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Nursing Interventions to Reduce Anxiety in Children and Aolescents with Thalassemia Major a Scoping Review

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Abstract

Children and adolescents diagnosed with thalassemia major face not only physical burdens but also prolonged psychological stress that can lead to chronic anxiety. Nurses a crucial role in delivering psychosocial support through effective and evidence-based interventions. This research contributed to nursing by reviewing the effectiveness of nursing interventions in reducing anxiety among children and adolescents with thalassemia major. This systematic review followed PRISMA guidelines. Articles were searched from PubMed, ScienceDirect, and EBSCOhost databases, screened using strict inclusion and exclusion criteria, and assessed for methodological quality using the Joanna Briggs Institute Critical Appraisal Tool. A total of five studies met the eligibility criteria and were narratively synthesized. The reviewed nursing interventions showed a significant impact in reducing anxiety. Techniques such as foot reflexology and music therapy were found to be effective in alleviating procedural anxiety. Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT) were successful in reducing chronic anxiety through cognitive restructuring and enhanced psychological flexibility. Additionally, the Partnership Care Model demonstrated moderate effectiveness by encouraging collaborative interaction. Nursing interventions play an essential role in decreasing anxiety among pediatric and adolescent thalassemia major patients. Tailoring these interventions to individual anxiety types and patient characteristics is key to achieving optimal outcomes.

Keywords: *Adolescents; Anxiety; Children; Nursing Intervention*

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1. Introduction

Thalassemia remains a significant health problem that requires special attention. Based on data from the 2021 Global Burden of Disease (GBD) study published in The Lancet eClinicalMedicine, the number of people with thalassemia globally is estimated to reach 1,310,407 people (95% UI (Uncertainty Interval): 1.099.973–1.572.220). This represents a standardised prevalence of 18.28 per 100,000 population (Rao et al., 2024). Indonesia falls within the 'thalassemia belt', with the prevalence of beta (b-thal) thalassemia trait carriers ranging from 5.0 to 10.0% (Mediani & Fuadah, 2025).

Physically, the disease is characterised by severe anaemia, where haemoglobin (Hb) levels often fall below 7 g/dL, requiring lifelong blood transfusions every 2 to 4 weeks (Kemenkes, 2019; Tesya, 2020). Repeated blood transfusions can lead to complications such as haemochromatosis and haemosiderosis, which risk damaging vital organs (Ansari et al., 2024). In addition, excessive bone marrow hyperplasia can lead to bone deformities, particularly of the face and skull, known as Cooley's facies, which is a distinctive facial appearance due to abnormal bone development. These physical manifestations have a major impact on the psychological state of patients with thalassemia major.

Psychologically, children with thalassemia major often experience negative thoughts that can trigger anxiety (Sarinengsih et al., 2023). This causes constant psychological distress and can hinder a child's social and emotional development (Tarım & Öz, 2022). Anxiety in children with thalassemia major is triggered by fear of the future, emotional distress due to repeated medical procedures, and guilt about being a burden on the family, social stigma, isolation from peers, and educational barriers due to regular absenteeism, which also exacerbate emotional conditions and cause long-term stress (Akter et al., 2020).

Previous research showed that the anxiety rate among thalassemia major children in West Java

was 70.5%, while 9.8% were in the moderate anxiety category, and 19.7% experienced severe anxiety (Mediani & Fuadah, 2025). Anxiety experienced by adolescents with thalassemia major is a crucial issue that requires early treatment. If left untreated, anxiety can escalate to a panic level (Mediani & Fuadah, 2025).

Pediatric nurses have an important role not only in meeting the physical needs of children and adolescents with thalassemia major, but also in providing psychological support (Mediani & Fuadah, 2025). A holistic approach is needed to improve overall care outcomes. However, current nursing interventions focus largely on managing physical symptoms, with little attention to mental health aspects, particularly anxiety reduction. This suggests a significant gap in nursing practice and research regarding psychosocial care for this group.

Given the limited synthesis of scientific evidence that systematically evaluates the effectiveness of nursing interventions in reducing anxiety in adolescents with thalassemia major, a systematic review is needed to assess the effectiveness of these interventions in a comprehensive and evidence-based manner. Therefore, this study aims to evaluate the effectiveness of nursing interventions that have been implemented to reduce anxiety in children and adolescents with thalassaemia major. This systematic review contributes to strengthening the foundation of a holistic nursing approach by integrating psychosocial aspects as an essential domain of care, while also formulating practical recommendations to improve the quality of comprehensive paediatric nursing care.

2. Method

This study used the systematic review method by compiling a narrative synthesis of the main findings of various nursing interventions aimed at reducing anxiety levels in children with thalassemia major. The process of reporting and preparing this article refers to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines designed to improve the transparency and quality of reporting systematic reviews.

The authors used the PRISMA guidelines as the basis for developing the protocol, conducting study selection, and compiling the results report in picture 1. PRISMA is an evidence-based instrument consisting of 30 checklist items and includes four main stages: identification, screening, eligibility assessment, and study inclusion (Tricco et al., 2018). By using this approach, it is expected that the results of the systematic review can be presented in a transparent, structured and replicable manner.

This systematic review protocol was developed based on research questions formulated using the PICO (Population, Intervention, Comparison, Outcome) framework. The question asked was: "Children with thalassemia major (P), nursing interventions (I), usual care or no intervention (C), and reduction in anxiety (O)".

The article search was conducted systematically with the following inclusion criteria: (1) Research design: quasi-experimental, RCT, or other primary studies, (2) involving children aged 13 to 18 years with a diagnosis of thalassemia major, (3) published within the last 10 years (2015-2025) and (4) evaluating the effect of nursing interventions on anxiety. In this systematic review, the authors also determined the exclusion criteria: (1) non-interventional studies (such as literature reviews, opinion pieces, or case reports), (2) did not involve children with thalassemia major, (3) interventions were not performed by nurses, (4) did not report anxiety as one of the outcomes, or (5) articles were not available in full text and open access.

The literature search strategy was conducted from January to April 2025 using three databases namely PubMed, ScienceDirect, and EBSCOhost. The search was conducted using the following combination of keywords and Boolean operators: ("nursing intervention" OR "nursing care") AND ("thalassemia major") AND ("anxiety" OR "psychological distress") AND ("children" OR "adolescents" OR "pediatric"). Search filters were restricted to articles in English or Indonesian, published between 2015-2025, and available in full-text. Duplicate articles were removed automatically and manually before the selection process.

The study selection process followed four main stages as shown in the PRISMA diagram. The first stage, identification, was carried out by combining the search results from all databases used, followed by the removal of duplicate studies. In the second stage, screening, researchers selected articles based on year of publication and availability of full text. The third stage was eligibility testing, in which articles were examined to determine whether they met the pre-established inclusion criteria. Articles that did not meet the criteria, such as those not written in English or Indonesian, those that did not involve children as the population, or those that were not intervention studies, were excluded. At this stage, methodological quality was assessed using appropriate instruments, and the results were used for the final synthesis process. The final stage was inclusion, where studies that were deemed eligible and met all selection criteria were included for further analysis in the systematic review process.

The methodological quality of the studies was assessed using the Joanna Briggs Institute (JBI)

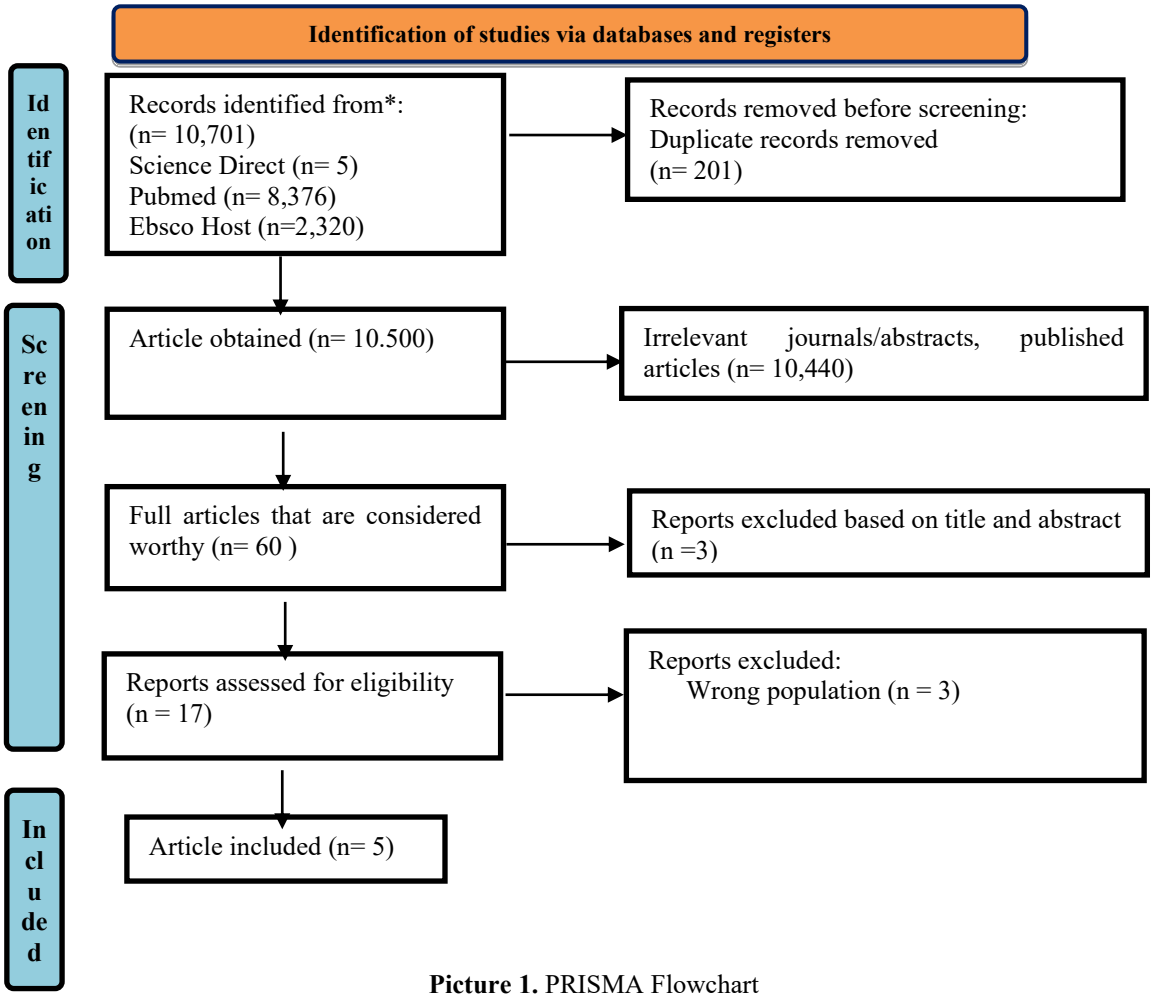
Critical Appraisal Tool, which was tailored to the respective research design (Table 1). Studies that scored ≥75% were considered of good quality and included in the data synthesis process. The article selection process was conducted by one researcher independently. If there were any doubts or discrepancies in determining the eligibility of an article, the final decision was made through discussions with the second and third researchers.

In this study, the data extraction process was conducted using a form designed to guide the systematic retrieval of information according to the review objectives. Information collected from each study that met the inclusion criteria included: author name, year of publication, country of origin, characteristics of the population and context (setting), research design, study objectives, intervention methods, instruments used, duration of follow-up, and reported outcomes. The extracted data were then grouped for further analysis, including components: author, year, country, type of intervention, analysis method, findings, and study conclusions.

Data synthesis was conducted qualitatively by the principal investigator and two co-researchers through discussions to evaluate and compare findings from each included study. The focus of the analysis was on nursing interventions aimed at reducing anxiety levels in children with thalassemia major. The results of the data synthesis are shown in Table 2.

Table 1. Critical Appraisal Tool

Articles	JBI Critical Appraisal Tool	Study Design
(Jadhav et al., 2024)	100% (9/9)	Quasi Eksperimen
(Jabbarifard et al., 2019)	100% (9/9)	Quasi Eksperimen
(Mohamadian et al., 2018)	76.9% (10/13)	RCT
(Sheikhi et al., 2020)	88.8 (8/9)	Quasi Eksperimen
(Shamsi et al., 2017)	88.8% (8/9)	Quasi Eksperimen



Picture 1. PRISMA Flowchart

Table 2. Study Summary of Non-Pharmacological Interventions to Manage Anxiety and Other Symptoms in Thalassemia Patients

No	Author	Title	Research Objectives	Method	Intervention	Instrument	Sample	Research Results
1	(Jadhav et al., 2024)	*Impact of Foot Reflexology Versus Simple Massage on Vital Signs, Anxiety, and Pain During Blood Transfusion Among Children With Thalassemia*	Evaluating the effect of foot reflexology compared to simple massage on vital signs, anxiety and pain during blood transfusion in children with thalassemia.	RCT	*Foot Reflexology*	Observational Scale of Behavioral Distress – Revised (OSBD-R)	60 people	Foot reflexology was shown to significantly reduce anxiety levels in children with thalassemia major during blood transfusion. The decrease in anxiety in the foot reflexology group had a significance value of p = 0.0001, more effective than the regular massage group which also decreased but not as much as foot reflexology. These results suggest that foot reflexology can be an effective nonpharmacological nursing intervention in reducing procedural anxiety in children with thalassemia major.
2	(Jabbarifard et al., 2019)	*The Effectiveness of Acceptance and Commitment Therapy on Perceived Stress, Resilience, and the Quality of Life in Thalassemia Major Patients*	To examine the effect of Acceptance and Commitment Therapy (ACT) on perceived stress, resilience, and quality of life in patients with thalassemia major.	Quas experimental	*Acceptance and Commitment Therapy* (ACT)	*Perceived Stress Scale* (PSS)	40 people	Although the main focus of this study was on perceived stress, resilience, and quality of life, the results showed that Acceptance and Commitment Therapy (ACT) intervention significantly decreased perceived stress levels and improved psychological resilience and quality of life of patients with thalassemia major. The positive effects of ACT persisted up to three months after the intervention ended (p < 0.001). The psychological improvement was attributed to increased psychological flexibility and self-awareness as key components of ACT.
3	(Mohamadian et al., 2018)	*The Effects of Cognitive Behavioral Therapy on Depression and Anxiety among Patients with Thalassemia: A Randomized Controlled Trial*	Evaluate the effect of Cognitive Behavioural Therapy (CBT) on anxiety and depression in patients with thalassemia.	RCT	*Cognitive Behavioral Therapy* (CBT)	*Beck Anxiety Inventory* (BAI)	76 people	Cognitive behaviour therapy (CBT) intervention was effective in reducing anxiety in patients with thalassemia. Anxiety scores in the CBT group decreased significantly compared to the control group (p= 0.019). A significant decrease also occurred in the CBT group between pre- and post-intervention (p= 0.001), while the control group showed no

								significant change (p= 0.61). These results suggest that CBT may be an effective psychological intervention for anxiety in this population.
4	(Sheikhi et al., 2020)	*The Effect of Music Therapy on the Anxiety Level of Children with Thalassemia Major Under Blood Transfusion*	Evaluate the effect of music therapy in reducing anxiety in children with thalassemia major during blood transfusion.	Quasi experimental	*Music Therapy*	*Observational Scale of Behavioral Distress-Revised* (OSBD-R)	30 people	Music therapy was shown to significantly reduce anxiety levels in children with thalassemia major undergoing blood transfusion. After a 45-minute music therapy session, anxiety scores in the intervention group decreased significantly ($p < 0.001$), while the control group showed no significant change. These findings support the effectiveness of music therapy as a simple and feasible non-pharmacological method to be applied in the management of procedural anxiety in children.
5	(Shamsi et al., 2017)	*The Effect of Partnership Care Model on Mental Health of Patients with Thalassemia Major.*	Analysing the effect of the Partnership Care Model on mental health (including anxiety) in patients with thalassemia major.	Quasi experimental	*Partnership Care Model*	*General Health Questionnaire -28* (GHQ-28)	82 people	The implementation of the Partnership Care Model for six months showed a significant reduction in anxiety symptoms in patients with thalassemia major. Based on the subscores of GHQ-28, the mean anxiety score in the intervention group decreased from 8.4 ± 1.07 to 5.2 ± 1.54 after the intervention, while in the control group there was an increase in anxiety score from 8.6 ± 1.17 to 9.0 ± 0.66. The difference between the intervention and control groups was statistically significant ($p = 0.014$). These results suggest that the Partnership Care Model is effective in improving mental health, including reducing anxiety symptoms, through a collaborative approach involving patients, nurses, and other health professionals.

3. Results and Discussion

Five studies were included in the final synthesis of this systematic review. All nursing interventions analysed showed positive results in reducing anxiety in children or adolescents with thalassemia major. The anxiety measurement instruments used in these studies included the Beck Anxiety Inventory (BAI), Observational Scale of Behavioural Distress-Revised (OSBD-R), GHQ-28 anxiety subscale, and Perceived Stress Scale (PSS), with variations in intervention approach and duration of therapy (Jabbarifard et al., 2019; Jadhav et al., 2024; Mohamadian et al., 2018; Shamsi et al., 2017; Sheikhi et al., 2020).

One study reported that an eight-session Cognitive Behavioural Therapy (CBT) intervention resulted in a significant reduction in anxiety based on BAI scores, with intergroup differences ($p = 0.019$) and intragroup differences ($p = 0.001$), while the control group showed no significant change ($p = 0.61$) (Mohamadian et al., 2018). The Acceptance and Commitment Therapy (ACT) intervention also showed a significant reduction in anxiety based on SCAS scores ($p<0.001$), although no long-term follow-up was reported (Jabbarifard et al., 2019).

Foot reflexology as a non-pharmacological intervention showed a highly significant reduction in anxiety ($p=0.0001$) after 20 minutes before blood transfusion, as measured by the OBSD-R. The effects are immediate and procedural (Jadhav et al., 2024).

Music therapy, provided for 45 minutes using headphones, showed a significant decrease in anxiety ($p<0.001$) based on the OSBD-R. Results were measured immediately after the intervention and have not been assessed over a longer period of time (Sheikhi et al., 2020).

The only study that evaluated medium-term sustainability was one that implemented the Partnership Care Model for six months. This study used the GHQ-28 anxiety subscale and showed a decrease in scores from 8.4 ± 1.07 to 5.2 ± 1.54 in the intervention group, while the control group actually experienced an increase from 8.6 ± 1.17 to 9.0 ± 0.66, with a significant difference ($p = 0.014$) (Shamsi et al., 2017).

Overall, all studies showed that both psychological (CBT, ACT) and non-pharmacological (music therapy, foot reflexology, collaborative care model) nursing interventions significantly contributed to anxiety reduction in children with thalassemia major. However, only one study explicitly evaluated medium-term effects, while the other four focussed on short-term or immediate anxiety reduction after the intervention.

All nursing interventions analysed in this review were effective in reducing anxiety in children and adolescents with thalassemia major. These interventions encompassed psychological approaches such as Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment Therapy (ACT), non-pharmacological relaxation techniques such as music therapy and foot reflexology, and collaborative educational models such as the Partnership Care Model.

Anxiety in this population can be broadly categorized into two types: state anxiety, which is temporary and situational, often triggered by specific events such as medical procedures; and trait anxiety, which reflects a more persistent, inherent tendency to experience anxiety across various situations (Saputra et al., 2023). This distinction is critical in understanding the differential effectiveness of the interventions reviewed.

For instance, foot reflexology and music therapy were particularly effective in rapidly alleviating state anxiety associated with medical procedures such as blood transfusions (Jadhav et al., 2024; Sheikhi et al., 2020). These interventions provide immediate sensory and emotional relief, making them well-suited for acute anxiety management. In contrast, CBT and ACT demonstrated efficacy in addressing trait anxiety by modifying underlying cognitive and emotional patterns, thereby fostering long-term psychological resilience (Jabbarifard et al., 2019; Mohamadian et al., 2018). Meanwhile, the Partnership Care Model offered a sustained, collaborative approach that involved patients and families in the care process, contributing to reduced anxiety over a longer period. Their mechanism of action can be explained through the activation of the parasympathetic nervous system which decreases the physiological response to stress. This is consistent with Cannon's physiological theory of stress, which explains that stressors activate the fight or flight response, as well as Selye's stress adaptation model, which emphasises the importance of body homeostasis in the face of acute stress (Gaol, 2016). Music therapy has been shown to stimulate the limbic system, promote relaxation, and reduce levels of stress hormones such as cortisol, making it effective in creating emotional calmness in children during blood transfusion procedures (Sheikhi et al., 2020).

CBT and ACT interventions are more suitable to treat persistent or trait anxiety in children with thalassemia major (Jabbarifard et al., 2019; Mohamadian et al., 2018). Cognitive therapy focuses on restructuring irrational thoughts or beliefs, while behavioural therapy emphasises on establishing more adaptive behavioural response patterns to situations that trigger stress or anxiety (Saputra et al., 2023). These two approaches complement each other in helping individuals recognise and change negative thought patterns,

while developing constructive coping skills (Albers et al., 2021).

This approach is in line with Beck's cognitive theory, which states that negative emotions such as anxiety arise from distorted and unrealistic beliefs about the self, the world, and the future (Sinring, 2023). By challenging and changing these cognitive distortions, individuals can reduce anxiety symptoms and improve overall adaptive functioning.

Meanwhile, the ACT intervention focuses on increasing psychological flexibility through acceptance of difficult thoughts and feelings, and a commitment to live life according to personal values (Thompson et al., 2021). ACT does not aim to eliminate negative thoughts, but helps the individual form a more adaptive relationship to internal experiences (Mathew et al., 2021). This strategy has been shown to be effective in helping children with chronic illnesses, including thalassemia major, to better manage anxiety and depression through the application of mindfulness principles, cognitive defusion, and values orientation (Jabbarifard et al., 2019).

The Partnership Care Model approach is the only one that is medium-term collaborative, and involves families in the care process. This approach is consistent with Watson's theory of caring, which emphasises empathic relationships between nurses and patients (Ghozali et al., 2024).

Comparisons show that psychological interventions have the power to reshape long-term emotional processing, whereas relaxation and sensory therapies are more responsive to momentary stress. Meanwhile, family-based collaborative interventions allowed for more stable and sustained emotional support. The practical implication is that nurses have a great opportunity to provide evidence-based interventions in the context of paediatric nursing that address not only the physical symptoms, but also the emotional and social aspects of the child. A combination of psychological, sensory and collaborative approaches can be used adaptively according to clinical needs.

4. Conclusions

Based on this systematic review, it can be concluded that nursing interventions focusing on psychological and non-pharmacological aspects have been proven effective in reducing anxiety in children and adolescents with thalassaemia major. The main findings show that each type of intervention has different characteristics and response times. Sensory-based and relaxation interventions, such as music therapy and foot reflexology, have been shown to be effective in directly reducing procedural anxiety (state anxiety). Meanwhile, psychological interventions such as Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment Therapy (ACT), as well as collaborative approaches such as the Partnership Care Model, have a greater impact on chronic anxiety (trait anxiety) with sustained effects. These findings underscore the importance of holistic, evidence-based approaches and tailoring interventions to the characteristics of anxiety and the clinical context of each patient.

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