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Psychological Impact and Quality of Life in Patients with Transfusion-Dependent Thalassemia and Their Families: A Systematic Review

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Abstract

Background: Transfusion-dependent thalassemia is a chronic blood disorder that can affect psychological well-being and quality of life among patients and their families.**Purpose:** This systematic review examined the psychological challenges and quality-of-life concerns experienced by patients with transfusion-dependent thalassemia and their families.

Methods: A systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework. Scopus, ProQuest, ScienceDirect, and Taylor & Francis were searched for relevant studies published from 2022 through December 2024. Eligible studies used standardized, validated instruments to assess psychological health or quality of life in patients with transfusion-dependent thalassemia and their families and employed a cross-sectional design.

Results: Eleven studies met the inclusion criteria. Patients experienced psychological difficulties, including anxiety, depression, panic symptoms, social phobia, and problems with self-concept. Children also exhibited behavioral difficulties, attention-related problems, and challenges in peer relationships. Quality-of-life concerns included impaired school functioning, emotional well-being, social participation, physical health, pain, fatigue, and work limitations. Families and caregivers experienced emotional distress, financial strain, and challenges associated with regular blood transfusions. Caregivers also reported feelings of discouragement and powerlessness, underscoring the demands of long-term care.

Conclusions: Transfusion-dependent thalassemia is associated with psychological challenges and reduced quality of life among patients and their families. Comprehensive, family-centered support may help address these multidimensional needs. Further research should evaluate interventions that support psychological well-being and quality of life in both patients and caregivers.

Keywords: Thalassemia; Quality of Life; Mental Health; Caregivers; Family

Introduction

Thalassemia is an inherited blood disorder caused by absent or reduced synthesis of one or more globin chains in hemoglobin (Shafie et al., 2020). Severe forms can require lifelong transfusion support and may lead to substantial clinical, social, psychological, and financial consequences. These consequences can extend beyond physical health, affecting relationships, daily activities, social participation, and interactions with the surrounding environment (Cousens et al., 2010; Mazzone et al., 2009; Thavorncharoensap et al., 2010). Thalassemia remains an important public health concern in regions where hemoglobin disorders are

prevalent. Earlier reports have described a substantial global carrier population and geographic variation, including reported prevalence in Mediterranean countries and parts of mainland China (Lai et al., 2017; Maheen et al., 2015; Thavorncharoensap et al., 2010)

Transfusion-dependent thalassemia (TDT), particularly beta-thalassemia major, can affect psychological well-being and quality of life across the life span. Recurrent hospital visits for transfusions may disrupt schooling, peer interaction, family routines, and participation in ordinary activities (Thavorncharoensap et al., 2010). Children with thalassemia have been reported to experience more behavioral, emotional, and psychological difficulties than their peers (Behdani et al., 2015; Molla et al., 2022; Raman et al., 2019; Shaligram et al., 2007). Emotional and social difficulties may be compounded by chronic pain, reduced physical functioning, and complications affecting vital organs. Adults may also report poorer quality of life than children, particularly in relation to physical capacity and disease-related limitations (Klaassen et al., 2014). Health-related quality of life encompasses physical, psychological, and social functioning as affected by illness and treatment (Sprangers, 2002).

Psychological concerns reported among people with thalassemia include anxiety, depression, difficulties with self-concept, and other emotional or behavioral symptoms. Such concerns may be overlooked unless they are assessed systematically, particularly when clinical care focuses primarily on transfusion schedules, iron chelation, and management of complications (Arumsari et al., 2024). Psychological follow-up has been recommended for children with chronic hematologic conditions, including TDT and sickle cell disease, to identify and address mental health needs (Graves et al., 2016). Research has also identified differences in quality of life and behavior between children with thalassemia major and healthy peers (Behdani et al., 2015). These findings support evaluating psychosocial outcomes alongside clinical indicators.

The demands of long-term treatment can also affect parents, caregivers, and other family members. Caregivers may need to accompany patients to frequent transfusion appointments while managing household, employment, and financial responsibilities. These demands can contribute to exhaustion, helplessness, hopelessness, and physical and psychological stress (Jawaria, Anum & Dasti, 2016). Previous studies have described strain among caregivers of people with thalassemia and potential consequences for their emotional and physical well-being (Ali et al., 2012; Metin, ZG et al, 2019). The broader burden may extend to the individual, family, and society (Paramore et al., 2021). Family support and clear information about the disease and treatment are important components of care (Ammad et al., 2011). Although hematopoietic stem cell transplantation may offer a curative option for selected patients, ongoing care often

includes safe transfusion practices, iron chelation, and coordinated follow-up (Mettananda et al., 2019; Porter, 2018).

Although studies have examined the clinical and psychological experiences of people with thalassemia, evidence on psychological outcomes and quality of life across patients and their families remains dispersed. Studies vary in age groups, settings, outcomes, and assessment instruments, making it difficult to understand the range of needs across the care continuum. A systematic synthesis can bring these findings together and identify implications for holistic nursing practice, including screening, education, family support, and referral for psychological care. This systematic review aimed to summarize evidence on psychological concerns and quality of life among children and adults with TDT and their families.

Materials and Methods

Design and reporting approach.

This systematic review was planned and reported with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Moher et al., 2009). The review focused on psychological health and quality of life among people with thalassemia and their families. The source manuscript describes an evidence synthesis of observational cross-sectional and case-control studies.

Search strategy and data sources.

The Population, Interest, Comparison, and Outcome approach informed the search concepts. The population included families, parents, caregivers, children, adolescents, and adults; the interest was thalassemia and its impact; no comparison group was required; and the outcomes were mental health and quality of life. Searches were conducted in Scopus, ProQuest, ScienceDirect, and Taylor & Francis for literature published from 2022 through December 2024. The search expression reported in the source manuscript was: (Thalassaemia) AND (Psychological Impact) AND (Family) AND (Child) AND (Quality of Life). The exact search dates, database-specific adaptations, and additional limits were not specified in the supplied text and must be confirmed before submission.

Eligibility criteria.

Studies were eligible if they used a cross-sectional or case-control design; assessed mental health and/or quality of life among people with thalassemia, their parents, caregivers, or family members; and used standardized measurement instruments with evidence of validity. Articles were excluded if they were not written in English or if full text was unavailable. The source manuscript also states that reviews and qualitative studies were excluded during full-text assessment.

Study selection.

Two reviewers independently screened titles and abstracts against the eligibility criteria. Full texts were obtained for potentially eligible records and assessed for inclusion. Disagreements were resolved through assessment by a third and fourth reviewer. The reported search yielded 245 records; 18 duplicates were removed, leaving 227 records for screening. Following title and abstract screening, 22 full-text reports were assessed. Eleven were excluded because they did not meet the eligibility criteria, were literature reviews, or used qualitative methods. Eleven studies were included. The number excluded at title/abstract screening is calculated from the reported totals and must be verified against the original screening log.

Data extraction.

Extracted information included the lead author, article title, country, study design, sample size, participant characteristics, measurement instruments, prevalence or outcome estimates, and a summary of findings. The source manuscript does not specify whether extraction was performed independently by two reviewers or whether a piloted extraction form was used; clarify this if applicable.

Quality appraisal.

Methodological quality was assessed using the Joanna Briggs Institute critical appraisal checklist for prevalence studies (Joanna Briggs Institute, 2020). The source manuscript describes checklist items concerning the sampling frame, sampling method, sample size, participant characteristics, adequacy of analysis, reliability of measurement, statistical analysis, response rate, and validity of measurement. Responses were categorized as yes, no, unclear, or not applicable. The source manuscript reports assigning one point for "yes" and zero for "no," with scores ranging from 0 to 8, and states that studies scoring above 5 were considered eligible. Because the checklist is described as containing nine items while the reported score range is 0–8, verify the scoring procedure and item applicability against the original appraisal records before submission.

Data synthesis.

Findings were synthesized narratively and organized by population and outcome: pediatric patients, adult patients, and families or caregivers. Psychological outcomes and quality-of-life findings were summarized separately where possible. The studies used heterogeneous populations and instruments; therefore, no pooled quantitative meta-analysis was reported.

Ethical considerations.

This review synthesized findings from published studies and did not involve direct recruitment of human participants. The supplied manuscript did not provide a formal ethics statement; confirm the journal's preferred wording and any institutional requirements.

Results

Search results. The search identified 245 records across the four databases. After 18 duplicates were removed, 227 records remained for title and abstract screening. Twenty-two full-text reports were assessed for eligibility, and 11 were excluded because they did not meet the inclusion criteria, were literature reviews, or used qualitative methods. Eleven studies were included in the final synthesis.

Characteristics of included studies. The 11 studies were conducted in seven countries: China (n = 1), Pakistan (n = 1), Greece (n = 2), Italy (n = 2), Turkey (n = 2), Indonesia (n = 2), and Palestine (n = 1). Five studies focused on children, five on adults, and one included both pediatric and adult participants. Ten studies used a cross-sectional design and one used a case-control design. Sample sizes ranged from 43 to 286 participants. Six studies primarily assessed quality of life, four assessed psychological outcomes, and one examined both psychological outcomes and quality of life. Table 1 summarizes the reported characteristics and findings.

Psychological outcomes and quality of life in pediatric patients. The included studies described psychological and psychosocial concerns among children and adolescents with TDT, including anxiety, depression, difficulties with self-concept, panic symptoms, obsessive symptoms, social phobia, behavioral difficulties, hyperactivity or inattention, and problems with peer relationships (Arumsari et al., 2024; Cikili-Uytun et al., 2023; Yetim Şahin et al., 2024). Substantial anxiety and depression symptoms were reported among pediatric participants in studies assessing these outcomes (Cikili-Uytun et al., 2023; Yetim Şahin et al., 2024). Younger children were reported to have greater difficulties with peer relationships in one study (Arumsari et al., 2024). Quality-of-life limitations were described across school, emotional, psychosocial, social, and physical domains. School functioning was among the lowest-scoring domains in several studies, although one study reported social functioning as the lowest domain, followed by school functioning (Batool et al., 2022; Cikili-Uytun et al., 2023; Mulas et al., 2023; Permana et al., 2024). Regular hospital attendance for transfusions and reduced energy for school activities were discussed as possible contributors to school-related limitations (Thavorncharoensap et al., 2010).

Psychological outcomes and quality of life in adult patients. Adult participants also experienced psychological concerns, including depression, anxiety, and difficulties with self-concept. 55.8% of participants were classified as having severe depression, 22.8% moderate depression, 15.3% minimal

depression, and 6.1% mild depression. reported anxiety and depression among adults with TDT (Cikili-Uytun et al., 2023; Sarhan et al., 2022). Quality-of-life findings indicated limitations in physical and psychological well-being, social participation, pain, work-related functioning, vitality, and general health. Compared with population reference data, adults with TDT reported lower scores across several health-related quality-of-life domains (Klonizakis et al., 2024; Tedone et al., 2022). No statistically significant differences in Short Form-36 scores were observed between patients who had undergone splenectomy and those who had not, indicating no clear evidence of differences in health-related quality of life by splenectomy status (Caocci et al., 2023).

Psychological and practical burden among families and caregivers. Evidence on family outcomes was more limited than evidence on patient outcomes. The included family-focused study examined caregiver burden among families of adults with thalassemia. The mean Zarit Burden Interview score was 38.00, with greater caregiver burden observed in circumstances involving interrupted transfusion treatment and responsibility for caring for additional individuals (Zhang et al., 2024). The source manuscript also describes emotional strain, financial pressure, and the demands of accompanying patients for regular transfusions and iron chelation therapy (Ali et al., 2012; Anum & Dasti, 2016; Gok Metin et al., 2019; Paramore et al., 2021). Because few included studies directly assessed family outcomes, these findings should be interpreted as limited evidence rather than a comprehensive estimate of burden among all families.

Discussion

This systematic review synthesized 11 observational studies on psychological outcomes and quality of life among children and adults with transfusion-dependent thalassemia (TDT), alongside the more limited evidence on their families. Taken together, the findings suggest that the impact of TDT extends beyond disease management: psychological symptoms and limitations in school, social, physical, and work-related functioning may coexist, while caregivers may experience substantial demands. This pattern is consistent with earlier research describing psychosocial difficulties in thalassemia (Molla et al., 2022; Raman et al., 2019). However, because the included studies were observational and used varied measures, the review identifies recurring needs rather than demonstrating that TDT directly caused each outcome. The main contribution is to bring patient and family concerns into one synthesis and highlight the need for assessment that complements routine clinical monitoring.

Pediatric findings highlighted anxiety, depression, self-concept concerns, behavioral symptoms, and peer relationship difficulties. These concerns are consistent with previous reports that children with thalassemia

may experience emotional and behavioral problems more often than healthy peers (Behdani et al., 2015; Molla et al., 2022; Raman et al., 2019; Shaligram et al., 2007). Adolescence may be an important period for assessment, as the included evidence linked younger age or more frequent transfusion with some psychological symptoms (Yetim Şahin et al., 2024). However, studies differed in instruments, age ranges, and symptom definitions; estimates should not be interpreted as directly comparable prevalence measures. Routine screening with age-appropriate validated tools, followed by clinical assessment when indicated, may help nursing teams identify concerns that would otherwise remain unrecognized (Arumsari et al., 2024; Graves et al., 2016).

School and social functioning were recurring quality-of-life concerns among children. Regular transfusions can interrupt school attendance and limit opportunities for peer interaction and participation in usual activities (Thavorncharoensap et al., 2010). Nursing care can include coordination with families and schools, treatment education, and referral to psychosocial services when needed. The review does not establish that transfusions alone cause lower school functioning; disease severity, complications, access to care, family resources, and other contextual factors may also contribute. Pediatric quality-of-life studies have emphasized assessing multiple domains rather than relying on a single total score (Batool et al., 2022; Mulas et al., 2023; Permana et al., 2024).

Among adults, studies reported depression, anxiety, and lower quality of life across physical, psychological, social, and general-health domains (Klonizakis et al., 2024; Sarhan et al., 2022; Tedone et al., 2022). Work limitations, fatigue, pain, and reduced vitality may affect social roles and daily functioning. Some studies identified associations between depression and socioeconomic circumstances, including income and educational attainment (Sarhan et al., 2022). These associations should be interpreted in context rather than as evidence that a single demographic characteristic determines mental health. Differences across countries may reflect variation in healthcare access, social expectations, economic conditions, and measurement methods. Disease-specific and generic quality-of-life instruments can provide complementary information and help clinicians identify needs that may not be apparent from routine clinical indicators (Klonizakis et al., 2024; Sprangers, 2002).

Family outcomes deserve greater attention because treatment demands are managed within households, not by patients in isolation. The included family-focused evidence linked caregiver burden with interrupted transfusion treatment and responsibility for caring for others (Zhang et al., 2024), while earlier studies have also described caregiver strain in thalassemia (Ali et al., 2012; Gok Metin et al., 2019; Khanna et al., 2015). These findings suggest that practical pressures—time, finances, and competing care responsibilities—should

be considered alongside emotional well-being. Nevertheless, only one of the 11 included studies directly examined family or caregiver burden; therefore, its findings cannot establish how common caregiver distress is or which factors predict it across families. This gap is an important knowledge contribution of the review and supports research that measures caregiver outcomes directly, including family functioning, social support, financial strain, and access to respite or community resources.

Across age groups, the recurring concerns were not identical: children's findings emphasized school participation, peer relationships, and emotional or behavioral symptoms, whereas adult findings also included work-related functioning, pain, vitality, and general health. This distinction suggests that psychosocial assessment should be developmentally appropriate rather than based on a single uniform checklist. At the same time, differences in instruments and study populations limit direct comparisons between age groups; the evidence supports tailored assessment, not a ranking of which group is most affected.

The findings are most directly relevant to holistic and family-centered nursing, with implications for pediatric and adult hematology services and psychosocial care. Routine care can incorporate age-appropriate psychological screening, domain-level quality-of-life assessment, treatment education, and direct questions about caregiver needs. Nurses can clarify transfusion and iron-chelation plans, identify practical barriers without blame, and coordinate referrals to psychology, psychiatry, social work, school services, and community support. These actions align with recommendations for psychological follow-up and multidisciplinary care (Graves et al., 2016; Higgins et al., 2020; Permana et al., 2024). At the service level, the findings support care pathways that connect medical treatment with psychosocial assessment and referral. These are practice implications, not proven intervention effects, because this review synthesized observational studies and did not evaluate service interventions.

Strengths and limitations.

This review brings together evidence on pediatric patients, adult patients, and families from seven countries across Asia, Europe, and the Middle East. It also highlights that family and caregiver outcomes have received less research attention than patient outcomes. Limitations include the small number of included studies and their concentration in Asian or European settings, which may limit generalizability. The studies used different designs, samples, and instruments, preventing direct comparisons and quantitative pooling. The search was limited to four databases, English-language full-text reports, and studies published from 2022 through December 2024; relevant studies may have been missed. Most included

studies were cross-sectional, limiting conclusions about temporal relationships or causality. The supplied methods do not document exact search dates, protocol registration, or detailed reviewer-level quality scores; these items should be verified and reported where available.

Interpretation of psychological outcomes

The psychological outcomes reported in the included studies should be understood as a spectrum rather than a single, uniform response to TDT. Anxiety, depressive symptoms, self-concept concerns, and behavioral difficulties were measured using different instruments and in different age groups. This variation limits direct comparison across studies, but the recurring pattern indicates that psychosocial assessment should not be restricted to patients who spontaneously report distress. Some symptoms may remain unrecognized when treatment encounters concentrate on transfusion delivery, iron chelation, and monitoring for complications (Arumsari et al., 2024). Nurses who have regular contact with patients and caregivers are well placed to ask about mood, school or work participation, peer relationships, and coping, while referring concerning findings for appropriate assessment.

Developmental and social context

The needs of children and adolescents differ from those of adults. For younger patients, school attendance, peer relationships, emotional development, and self-concept are important dimensions of well-being. Frequent treatment appointments can interfere with these areas and may reinforce a sense of being different from peers (Behdani et al., 2015; Thavorncharoensap et al., 2010). Adolescents may also be managing greater expectations for independence while remaining dependent on family members for treatment and daily support. The reported associations between younger age, transfusion frequency, and psychological symptoms should therefore prompt careful assessment rather than assumptions that these factors inevitably produce distress (Yetim Şahin et al., 2024). Individual circumstances, family resources, and the availability of school and community support may influence how patients experience treatment.

Interpreting quality-of-life findings

Quality of life is multidimensional, and the included studies used both generic and thalassemia-specific measures. Generic measures can support comparisons with broader populations, whereas disease-specific tools may capture treatment-related concerns that are particularly relevant to TDT. Differences in domains and scoring methods mean that a lower score in one study cannot always be compared directly with a score from another instrument. Nevertheless, limitations in school functioning, vitality, physical functioning, social participation, and general health were recurring themes in the reviewed evidence (Klonizakis et al., 2024; Permana et al., 2024; Tedone et al., 2022). Clinical teams should review domain-level results where

available, because a total quality-of-life score may conceal a specific problem that can be addressed through care coordination or referral.

Implications for family-centered nursing

Family-centered care is particularly relevant because the treatment plan affects household routines and caregiver responsibilities as well as the patient. Families may need to coordinate transport, appointments, medication, employment, and care for other dependents. The limited family-focused evidence in this review described caregiver burden and greater burden in circumstances involving interrupted transfusion treatment or responsibility for caring for additional people (Zhang et al., 2024). Although the evidence is too sparse to estimate the burden across all families, it supports asking caregivers directly about their own well-being rather than assuming that patient-focused assessment captures family needs. Brief caregiver check-ins, practical education, discussion of available social support, and referral to social work or psychological services may be incorporated into routine nursing encounters when resources permit.

Care coordination and access

The review also highlights the relationship between treatment continuity and everyday functioning. Regular transfusion and iron chelation are central elements of care for many patients with TDT, but treatment schedules can create logistical and financial demands. The reviewed studies do not establish that a particular service intervention will improve psychological outcomes; however, their findings support attention to access barriers and treatment burden as part of holistic care. Nurses can help clarify treatment instructions, assess barriers to adherence without blame, and coordinate with the multidisciplinary team when patients or caregivers report difficulty attending appointments or obtaining medication. Support for school attendance and work participation may also be important, particularly when repeated hospital visits disrupt usual routines (Permana et al., 2024; Sarhan et al., 2022).

Research implications

Future research should address the imbalance between patient-focused studies and studies that directly assess family members. Longitudinal designs could clarify how psychological symptoms and quality of life change over time and whether caregiver outcomes are associated with treatment continuity, social support, and family responsibilities. Studies should report recruitment procedures, participant characteristics, validated measurement tools, scoring methods, and missing data transparently to improve comparability. Research across more diverse geographic and healthcare settings is also needed to assess transferability. Finally, adequately designed intervention studies should test whether nurse-led screening, psychoeducation, family support, and coordinated referral improve patient- and caregiver-reported outcomes. Until such

studies are available, recommendations for practice should be interpreted as evidence-informed priorities rather than established intervention effects.

Conclusions

This systematic review found that TDT is associated with psychological concerns and reduced quality of life among pediatric and adult patients. Reported concerns included anxiety, depression, self-concept difficulties, behavioral symptoms, and limitations in school, social, physical, and work-related functioning. The limited evidence focused on families also indicated caregiver burden and emotional and financial strain. Because the evidence was predominantly observational and heterogeneous, the findings do not establish causality and should be interpreted in light of the included studies' limitations.

Holistic nursing services should consider routine psychological screening and quality-of-life assessment for patients, alongside direct assessment of caregiver needs. Family-centered education, coordinated multidisciplinary care, support for school and work participation, and improved access to transfusion and iron chelation services may address important practical and psychosocial needs. Future research should include more diverse settings, use clearly described validated measures, and evaluate family-centered interventions prospectively.

Declaration of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this manuscript.

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Data Availability

The data extracted for this review and the corresponding critical appraisal records are available from the corresponding author upon reasonable request. The data are not publicly deposited in a repository.

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Table 1. Characteristics and Main Findings of the Included Studies

Study	Population / setting	Design and sample	Instrument(s)	Main reported findings
Sarhan et al. (2022)	Adults; Palestine	Cross-sectional; n = 163; ages 16–26	Beck Depression Inventory	Minimal depression 15.3%; mild 6.1%; moderate 22.8%; severe 55.8%. Lower income and education were associated with depressive symptoms.
Yetim Şahin et al. (2024)	Children/adolescents; Turkey	Case-control; 40 adolescents with TDT and 62 healthy peers; ages 10–18	Revised Child Anxiety and Depression Scale, Turkish version	Anxiety and depression scores were higher among patients than controls; earlier adolescence and more frequent transfusions were reported as correlates.
Permana et al. (2024)	Children; Indonesia	Cross-sectional; n = 158; ages 5–18	Pediatric Quality of Life Inventory	Quality of life was associated with sex and iron-chelation adherence; 58.9% had low adherence to iron-chelation therapy.
Arumsari et al. (2024)	Children; Indonesia	Cross-sectional; n = 120 questionnaires; ages 4–18	Strengths and Difficulties Questionnaire	Mean total difficulties score was 24.5; younger children had more peer relationship difficulties.
Tedone et al. (2022)	Adults; Italy	Cross-sectional; n = 167; ages 14–64	Psychological General Well-Being Index; Short Form-36	Scores were lower in several quality-of-life and well-being domains than in the general population.
Caocci et al. (2023)	Adults; Italy	Cross-sectional; n = 114; ages 18–62	Short Form-36	No statistically significant differences were observed between splenectomized and nonsplenectomized patients on Short Form-36 scales.
Cikili-Uytun et al. (2023)	Children and adults; Turkey	Cross-sectional; 24 patients with thalassemia major and 13 patients at least 2 years after hematopoietic stem cell transplantation; ages reported as 6–37	Child Depression Inventory; Pediatric Quality of Life Inventory; State-Trait Anxiety Inventory; Piers-Harris Self-Concept Scale; Beck Depression Inventory; Beck Anxiety Inventory; World Health Organization Quality of Life-BREF	Psychopathology was reported in both groups. The transplantation group had higher scores on selected quality-of-life and self-esteem measures.
Batool et al. (2022)	Children/adolescents; Pakistan	Cross-sectional; n = 178; older than 5 years	Pediatric Quality of Life Inventory	Mean total summary quality-of-life score was 63.91; authors recommended improving treatment management and services.
Mulas et al. (2023)	Children and parents; Italy	Cross-sectional; 43 pediatric patients and 43 parents; children younger than 18	Pediatric Quality of Life Inventory 4.0	Mean quality-of-life scores were higher in the transplantation group than in the conventional-therapy group for children and parents.
Klonizakis et al. (2024)	Adults; Greece	Cross-sectional; n = 283 adults with TDT	Short Form-36 version 2; Transfusion-dependent Quality of Life Questionnaire	Short Form-36 scores were lower than general-population reference scores; mean Transfusion-dependent Quality of Life Questionnaire summary score was 71.
Zhang et al. (2024)	Families/caregivers of adults; China	Cross-sectional; 75 included patients/caregiver contexts as reported	Chinese Zarit Burden Interview; Chinese Social Support Rating Scale	Mean Zarit Burden Interview score was 38.00; burden was greater with interrupted transfusion treatment and when caregivers also cared for others.

Note. TDT = transfusion-dependent thalassemia; Short Form-36 = 36-Item Short Form Health Survey; BREF = Brief Version. Verify all sample details, scores, instrument names, and reported findings against the original articles before submission.

Figure1 prisma flow diagram

