

Symptoms and Impacts of Transfusion-Dependent β-Thalassemia: A Qualitative Interview Study and the Development of a Conceptual Model

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INTRODUCTION

- Transfusion-dependent β -thalassemia (TDT) is a hereditary blood disorder requiring a lifelong regimen of frequent red blood cell transfusions (RBCTs) for survival,¹ leading to iron overload^{2,3} and requiring chelation therapy
- Iron overload can result in progressive organ damage and life-threatening organ dysfunction.^{3,4} Numerous secondary problems that arise from RBCTs can severely impair the health-related quality of life (HRQoL) and functional status of patients with TDT, and RBCTs are the major cause of morbidity and mortality in this patient population^{2,3}
- The requirement for lifelong RBCTs, iron monitoring, and chelation therapy inevitably impacts the HRQoL of patients with TDT and presents a significant cost impact to healthcare systems.⁶⁷ Additionally, individuals with TDT can experience worsening of TDT symptoms (e.g., fatigue) and reduced functional ability (e.g., physical and cognitive), which can further impact their HRQoL⁷
- However, the impact of TDT and its associated treatments on an individual's HRQoL have not been well studied, and as a result, a holistic understanding of the humanistic burden among individuals with TDT (e.g., symptoms, HROoL impacts, and work impacts) has yet to be established

OBJECTIVE

• To characterize the humanistic burden among individuals living with TDT by exploring the disease and treatment burder

METHODS

Targeted Literature Review (TLR)

- A TLR was conducted to better understand the humanistic burden of TDT (e.g., symptoms, HRQoI impacts, and work/school impacts)
- Findings from the TLR informed the semi-structured interview guide for the healthcare practitioner (HCP) and TDT patient interviews

HCP Interviews

- Semi-structured interviews were conducted with HCPs (N = 6) who had experience treating patients with TDT in the United States and United Kingdom
- Findings from the HCP interviews were used to inform the semi-structured interview guide for the TDT patient interviews

TDT Patient Interviews

- Concept elicitation interviews were conducted with 30 individuals aged ≥18 years from the United Kingdom, the United States, and France who self-reported a TDT diagnosis and received ≥8 RBCTs per year in each of the past 2 years prior to enrollment. Participants were recruited via patient panels and patient advocacy groups
- · Interviews followed a semi-structured interview guide, which included questions on the symptoms and impacts of TDT, and its treatments, on HRQoL
- · Interviews were conducted via Zoom, lasted approximately 1 hour, and were recorded and transcribed
- All participants provided their informed consent and completed a background questionnaire prior to the interviews

Thematic Analysis

- Interview transcripts were analyzed using thematic analysis to describe the relevant reported symptoms as well as the impacts of TDT, and its treatments, on HRQoL
- Each transcript was systematically coded based on the initial coding framework, which was developed iteratively throughout the analysis

RESULTS

Demographics

- A total of 30 adults with TDT met the eligibility criteria and participated in the study
- Participants were from the United Kingdom (n = 12), the United States (n = 14), and France (n = 4) (Table 1)

Demographics (Continued)

- Most participants were female (73.3%), were South Asian (40.1%), and had a bachelor's degree or higher (Table 1)
- Approximately 13.3% of the participants were unemployed or unable to work due to TDT, and only 50.0% were working full-time (≥32 hours/week) (Table 1)

Table 1. Demographics

	Participants With TDT (N = 30)
Age (years), mean (SD)	28 (5.1)
S ex, n (%) Female Male	22 (73.3) 8 (26.7)
Country, n (%) United States United Kingdom France	14 (46.7) 12 (40.0) 4 (13.3)
Race, n (%) Asian or Pacific Islander Other Indian Pakistani White or Caucasian Bangladeshi	8 (26.7) 8 (26.7) 5 (16.7) 5 (16.7) 5 (16.7) 2 (6.7)
Employment status, n (%) Employed full-time In education/training Employed part-time Unemployed Full-time homemaker/caregiver Sick leave	15 (50.0) 5 (16.7) 4 (13.3) 4 (13.3) 1 (3.3) 1 (3.3)
Education, n (%) Bachelor's degree or above No degree	27 (90.0) 3 (10.0)

D, standard deviation; TDT, transfusion-dependent

Clinical Characteristics

- Participants reported receiving a mean of 18 RBCTs (standard deviation: 8.2) in the past 12 months
- The key reported symptoms (>50% frequency) present in the past 3 months were tiredness/ fatigue (100%), weakness (90.0%), pain/discomfort (86.7%), shortness of breath (73.3%), and tachycardia (50.0%)

Concept Saturation and Participant Quotes

- · All symptom and functional impact concepts were spontaneously reported during the first 4 interviews (Table 2); select participant quotes are summarized in Figure 1
- All HRQoL impact concepts were spontaneously reported during the first 2 interviews (Table 3); select participant quotes are summarized in Figure 2

Table 2. Concept Saturation: Symptoms and Functional Impact

														Pa	rtic	ipaı	nts													
	UK101	UK102	US 202	US 204	US 201	UK110	US 205	UK 111	UK106	UK116	US 207	UK118	UK107	FR320	FR319	US210	UK120	US 228	US248	US250	US252	FR333	FR332	US 245	US 233	UK128	UK129	UK130	US 253	US254
Fatigue	S	S		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Pain	Ρ	S	S	Ρ	S	S	Ρ	S	S	S	Ρ	Ρ	S	S	S	S	S	S	Ρ	Ρ	S	S				Ρ	S	S	S	S
Shortness of breath	S	S	S	S		S	S	S		S		S		S	S	S			S			S	S	S					S	
Headaches		S	S	S	S					S	S			Ρ	S	S		S	S	S		S	S			S	S	S		
Heart palpitations		Ρ	S	S		Ρ	Ρ	Ρ				S			S	S				S		S	S				S			
Dizziness				S		S	S							Ρ		S			S			S				S				
Weakness	S							S			S	S		S	S			S				S	Ρ							
Sleep	S		S		S	S	S				S		S	S	Ρ	S	S				S	S	S			S		S		S
Concentration difficulties	S			S		S	S	Ρ		Ρ		S			S							S		S		S	S	S		
Reduced appetite	S				S	S								S	Ρ									S						
Mobility	S	S		S		Ρ	Ρ	S		S		Ρ		S	S	Ρ	Ρ	S	Ρ	Ρ	Ρ	S	Ρ	S	Ρ	Ρ	S	Ρ	S	S
FR, France; P, probed; S, spontaneously rep	orted	; UK,	Unite	d Kin	adom	; US,	Unite	d Stat	es.																					

Figure 1. Participant Quotes: Symptoms and Functional Impact

Fatigue

"The biggest problem is really this tiredness that you can't really do anything about. That's it. Some people will tell me: 'you have to sleep,' 'sleep more, 'rest more.' but it's not... it's really a fatiaue. Participant 319, France

Dizziness

"[The dizziness] causes sickness and vomiting and things like that. It often happens, like my dizziness is very often because I can't sort of like turn around without feeling dizzy." Participant 128, United Kingdom

Pain "It's just a really intense throbbing pain, usually in my spine but sometimes in my jaw bones and my, my leas every so often. It's intense and it's throbbing Participant 253, United State

Table 3. Concept Saturation: HRQoL Impacts

														Ра	rtic	ipaı	nts													
	UK 101	UK 102	US202	US204	US201	UK110	US 205	UK111	UK 106	UK116	US 207	UK 118	UK 107	FR320	FR319	US210	UK 120	US228	US 248	US250	US252	FR333	FR332	US 245	US233	UK 128	UK 129	UK 130	US 253	US254
Time and planning	Ρ	S	S	S	S	Р	S	S	S	S	S	S	S	S	S	S		S		S	S	S		S	S	S		S	S	S
Self-care		S		Ρ		S	Ρ	S		Ρ	Ρ	Ρ		S	Ρ	S		Ρ		Ρ		S				S		S		Ρ
Emotional wellbeing																														
Overall mental health	S	S	S	S	Ρ	S	S	S	Ρ	S	S	S	S	S	S	S	S	S	S	Ρ		S	S	S	Ρ	S	S	S	Ρ	S
Anxiety and depression		S	S	S	S	Р	S	S		S	S		S	S	S	S	S	Ρ	S	Ρ		Р	Ρ	Ρ	Ρ	S	Ρ	S		S
Daily activities																														
Household	S	S		S	S	Р	S	S		Ρ		S		S	Ρ	S	Ρ	Ρ		Ρ	S	S		S	Ρ		Ρ	S		
Leisure	S	s	S		S	S	S	Ρ		Ρ	Р	S	S	S	S		S	S	Р	Р	Р	Р		S	S		S	S	S	S
Social	s	s	S	S	S	S	S	Ρ	S	S	S		S	S	S	S	S	S	S	S	S	S			S		S	S	S	S
Work/school	S	S	S	S	S	S	Р	Р	S	S	S	S	S	Р	Р	S	S	S	S	Р	S	S	S	S	S		S	S	S	S
Relationships	S	S	S		S		S	S		S	S		S	S	S	Р	S		S	Р	S	S	Р	S	S	S	Р	S	S	S

Figure 2. Participant Quotes: HRQoL Impacts

Impact on Time Burden and Ability to Plan "It's Imv TDTI constantly on my mind because you have to organise your life around it. you know? Like I get transfusions every three weeks so netimes I have to skip certain plans. Participant 204, United States

Impact on Daily Activities

"At the time [when my RBCT is due], I ask my mum, 'Can you wash my hair for me? Can you like wash my back and stuff.' And then sometimes I can't fasten like zips on my clothes at the back or my bra strap, so my mum or sister have to do it." Participant 116. United Kingdom

Impact on Work

"Some days, I have to take a leave from work, miss my school, just to go to the treatment centre get IV [my RBCT] done." Participant 228, United States

Shortness of Breat

"Even small tasks like if I get up ... go to the corner store or something like that. I can feel very like out of breath, um, just by doing that like small thing." Participant 248, United States

Headaches

"I also have intense headaches, in fact, it's a migraine, and there, I can't do anything. Participant 332, France

Concentration Difficulties

"Even if it's just like cooking I think I would definitely need assistance because I can't really concentrate. Like my memory is really bad as well near the end of the month [when my RBCT is due], like I won't even remember how much salt I put in, if I even put in salt...' Participant 110. United Kingdom

Impact on Leisure Activities

"Near the start of the month I could ao [to the] gym and biking with my friends. But near the end of the month [when my RBCT is due] I don't think I could do much activity. Participant 110. United Kingdom

Impact on Emotional Wellbeing

"And this vicious circle of 'we're fine, we're not fine. We are fine, we are not fine it is very... tiring. So I'm going to close in on myself. I'm aoina to be much more sensitive I'm going to cry a lot more easily... Participant 319, France

Impact on Relationships

"A few of my friends are always angry with me because whenever they plan, I always have an excuse to say sorry not feeling well." Participant 102, United Kingdom

Conceptual Model

• A conceptual model of the participants' TDT experience was developed using the themes identified in the TLR and qualitative interviews (Figure 3)

Figure 3. A Conceptual Model on the Patient Experience of TDT



LIMITATIONS

• Study participants were self-selected and needed access to the Internet and email, which may impact the generalizability of these results

CONCLUSIONS

- Individuals with TDT reported a wide range of symptoms and functional issues that, together with treatments for TDT (e.g., RBCTs and iron chelation therapy), significantly impact all aspects of life, including work, leisure and social activities, relationships, and emotional wellbeing
- The severity of these symptoms and functional issues, and their impact, was reported to fluctuate according to where the participants were in their RBCT cycle
- · This qualitative study of individuals living with TDT demonstrates the substantial humanistic burden and indirect impacts of the disease

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AUTHOR DISCLOSURES

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