Impact of non-transfusion-dependent thalassemia on adult patients' health-related quality of life and work productivity: a multi-region real-world survey

PF1192

Khaled M. Musallam[1*], Maria Domenica Cappellini[2], Janet L. Kwiatkowski[3], Christina Chamberlain[4], Amey Rane[4], Keely Gilroy[4], Susan Morris[4], Emma Chatterton[5], Brianne Kerr[5], Katie Lewis[5], Ali T. Taher[6]

[1]Center for Research on Rare Blood Disorders (CR-RBD) and Thalassemia & Sickle Cell Center, Burjeel Medical City, Abu Dhabi, United Arab Emirates; Department of Public Health & Epidemiology, Khalifa University, Abu Dhabi, United Arab Emirates; Division of Hematology/Oncology, Department of Pediatrics, Weill Cornell Medicine, New York, NY, USA; [2]Unit of Medicine and Metabolic Disease, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy; [3]Children's Hospital of Philadelphia and University of Pennsylvania Perelman School of Medicine, Philadelphia, PA, USA; [4]Agios Pharmaceuticals Inc., MA, USA; [5]Adelphi Real World, Bollington, UK; [6]Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon
*Presenting author

BACKGROUND

- Thalassemia is associated with ineffective erythropoiesis and hemolysis, leading to chronic anemia and complications that can impact life expectancy, health-related quality of life (HRQoL), and work productivity[1–3]
- Research on the patient-reported impacts of non-transfusion-dependent thalassemia (NTDT), including α- and β-thalassemia, is limited

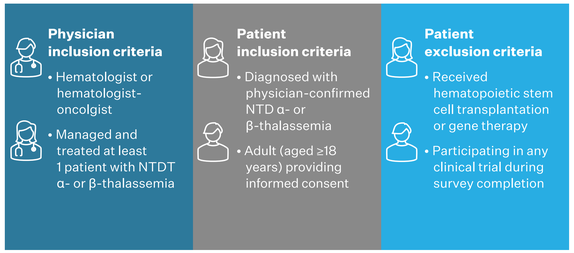
AIM

The aim of this study was to investigate HRQoL and work productivity of adult patients with NTDT across multiple regions

METHODS

- Data were drawn from the Adelphi Real World Thalassemia Disease Specific Programme™[4–7], a cross-sectional, retrospective survey of physicians (hematologists/hematologist-oncologists) and their adult patients with a physician-confirmed diagnosis of NTDT (α- or β-thalassemia), conducted from February to November 2024 (**Figure 1**)
- Physicians reported patient demographics and clinical characteristics in a patient record form (PRF) for up to 15 consecutive patient consultations
- Each patient for whom the physician completed a PRF was invited to complete a voluntary patient self-completion form (PSC)

Figure 1: Study physician and patient inclusion & exclusion criteria



NTD, non-transfusion-dependent; NTDT, non-transfusion-dependent thalassemia.

- The PSC captured patient-reported demographics, clinical characteristics, symptoms, and thalassemia outcomes through individual questions and the established patient-reported outcome measures (PROMs) detailed in **Table 1**

Table 1: PROMs included in this study

Functional Assessment of Chronic Illness Therapy (FACIT)-Fatigue scale, version 4[8]	13-item measure to assess fatigue and its impact upon daily activities and function over a 7-day recall period; score range of 0–52; higher scores indicate lower fatigue
Patient-Reported Outcomes Measurement Information System (PROMIS) Physical Function, version 2 Short Form 8b[9]	8-item measure that assesses patients' ability to carry out physical tasks and daily activities; calculates a T-score with a range of 0–100; higher scores indicate less physical function impairment
Work Productivity and Activity Impairment (WPAI)-Thalassemia[10]	6-item instrument to measure impairments in both paid work and daily activities due to a problem, i.e. thalassemia, over a 7-day recall period; expressed as 4 percentage scores indicating difficulties with absenteeism, presenteeism, and work productivity and activity impairment (absenteeism, presenteeism, and overall work impairment scores are only reported for employed participants); score range of 0–100; higher scores indicate greater impairment and less productivity

FACIT, Functional Assessment of Chronic Illness Therapy; PROM, patient-reported outcome measure; PROMIS, Patient-Reported Outcomes Measurement Information System; WPAI, Work Productivity and Activity Impairment.

- Descriptive analysis was conducted on data for the group of patients who completed a PSC
- Data were reported from the following regions: Asia (Malaysia, Thailand), EU and NA (France, Germany, Greece, Italy, Spain, US), MENA (Egypt, Saudi Arabia, Turkey, UAE), and South America (Brazil)
- Data were analyzed by:
  - Thalassemia genotype (α- and β-thalassemia)
  - Geographic region (Asia, EU and NA, MENA, South America)
  - Age (<35 years, ≥35 years)
  - Gender (male, female)
  - Average hemoglobin (Hb) level in the 12 months prior to survey (≤10 g/dL, >10 g/dL)

RESULTS

Patient characteristics

- Overall, 164 patients with NTDT (α-thalassemia, n=81; β-thalassemia, n=83) completed a PSC and had corresponding PRF data completed by 51 physicians
- Patient-reported characteristics are shown in **Table 2**
  - When asked about symptoms ever experienced, 51.9% and 38.0% of patients (n=158) reported fatigue and weakness, respectively
  - At survey completion, 33.5% (n=155) and 26.1% (n=153) reported that fatigue and shortness of breath, respectively, interfered with their ability to carry out daily activities; 61.4% (n=153) reported that they are worried about the risk of long-term complications

Table 2: Patient characteristics at the time of survey completion

	Overall NTDT (N=164)	α-NTDT (N=81)	β-NTDT (N=83)
Age (years), mean (SD)	36.0 (12.4)	36.0 (13.8)	36 (10.9)
Gender, female, n (%)	82 (50.0)	41 (50.6)	41 (49.4)
Current employment status[a], n (%)			
Working full time	78 (47.6)	45 (55.6)	33 (39.8)
Working part time	26 (15.9)	5 (6.2)	21 (25.3)
Homemaker	25 (15.2)	14 (17.3)	11 (13.3)
Student	19 (11.6)	12 (14.8)	7 (8.4)
Other[b]	17 (10.4)	6 (7.4)	11 (13.2)
Signs and symptoms ever experienced due to thalassemia (3 most frequently reported)[a], n (%)	*n=158*	*n=78*	*n=80*
Fatigue/feeling tired	82 (51.9)	46 (59.0)	36 (45.0)
Pale skin	72 (45.6)	40 (51.3)	32 (40.0)
Weakness (asthenia)	60 (38.0)	30 (38.5)	30 (37.5)
Expressed concerns over long-term complications, n (%)	*n=153* 94 (61.4)	*n=77* 41 (53.3)	*n=76* 53 (69.8)
Fatigue interferes with ability to carry out daily activities, n (%)	*n=155* 52 (33.5)	*n=78* 24 (30.7)	*n=77* 28 (36.5)
Shortness of breath interferes with ability to carry out daily activities, n (%)	*n=153* 40 (26.1)	*n=78* 18 (23.0)	*n=75* 22 (29.4)
Average Hb levels (past 12 months) (g/dL)[c], mean (SD)	*n=147* 9.4 (1.3)	*n=73* 9.4 (1.2)	*n=74* 9.4 (1.3)

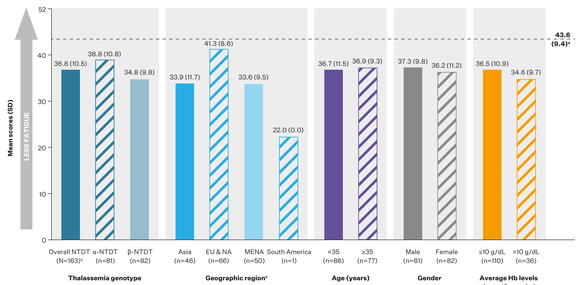
[a]Multiple answers accepted. [b]Retired; on long-term sick leave; on disability benefit; unemployed. [c]Data obtained from patient record form as reported by the physician. Hb, hemoglobin; NTDT, non-transfusion-dependent thalassemia; SD, standard deviation.

Patient-Reported Outcomes: FACIT-Fatigue

- Mean FACIT-Fatigue scores were lower for patients with NTDT (α- or β-thalassemia) and across geographic regions, age, gender, and average Hb levels, relative to published US population norms[8,a], indicating a higher level of fatigue (**Figure 2**)

[a]Published US population norms were used because there are no current multi-regional FACIT-Fatigue population norms available[8].

Figure 2: FACIT-Fatigue scores by subgroup



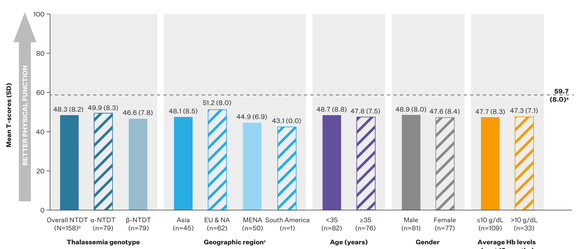
*Dotted line indicates published US general population mean (SD) FACIT-Fatigue score, 43.6 (9.4)[8]. [a]Base change due to a patient not fully completing the patient-reported outcome tool. [b]Geographic region – Asia: Malaysia, Thailand; EU and NA: France, Germany, Greece, Italy, Spain, US; MENA: Egypt, Saudi Arabia, Turkey, United Arab Emirates; South America: Brazil. EU, Europe; FACIT, Functional Assessment of Chronic Illness Therapy; Hb, hemoglobin; MENA, Middle East and North Africa; NA, North America; NTDT, non-transfusion-dependent thalassemia; SD, standard deviation; US, United States.

Patient-reported outcomes: PROMIS Physical Function

- Mean PROMIS Physical Function T-scores were lower for patients with NTDT (α- or β-thalassemia), and across geographic regions, age, gender, and average Hb levels, relative to published US population norms[11,a,b], indicating difficulties with physical mobility (e.g. climbing stairs, walking for 15 minutes, 2 hours of physical labor) and daily life activities (e.g. chores, housework, grocery shopping) (**Figure 3**)

[a,b]Published US population norms used because there are no current multi-regional PROMIS Physical Function population norms available[11].

Figure 3: PROMIS Physical Function T-scores by subgroup



*Dotted line indicates published US general population mean (SD) PROMIS Physical Function T-score, 59.7 (8.0)[11]. [a]Base change due to 6 patients not fully completing the patient-reported outcome tool. [b]Geographic region – Asia: Malaysia, Thailand; EU and NA: France, Germany, Greece, Italy, Spain, US; MENA: Egypt, Saudi Arabia, Turkey, United Arab Emirates; South America: Brazil. EU, Europe; Hb, hemoglobin; MENA, Middle East and North Africa; NA, North America; NTDT, non-transfusion-dependent thalassemia; PROMIS, Patient-Reported Outcomes Measurement Information System; SD, standard deviation; US, United States.

Table 3: WPAI-Thalassemia—absenteeism, presenteeism, and activity impairment by subgroup

	Thalassemia genotype			Geographic region[b]				Age (years)		Gender		Average Hb levels (past 12 months)	
	Overall NTDT	α-NTDT	β-NTDT	Asia	EU & NA	MENA	South America	<35	≥35	Male	Female	≤10 g/dL	>10 g/dL
Percent absenteeism[a], mean (SD)	*n*=88 10.0 (16.6)	*n*=40 9.8 (17.7)	*n*=48 10.1 (15.8)	*n*=26 12.9 (9.6)	*n*=28 4.5 (18.9)	*n*=34 12.3 (18.2)	–	*n*=42 9.6 (16.2)	*n*=46 10.3 (17.1)	*n*=54 11.8 (19.8)	*n*=34 7.1 (9.2)	*n*=55 10.7 (15.9)	*n*=22 11.7 (21.1)
Percent presenteeism[a], mean (SD)	*n*=95 30.6 (25.9)	*n*=45 29.6 (26.6)	*n*=50 31.6 (25.5)	*n*=32 32.2 (27.8)	*n*=29 20.7 (22.2)	*n*=34 37.6 (25.1)	–	*n*=46 31.1 (26.4)	*n*=49 30.2 (25.7)	*n*=55 33.1 (26.5)	*n*=40 27.2 (25.1)	*n*=64 30.0 (25.1)	*n*=20 42.5 (29.4)
Percent activity impairment, mean (SD)	*n*=155 30.0 (25.0)	*n*=77 26.4 (26.6)	*n*=78 33.6 (22.9)	*n*=44 32.7 (26.6)	*n*=65 20.8 (20.7)	*n*=45 40.9 (24.7)	*n*=1 20.0 (0.0)	*n*=80 29.5 (25.6)	*n*=75 30.5 (24.5)	*n*=79 32.4 (26.1)	*n*=76 27.5 (23.7)	*n*=106 30.3 (24.8)	*n*=32 35.6 (27.0)

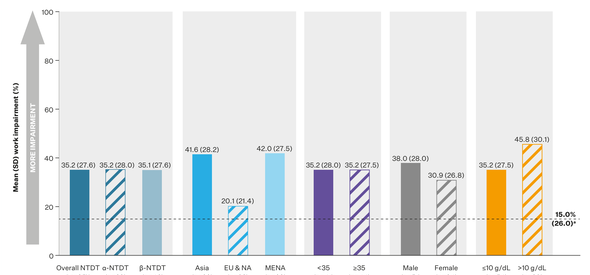
Published US general population WPAI mean (± SD): absenteeism 3.49% (± 13.88%), presenteeism 12.91% (± 21.98%), and activity impairment 22.08% (± 28.33%)[10]. Absenteeism: work time missed; presenteeism: impairment while working. [a]Base change due to patients either not in employment or not fully completing the patient-reported outcome tool. [b]Geographic region – Asia: Malaysia, Thailand; EU and NA: France, Germany, Greece, Italy, Spain, US; MENA: Egypt, Saudi Arabia, Turkey, United Arab Emirates; South America: Brazil. EU, Europe; Hb, hemoglobin; MENA, Middle East and North Africa; NA, North America; NTDT, non-transfusion-dependent thalassemia; SD, standard deviation; US, United States; WPAI, Work Productivity and Activity Impairment.

Patient-reported outcomes: WPAI-Thalassemia

- Mean percent absenteeism (work time missed), presenteeism (impairment while working), overall work impairment, and activity impairment were worse for patients with NTDT (α- or β-thalassemia) and across geographic regions (except EU and NA, and South America for overall activity impairment domain), age, gender, and average Hb levels, relative to published US population norms[10,a,c], indicating greater impairment in work productivity and daily activities (**Figure 4** and **Table 3**)

[a,c]Published US population norms were used because there are no current multi-regional WPAI overall work impairment population norms available.

Figure 4: WPAI-Thalassemia—overall work impairment by subgroup



*Dotted line indicates published US general population WPAI mean (± SD) overall work impairment, 15.01% (± 25.96%)[10]. [a]Base change due to 79 patients either not in employment or not fully completing the patient-reported outcome tool. [b]Geographic region – Asia: Malaysia, Thailand; EU and NA: France, Germany, Greece, Italy, Spain, US; MENA: Egypt, Saudi Arabia, Turkey, United Arab Emirates. [d]Data from 1 patient in South America (Brazil) was included in the survey question; however, data were not reported for WPAI absenteeism, presenteeism, or overall work impairment because this patient was not employed at the time of survey. EU, Europe; Hb, hemoglobin; MENA, Middle East and North Africa; NA, North America; NTDT, non-transfusion-dependent thalassemia; SD, standard deviation; US, United States; WPAI, Work Productivity and Activity Impairment.

CONCLUSIONS

- **Patients with NTDT (α- or β-thalassemia) experienced fatigue, impaired physical function, and impairment in work productivity and daily activities**
  - **Relative to the published US general population norms across geographic regions, age, gender, and average Hb levels, patients with NTDT experienced worse fatigue and greater impairment in physical function, work productivity, and daily activities**
- **These data highlight an unmet need to reduce the humanistic burden of NTDT**

LIMITATIONS

- Participating patients may not reflect the general thalassemia population, because the Disease Specific Programme only includes patients who are consulting with their physician
- Recall bias, a common limitation of surveys, might also have affected physician and patient responses
  - Physicians had the ability to refer to patients' records while completing the PRF
  - Patient-reported FACIT-Fatigue and WPAI-Thalassemia scores were captured over the previous 7 days, minimizing the possibility of recall bias
- Despite the high numbers of overall study participants, some subgroups only had small sample sizes
- We have used published US population norms as a reference, because there are no current multi-regional population norms available for FACIT-Fatigue, PROMIS Physical Function, or WPAI
  - Future studies examining the population norms across geographic regions would aid in the interpretation of PROM results

Acknowledgments: We would like to thank the physicians and patients who took part in this study and provided the information included
The authors acknowledge Louise Lombard from Agios Pharmaceuticals, Inc. for her contributions to the design of the study materials, and the Adelphi Communications Limited team for their editorial assistance
Data collection was undertaken by Adelphi Real World (Bollington, UK) as part of an independent survey, entitled the Adelphi Thalassemia Disease Specific Programme™
All data are the intellectual property of Adelphi Real World. Agios Pharmaceuticals, Inc. subscribed to this survey and did not influence the original survey through either contribution to the design of questionnaires or data collection

References: 1. Kattamis A, et al. Lancet 2022;399(10343):2310–24. 2. Tuo Y, et al. eClinicalMedicine 2024;72(102619). 3. Taher AT, et al. N Engl J Med 2021;384(6): 727–43. 4. Anderson P, et al. Curr Med Res Opin 2008;24(11):3063–72. 5. Anderson P, et al. Curr Med Res Opin 2023;39(12):1707–15. 6. Babineaux SM, et al. BMJ Open 2016;6;(8). 7. Higgins V, et al. Diabetes Metab Syndr Obes 2016;9:371–80. 8. Cella D, et al. Cancer 2002;94(2):528–38. 9. PROMIS Short Form v2.0 – Physical Function 8b. Health Measures. Accessed March 13, 2025. https://www.healthmeasures.net/index.php?option=com_instruments&view=measure&id=795&Itemid=992. 10. Witt EA, et al. Value Health 2015;18(3):A176. 11. Fransvic S, et al. JBJS Open Access 2019;4(4).

Disclosures: Medical writing assistance was provided by Amy Hall, MSc, of Adelphi Group, Macclesfield, UK, funded by Agios Pharmaceuticals, Inc.
KMM has received consultancy fees from Agios Pharmaceuticals, Inc., Celgene Corp (Bristol Myers Squibb), CRISPR Therapeutics, Novartis, Novo Nordisk, Pharmacosmos, and Vifor Pharma and research funding from Agios Pharmaceuticals, Inc. and Pharmacosmos. **MDC** has received advisory board fees from Celgene Corp (Bristol Myers Squibb), CRISPR Therapeutics, Novartis, Novo Nordisk, Sanofi Genzyme, Vertex, and Vifor Pharma. **JLK** has received consultancy fees from Agios Pharmaceuticals, Inc., BioMarin, Celgene Corp (Bristol Myers Squibb), Chiesi, and Silence Therapeutics; research funding from Apopharma, Bioerativ, CRISPR Therapeutics, Sangamo Therapeutics, and Vertex Pharmaceuticals Inc.; and consultancy fees and research funding from bluebird bio, Forma, and Imara. **CC, AR, KG,** and **SM** are employees and shareholders of Agios Pharmaceuticals, Inc. **EC, BK,** and **KL** are employees of Adelphi Real World. **ATT** has received research funding and consulting fees from Agios Pharmaceuticals, Inc., Celgene Corp (Bristol Myers Squibb), Novo Nordisk, Pharmacosmos, and Roche.

Supplemental materials are available via the QR code

Presented at the European Hematology Association, June 12–15, 2025, Milan, Italy