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# The study of prevalence of depression, anxiety and stress among thalassemia patients admitted in a tertiary care centre

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## Abstract

**Background:** Beta thalassemia major is a severe chronic illness that demands frequent, often monthly, blood transfusions. This condition is commonly linked with a wide range of health complications, making regular medical check-ups and hospitalizations essential. In comparison, thalassemia intermedia usually presents later in life and is generally less dependent on transfusions. Although these patients may live longer, they often face a greater number of long-term health challenges. Both these clinically significant forms of thalassemia have far-reaching effects on a patient's daily life and well-being. **Aim and objective:** This study aimed to evaluate depression, anxiety and stress among children suffering from thalassemia, and to determine the levels of depression, anxiety and stress among these children. **Methods:** A hospital-based, single-centre, cross-sectional study was conducted in the Department of Pediatrics, Dr. S.C.G.M.C. Nanded, Maharashtra, over 2 years (August 2023 to August 2025). The study population comprised thalassemia patients attending the outpatient department and those admitted to the pediatric ward. Sample size: 67. **Results:** The majority of children were aged 5–7 years (37.3%), followed by 9–12 years (32.8%); the 7–9 years age group was least common (29.9%). There were 32 females (47.7%) and 35 males (52.2%). The most reported system involvement was respiratory (17.11%), followed by gastrointestinal (15.64%). The majority, 56 children (83.58%), had received more than 100 transfusions; only 11 children (16.42%) had received fewer than 100 transfusions. The majority, 23 (35.9%), had moderate anxiety scores. Most children, 42 (64.6%), had normal stress levels, and 23 children (35.3%) had mild to severe stress. Sixty children (89.6%) had normal depression scores and 7 children (10.4%) had mild to severe depression. Normal levels predominated across all ages; no significant association was found between age and anxiety scores. Stress scores increased with age, but the association was not statistically significant. **Conclusions:** These findings underscore the urgent need for integrated psychosocial care in thalassemia management. Routine mental health screening should be included in transfusion clinics, with structured counseling support for both patients and families. Schools should be sensitized to provide academic flexibility and peer support for affected children. Future care models must adopt a holistic bio-psycho-social approach that addresses medical complications, educational challenges, and emotional well-being together.

***Keywords:*** *Thalassemia, Clinical features, Depression score, Anxiety score, Stress score*

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## 1. Introduction

Thalassemia is an inherited disorder affecting haemoglobin production, where there is an imbalance between alpha (α) and beta (β) globin chains. In β-thalassemia, decreased or absent production of β-globin chains leads to an excess of unpaired α chains, causing ineffective red blood cell formation. There are over

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300 identified mutations in the β-globin gene, which can impact any stage of gene expression. When no β-globin is produced, it is called $\beta^0$-thalassemia, while $\beta^+$-thalassemia refers to reduced β-globin production. Some variants also involve structural changes like HbE, or increased foetal haemoglobin (HbF) production, as seen in δβ-thalassemia or hereditary persistence of foetal haemoglobin (HPFH).

Clinically, β-thalassemia major is the severe, transfusion-dependent form, while β-thalassemia intermedia presents with milder symptoms and may not require regular transfusions. Carriers, who have only one mutated gene, usually have no symptoms other than mild anaemia or microcytosis (Kliegman *et al.*, 2020).

Beta thalassemia major is a severe chronic illness that demands frequent, often monthly, blood transfusions. This condition is commonly linked with a wide range of health complications, making regular medical check-ups and hospitalizations essential. With progress in early diagnosis, timely treatment of complications, and proper use of iron chelation therapy, survival outcomes have improved considerably. As a result, healthcare priorities have shifted from simply extending life to improving the overall quality of life for those affected (Mikael and Al-Allawi, 2018; El-Beshlawy *et al.*, 2023).

In hospitalized patients, mood and anxiety disorders are common, increasing the length and cost of care. Cultural stigma, limited access to mental health services, and poor awareness further delay diagnosis and treatment. These findings highlight the urgent need for early detection, psychosocial support, and holistic care strategies to improve the quality of life in patients with thalassemia major (Sari *et al.*, 2024).

Although various studies have explored the quality of life and psychological challenges in thalassemia patients, the psychiatric impact, especially in the pediatric population and their families, remains underexplored (Mettananda *et al.*, 2019; Sahu *et al.*, 2023).

The Depression Anxiety Stress Scale (DASS) is a 42-item questionnaire designed to measure symptoms of depression, anxiety, and stress. It was developed by Lovibond and Lovibond in 1995 and has become widely used in research and clinical settings. Lovibond and Lovibond started with non-clinical samples because they believed that depression and anxiety are not simply "present or absent" but exist along a continuum. They also carefully selected items that represented the core features unique to either depression or anxiety, adding new items as needed to refine the scales (Crawford and Henry, 2003).

In one study, the DASS-21 scales showed normal data distribution and strong reliability, with Cronbach's alpha values between 0.855 and 0.862 for the three subscales, suggesting excellent internal consistency (Islam *et al.*, 2025). A cross-sectional study was conducted in 2014 on 64 patients with thalassemia major in Kermanshah, Iran, to assess depression, anxiety, and stress using the DASS-21 questionnaire. Data were collected through interviews and self-reports, covering demographic variables (age, gender, education, parental consanguinity, occupation, and comorbidities). Each DASS-21 subscale (depression, anxiety, stress) includes 7 items rated on a 4-point scale, with total scores doubled to reflect severity. The tool demonstrated high reliability, with Cronbach's alpha values of 0.97 (depression), 0.92 (anxiety), and 0.95 (stress) (Khamoushi *et al.*, 2015). With this background, we undertook the present study to assess the prevalence of psychiatric disorders in children with transfusion-dependent beta-thalassemia major.

## 2. Aim and objectives

This study aimed to study depression, anxiety and stress among children suffering from thalassemia.

## 3. Materials and methods

### 3.1. Study design, setting and population

This was a hospital-based, single-centre, cross-sectional study conducted in the Department of Pediatrics, Dr. S.C.G.M.C. Nanded, Maharashtra, from August 2023 to August 2025. The study population comprised thalassemia patients who attended the outpatient department and those who were admitted to the pediatric ward.

### 3.2. Sampling method

All children with thalassemia meeting the inclusion and exclusion criteria who attended or were admitted to the tertiary care hospital from August 2023 to August 2025 were enrolled in the study after informed consent was obtained from the mother or father.

### 3.3. Inclusion criteria

1. Patients diagnosed with thalassemia by Hb electrophoresis who had received more than 10 blood transfusions.
2. Patients aged between 5 and 12 years.
3. Willingness of parents/guardians to provide informed consent.

### 3.4. Exclusion criteria

1. Patients aged above 12 years.
2. Patients who failed to follow up or were lost to follow-up during the study period.
3. Patients or guardians unwilling to provide informed consent.

### 3.5. Methodology

Eligible participants and their caregivers were approached and briefed about the purpose and procedures of the study in simple, comprehensible language. After obtaining written informed consent from the parents/guardians, the Depression, Anxiety and Stress Scale-42 (DASS-42) questionnaire was administered. The semi-structured questionnaire, consisting of closed-ended items, was provided in Marathi and was either self-administered or interviewer-administered for younger children or those with reading difficulties. A quiet, well-lit and private setting was ensured to facilitate honest and undisturbed responses. The investigator maintained a neutral demeanour and avoided any leading prompts to minimize interviewer bias. Questionnaires were reviewed for completeness to prevent missing responses.

### 3.6. Statistical analysis

Statistical analysis was performed using IBM SPSS software. Descriptive statistics (mean, standard deviation, frequencies) were used to summarize demographic and clinical data. The prevalence of depression, anxiety, and stress was calculated as percentages. Chi-square tests and logistic regression were employed to identify associations between psychological symptoms and demographic/clinical variables. A *p*-value of less than 0.05 was considered statistically significant.

## 4. Results and observations

**Table 1: Frequency distribution of cases according to age**

| Age (years) | Frequency | Percent |
|---|---|---|
| 5–7 | 25 | 37.3 |
| 7–9 | 20 | 29.9 |
| 9–12 | 22 | 32.8 |
| Total | 67 | 100.0 |

The majority of children were between 5–7 years (37.3%), followed by 9–12 years (32.8%). The least proportion was in the 7–9 years age group (29.9%) (Table 1).

| Table 2: Frequency distribution of cases according to sex | | |
|---|---|---|
| **Category** | **Frequency** | **Percent** |
| Female | 32 | 47.7 |
| Male | 35 | 52.2 |
| Total | 67 | 100.0 |

The study included 67 participants, with 32 females (47.7%) and 35 males (52.2%) (Table 2).

| Table 3: Frequency of distribution according to level of anxiety (DASS-42) | | |
|---|---|---|
| **Score** | **Frequency** | **Percent** |
| Normal (0–7) | 17 | 26.6 |
| Mild (8–9) | 14 | 21.9 |
| Moderate (10–14) | 23 | 35.9 |
| Severe (15–19) | 10 | 15.6 |
| Total | 67 | 100.0 |

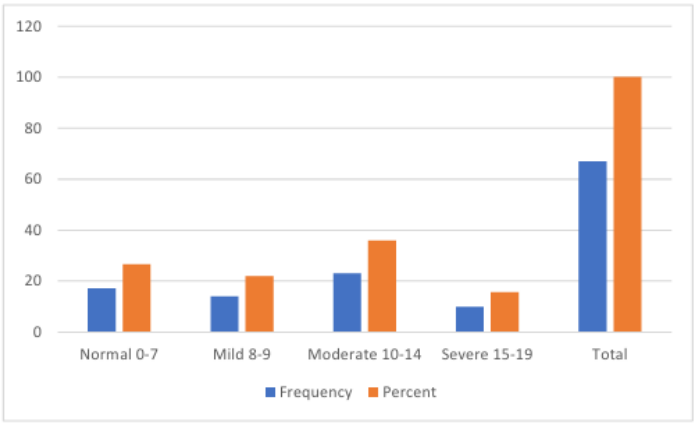



**Figure 1: Frequency of distribution according to level of anxiety (DASS-42)**

The majority, 23 children (35.9%), had moderate anxiety scores (Table 3; Figure 1).

| Table 4: Frequency of distribution according to level of stress (DASS-42) | | |
|---|---|---|
| **Score** | **Frequency** | **Percent** |
| Normal (0–14) | 42 | 64.6 |
| Mild (15–18) | 11 | 16.9 |
| Moderate (19–25) | 6 | 9.2 |
| Severe (26–33) | 6 | 9.2 |
| Total | 67 | 100.0 |

Most children, 42 (64.6%), were within normal stress levels. Only 23 children (35.3%) showed mild to severe stress (Table 4).

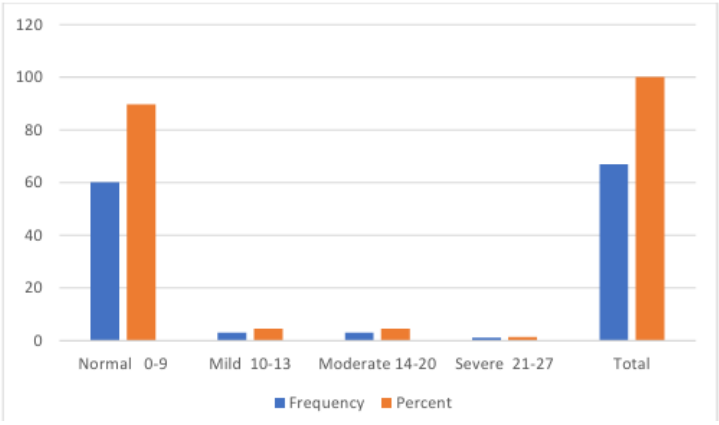



**Figure 2: Frequency of distribution according to level of depression (DASS-42)**

The majority, 60 children (89.6%), had normal depression scores; 7 children (10.4%) showed mild to severe depression (Figure 2).

**Table 5: Frequency distribution of cases according to age with respect to depression**

| Age (years) | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| 5–7 | 22 (32.84%) | 0 | 1 (1.49%) | 2 (2.99%) | 25 (37.31%) |
| 7–9 | 17 (25.37%) | 3 (4.48%) | 0 | 0 | 20 (29.85%) |
| 9–12 | 21 (31.34%) | 0 | 1 (1.49%) | 0 | 22 (32.84%) |

*Chi-square = 11.44, df = 8, p = 0.076.*

Most children across age groups were in the normal depression category; no significant association was seen between age and depression scores (Table 5).

**Table 6: Frequency distribution of cases according to age with respect to anxiety**

| Age (years) | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| 5–7 | 6 (8.96%) | 5 (7.46%) | 10 (14.93%) | 4 (5.97%) | 25 (37.31%) |
| 7–9 | 4 (5.97%) | 4 (5.97%) | 7 (10.45%) | 5 (7.46%) | 20 (29.85%) |
| 9–12 | 6 (8.96%) | 3 (4.48%) | 9 (13.43%) | 4 (5.97%) | 22 (32.84%) |

*Chi-square = 1.164, df = 6, p = 0.979.*

Normal levels predominated across age groups; no significant association was found between age and anxiety scores (Table 6).

**Table 7: Frequency distribution of cases according to age with respect to stress**

| Age (years) | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| 5–7 | 16 (23.88%) | 3 (4.48%) | 4 (5.97%) | 2 (2.99%) | 25 (37.31%) |
| 7–9 | 9 (13.43%) | 5 (7.46%) | 2 (2.99%) | 4 (5.97%) | 20 (29.85%) |
| 9–12 | 18 (26.87%) | 2 (2.99%) | 1 (1.49%) | 1 (1.49%) | 22 (32.84%) |

*Chi-square = 8.317, df = 6, p = 0.216.*

Stress scores increased with age, but the association was not statistically significant (Table 7).

## 5. Discussion

The aim of this study was to determine the prevalence and levels of depression, anxiety, and stress among children with thalassemia admitted to a tertiary care centre, and to explore their association with socio-demographic and clinical variables. The significance of this research lies in addressing the often-overlooked psychological dimension of thalassemia management. By highlighting the impact of transfusion burden, organomegaly, symptomatic complaints, and educational and socioeconomic factors on mental health, this study emphasizes the necessity of integrating psychosocial care into standard clinical practice. Early recognition of psychological morbidity can improve adherence to treatment, enhance quality of life, and reduce long-term complications, thereby reinforcing the importance of a holistic bio-psycho-social model in pediatric thalassemia care.

### 5.1. Age

In the present study, the largest proportion of children with thalassemia fell into the 5–7 years age group (37.3%), followed by those aged 9–12 years (32.8%) and 7–9 years (29.9%). This relatively young age profile reflects the chronic and early-onset nature of thalassemia, as most affected children are diagnosed within the first year of life and require lifelong blood transfusions. Our findings are comparable to those reported by Shaligram *et al.* (2007), who studied Indian children aged 8–16 years and found that psychological morbidity was already highly prevalent during childhood. In their cohort, 67% had anxiety-related symptoms and 62% had depression, demonstrating that psychological issues emerge early and persist through school years. Similarly, Naderi *et al.* (2012), in Iranian adolescents aged 15–24 years, documented psychiatric disorders in 53% of participants, showing that the burden remains significant into late adolescence.

The association between age and psychological outcomes in thalassemia has been inconsistent. In our study, no significant relationship was found between age and depression, anxiety, or stress. This is consistent with findings from Jordanian children (8–18 years), where age did not significantly affect HRQoL domains (Gharaibeh and Gharaibeh, 2012). In contrast, the Saudi Arabian cohort (Zolaly *et al.*, 2020) demonstrated that patients over 18 years had higher rates of depression and stress, suggesting that older adolescents and young adults may accumulate more psychosocial burden due to longer disease duration, treatment fatigue, and future concerns.

### 5.2. Gender

In our cohort, males (52.2%) slightly outnumbered females (47.7%), with no statistically significant differences in depression, anxiety, or stress scores between sexes. This finding suggests that gender alone may not be a primary determinant of psychological morbidity in thalassemia, which aligns with several international studies. Shaligram *et al.* (2007), however, reported that Indian girls with thalassemia had significantly higher psychopathology scores compared to boys, particularly in the domains of anxiety and depression. Naderi *et al.* (2012) also found that female adolescents had a higher prevalence of probable psychiatric disorders (59.8%) compared to males (44.7%), suggesting greater vulnerability among females in some populations.

### 5.3. Depression

In this study, age was not significantly associated with depression among children with thalassemia. Children across all three age groups (5–7 years, 7–9 years, and 9–12 years) had mostly normal depression scores, indicating that depression can occur irrespective of age. These findings are consistent with Jordanian studies, which reported similar outcomes. However, research from Saudi Arabia indicated that older adolescents and young adults exhibited higher depression rates, possibly due to longer disease exposure and treatment fatigue. Gender did not show any significant association with depression in our cohort, with both boys and girls displaying similar patterns. These results align with Malaysian and Jordanian studies but differ from Shaligram *et al.* (2007) and Naderi *et al.* (2012), who found higher depression levels among females, reflecting sociocultural influences.

### 5.4. Anxiety

Anxiety levels did not significantly vary by age group in this study ($p = 0.106$). Children across all age categories displayed similar anxiety patterns, indicating that age alone is not a determining factor. This is supported by Venty *et al.* (2018), who reported that maternal education and type of chelation therapy had a stronger influence on anxiety than age itself.

### 5.5. Stress

Stress levels showed an upward trend with increasing age, though the association was not statistically significant ($p = 0.051$). Older children, especially those aged 9–12 years, exhibited slightly higher stress scores. Similar findings were reported from Damascus (Alhaj Mohammad *et al.*, 2022), where higher stress was observed in older adolescents due to increased disease awareness.

## 6. Conclusions

These findings underscore the urgent need for integrated psychosocial care in thalassemia management. Routine mental health screening should be included in transfusion clinics, with structured counseling support for both patients and families. Schools should be sensitized to provide academic flexibility and peer support for affected children. Future care models must adopt a holistic bio-psycho-social approach that addresses medical complications, educational challenges, and emotional well-being together.

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