Beydoun, MD²; Rayan Bou-Fakhredin, BS², Ali T. Taher, MD, PhD, FRCP^{2*} 

¹Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

²Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon

³Trauma Department, Hannover Medical School, Carl-Neuberg-Strasse 1, Hannover, Germany

*Corresponding author: Ali T. Taher, MD, PhD, FRCP, Department of Internal Medicine, American University of Beirut Medical Center, Cairo Street, PO Box 11-0236, Riad El Solh 1107 2020, Beirut, Lebanon; Tel: 00961-1-350000 Fax: 00961-1-370814; ataher@aub.edu.lb

Text word count: 742

Number of figures: 0

Number of tables: 1

References: 4

Short Running title: Causes of Hospital Admission in β -Thalassemia

Keywords: thalassemia, hospital, admission

Conflicts of interest: The authors report no conflicts of interest relevant to this work.

Funding: None

This is the author's manuscript of the article published in final edited form as:

Saliba, A. N., Moukhadder, H. M., Harb, A., Beydoun, H., Bou-Fakhredin, R. and Taher, A. T. (), Causes of Hospital Admission in β -Thalassemia (CHAT) in Lebanon from 1995 to 2015: A pilot retrospective study from a tertiary care center. Am J Hematol. Accepted Author Manuscript. <http://dx.doi.org/10.1002/ajh.24900>

To the Editor

Causes of hospital admission have been studied in sickle cell disease^{1,2}. However, only two reports (one from Iran and the other from Sardinia), limited to patients with TM, have previously described the causes of hospital admission in thalassemia patients^{3,4}. We aimed at investigating the prevalence of causes of hospital admission in both TM and TI patients during the period from 1995 to 2015 in a tertiary care center in Beirut, Lebanon.

The study was approved by the Institutional Review Board of the American University of Beirut. The patients' electronic medical records were queried using the keyword "thalassemia". Data was evaluated and analyzed using STATA Data Analysis and Statistical Software 13. *p*-values less than 0.05 were considered significant. The Chi-Square test, the Student's *t*-test, and linear regression analysis were used to analyze patient characteristics, compare lengths of stay, and explore associations between different variables and length of stay.

Our cross-sectional study recruited 33 adult TM and TI patients admitted for a duration that exceeded 24 hours to the American University of Beirut Medical Center in Beirut, Lebanon during a 20-year period extending from January 1, 1995 to February 10, 2015. 205 admissions were analyzed. 15 patients (45.5%) had TM and 18 (54.5%) had TI. 125 admissions (61.0%) were in TM patients, while 80 (39.0%) were in patients who had TI. 15 patients (45.5%) were female and 18 (54.5%) were male. 119 admissions (58.0%) were in males (83.2% in TM and 16.8% in TI, $p < 0.001$) and 86 (42.0%) were in females (30.2% in TM and 69.8% in TI, $p < 0.001$). Males and females had a comparable mean length of hospital stay of around 5 days. The mean age of patients was 32.6 +/- 15.6 years (25.6 years in TM and 41.0 years in TI, $p = 0.003$).

Patients with TM were more likely to have a longer hospital stay per admission when compared to patients with TI (6.3 days versus 3.6 days, respectively; $p = 0.034$). Overall, the three most common causes of hospitalization were transfusion therapy (54.6%), infection (12.2%), and chemotherapy (7.3%). In TM, the most common causes of hospital admission were transfusion therapy (66.4%), infection (9.6%), and bone marrow transplantation (7.2%); whereas in TI, these were transfusion therapy (36.3%), chemotherapy (18.8%), and infection (16.3%). **Table 1** compares the characteristics of the TM and TI patients admitted to the hospital and summarizes the most common causes of hospital admission in both TM and TI cohorts.

In a linear regression model of all the hospital admissions, including age, sex, type of thalassemia, splenectomy status, aspirin therapy, iron chelation therapy, serum ferritin, and hemoglobin, a longer hospital stay was only associated with increasing age ($p = 0.001$). Transfusion therapy was the most common cause of hospital admission in both TM and TI patients. Second to transfusion therapy, infections were the most common cause of hospital admission among TM patients. Although splenectomy was the most common reason for hospital admission in the Iranian study ³, it was the fourth most common cause of hospitalization in TM patients in our cohort. Splenectomy was not found to be associated with a longer length of hospital stay in our cohort of patients. Chemotherapy was the second most common reason for hospitalization in TI patients. This is particularly evident in patients with TI as well reflected by our dataset whereby all admissions for malignancy-related chemotherapy were exclusively in TI patients.

This study is the first to examine the causes of hospital admission among patients with β -thalassemia in Lebanon. It is the first in the literature to investigate such causes in patients belonging to the TI subset. Infections are a major cause of hospitalization in both TM and TI.

This calls for antibiotic and vaccination prophylaxis in this patient population as a preventive measure. This study sheds the light on the need for prospective studies studying hospital admissions in patients with thalassemia as this study was limited to a retrospective chart review. Given the disparities in healthcare among different socioeconomic, demographic, and geographic populations, our study is likely to have suboptimally captured all characteristics of patients with thalassemia admitted to different hospitals across the country. This study is an important first step for a more geographically comprehensive approach to study the causes for hospital admission in thalassemia and guide preventive strategies. It will be equally important to study trends in hospital admissions with the establishment of outpatient transfusion centers and comprehensive care centers.

References

1. Aljuburi G, Laverty AA, Green SA, et al. Trends in hospital admissions for sickle cell disease in England, 2001/02-2009/10. *J Public Health (Oxf)*. 2012;34(4):570-576.
2. Teoh Y, Greenway A, Savoia H, Monagle P, Roy J, Barnes C. Hospitalisations for sickle-cell disease in an Australian paediatric population. *J Paediatr Child Health*. 2013;49(1):68-71.
3. Karimi M, Emadmarvasti V, Hoseini J, Shoja L. Major causes of hospital admission in Beta thalassemia major patients in southern iran. *Iranian journal of pediatrics*. 2011;21(4):509-513.
4. Origa R, Anni F, Mereu L, et al. Causes of hospital admission in children and adults with transfusion-dependent thalassemia in Sardinia, 2000-2015. *Ann Hematol*. 2017;96(6):1041-1042.

Table 1. Baseline characteristics of the studied cohort, and summary of the most common causes of hospital admission in both TM and TI cohorts. *BMT: bone marrow transplant, IV: intravenous.*

Baseline Characteristics	Thalassemia major	Thalassemia intermedia
Age (years, mean +/- SD)*	25.6 ± 11.0	41.0 ± 16.5
Sex (female, %)	44	46.7
Average length of stay (days, mean +/- SD)*	6.3 ± 4.3	3.6 ± 2.7
Splenectomy status (%)	83.3	60
Aspirin therapy (%)	28.6	22.2
Iron chelation therapy (%)*	66.7	26.7
Serum ferritin (ng/mL, mean +/- SD)	2463 ± 1891	2212 ± 1590
Hemoglobin (g/dL, mean +/- SD)*	10.6 ± 1.9	8.7 ± 2.0
Hospital visits (mean)	6.9	5.3
Chronic kidney disease (%)	5.6	20
Chronic heart failure (%)	11.1	26.7
Thrombosis (%)	16.7	20
Reason for admission		
	Thalassemia major	Thalassemia intermedia
Transfusion	83	29
Infection	12	13
Chemotherapy	0	15
BMT-related	9	0
Other	3	9
Osteoporosis for IV bisphosphonate	3	6
Splenectomy	5	2
Heart failure/angina	6	0
Liver disease	2	2
Bone fracture	0	2
Kidney transplant	0	1
Thrombosis	2	1
Total	125	80

*: statistically significant with a t-test *p*-value < 0.05