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Body Image in Relation with Stress Level and Self-Esteem Among Adolescents with Thalassemia Major

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Abstract

Background: Body image influences how adolescents perceive and accept physical changes. Adolescents with thalassemia major require regular blood transfusions, which may lead to iron overload and complications such as bone and skull deformities, growth delay, and low body mass index. These physical changes may contribute to body dissatisfaction, stress, and reduced self-esteem. This study aimed to examine the relationship between body image, stress, and self-esteem among adolescents with thalassemia major.

Methods: This analytical observational study used a cross-sectional design and was conducted from July to October 2023. A total of 54 adolescents aged 12–19 years from Jakarta, Bekasi, and Bogor participated in the study. After obtaining informed consent from their mothers, participants completed the Multidimensional Body-Self Relations Questionnaire–Appearance Scales (MBSRQ-AS), the Depression Anxiety Stress Scales (DASS-42), and the Rosenberg Self-Esteem Scale (RSES). Body image, stress level, and self-esteem were assessed using these instruments. Data were analyzed using the chi-square test.

Results: Most participants were female (61.1%), with a mean age of 14.4 ± 2.42 years. The majority had a positive body image (61.1%), were not experiencing stress (70.4%), and had high self-esteem (83.3%). No significant associations were found between body image and stress (p=0.630), body image and self-esteem (p=0.261), or stress and self-esteem (p=0.274).

Conclusion: No significant associations were observed between body image and stress, body image and self-esteem, or stress and self-esteem among adolescents with thalassemia major. Despite disease-related physical changes, most participants reported a positive body image, low stress levels, and high self-esteem.

Keywords: Adolescent, body image, self concept, stress, thalassemia

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Introduction

Thalassemia is a hereditary blood disorder caused by a decreased or absent production of alpha or beta globin chain. Due to abnormal structure of hemoglobin, the erythrocyte life span is shortened leading to chronic hemolytic anemia and ineffective erythropoiesis.[1] Therefore, patients with thalassemia major require regular, lifelong blood transfusion. Thalassemia major is usually diagnosed at approximately one year of age, and repeated transfusions may lead to iron overload in various tissues over time.[2] Patients with

thalassemia major may also experience bodily changes, including craniofacial bone deformities involving the maxillary region, dental protrusion, and prominent cheekbones.[3,4] Other clinical manifestations include growth retardation, delayed puberty, as well as heart and liver complications.[4] Patients with thalassemia major are often underweight, however, the spleen or liver may be enlarged, known as splenomegaly or hepatomegaly, respectively, due to excessive erythropoiesis.

Body image is an individual's subjective perception of physical appearance.[5] During adolescence, a transitional period marked by significant physical, psychological, and socio-emotional changes, body image becomes increasingly important.[6] Cultural emphasis on appearance and peer comparison may lead to negative body image, reduced self-acceptance, and psychological dissatisfaction, which can contribute to stress.[7] Adolescents with thalassemia major may perceive themselves as physically different from their peers because of disease-related bodily changes, increasing their vulnerability to body dissatisfaction and stress.[8] Stress is a response to internal or external demands that require psychological adaption and may affect resilience and self-evaluation.[9] Adolescence with thalassemia major have been reported to experience higher levels of stress, anxiety, and depression than healthy peers.[10,11]

Prolonged stress may negatively affect self-esteem, defined as an individual's sense of self-worth, particularly during adolescence when physical appearance plays a central role in social interaction.[13] Negative body image and chronic illness-related experiences are associated with lower self-esteem, with gender, age, and educational level also influencing self-perception.[14,15]

Although numerous studies have examined psychological outcomes in adolescents with thalassemia major, findings remain inconsistent regarding the strength and direction of relationships among body image, stress, and self-esteem. These inconsistencies may be attributed to differences in study design, measurement instruments, age ranges, cultural contexts, and psychosocial support systems across study populations. Furthermore, most existing studies have focused on depression and anxiety as primary outcomes, while the interrelationship between body image, stress, and self-esteem has received limited attention, particularly in Southeast Asian settings. Therefore, this study aimed to examine the relationship between body image, stress, and self-esteem among adolescents with thalassemia major in Jakarta, Indonesia.

Methods

This observational analytical study used a cross-sectional design. Purposive sampling was employed to recruit patients with including thalassemia major patients aged 12–19 years old from Jakarta, Bekasi, and Bogor. Patients were contacted through the heads of the regional parents association of thalassemia major patients (*perkumpulan orang tua penyandang thalassemia Indonesia,* POPTI), and the thalassemia patients association (*perkumpulan penyandang thalassemia Indonesia*, PPTI). After permission was obtained from Indonesian thalassemia foundation, data conducted from July to October 2023. This study received ethical clearance from the Ethical Committee from School of Medicine and Health Sciences, Catholic University of Indonesia Atma Jaya (No. 13/05/KEP-FKIKUAJ/2023).

Body Image was measured using the multidimensional body self relation questionnaire - appearance scales (MBSRQ-AS). A score ≥ 67.5 was categorized as positive body image, while a score < 67.5 was categorized as negative body image. Stress level was measured using the depression anxiety stress scales (DASS-42), with a score ≤ 14 categorized as no stress and a score ≥15 catogorized as stress. Self-esteem level was measured using the *rosenberg self-esteem scale* (RSES) with a score ≥15 categorized as high self-esteem and a score <15 categorized as low self-esteem.

Multidimensional body self relation questionnaire - appearance scales (MBSRQ-AS) was used to assess body image perception and consisted of 27 questions. After consent was obtained from the mothers, paper-based questionnaires were distributed and completed under the direct supervision of the researchers and research team. The questionnaires had been validated and adapted into Bahasa Indonesia. The exclusion criteria were inability to read or write and incomplete questionnaire responses.

MBSRQ-AS answers were scored using Likert scale: and scored as strongly disagree (1), disagree (2), agree (3), and strongly agree (4). Stress level was measured using the stress subscale of the DASS-42, which contains 14 questions assessing stress during

the previous seven days. Responses were scored as strongly disagree (0), disagree (1), agree (2), and strongly agree (3). The DASS-42 stress score was interpreted as follows: no stress, 0–14; mild stress, 15–18; moderate stress, 19–26; and severe stress, >34. The RSES contains 10 questions and was used to assess self-esteem. Responses were scored as strongly disagree (0), disagree (1), agree (2), and strongly agree (3).

Continuous scores obtained from the MBSRQ-AS, DASS-42, and RSES were dichotomized using established cut-off values recommended in the original instrument guidelines and previous validation studies. Dichotomization was performed to allow categorical analysis using the chi-square test, which is commonly applied approach in psychosocial and epidemiological research when examining associations between categorical variables.

Univariate analysis was conducted to describe the variables and was presented as frequencies and percentages . Bivariate analysis was performed using the chi-square test to examine the relationships between body image and stress level, body image and self-esteem, and stress level and self-esteem.

Table 1 Characteristic of Thalassemia Major Patients from Jakarta, Bekasi, and Bogor

Characteristic	n	%
Gender		
Male	21	38.9
Female	33	61.1
Age		
12 years	17	31.5
13 years	10	18.5
14 years	6	11.1
15 years	2	3.7
16 years	4	7.4
17 years	6	11.1
18 years	6	11.1
19 years	3	5.6
Education Level		
Elementary School	19	35.2
Junior high School	18	33.3
Senior high School	17	31.5

A p value <0.05 was considered statistically significant. Data were analyzed using SPSS version 25.

Editorial note: The cut-off values for dichotomizing MBSRQ-AS and RSES scores should be supported by specific citations to the original instrument guidelines or validation studies.

Results

In total, 54 patients with thalassemia major participated in this study. Most respondents were female (61.1%). The mean age was 14.4±2.42 years, and the most frequent age was 12 years. Respondents were relatively evenly distributed across educational levels (Table 1).

Most patients with thalassemia major had a positive body image (61.1%), with a mean body image score of 69.27. Most participants were not stressed (70.4%), with a mean stress score of 11.50. In addition, 83.3% of participants had high self-esteem (Table 2). There was no significant relationship between body image and stress level (p=0.630) or between body image and self-esteem (p=0.261) (Table 3). There was also no significant relationship between stress level and self-esteem (p=0.274) (Table 4).

In the appearance dimension, respondents agreed with several aspects related to appearance, including “most of people like

Table 2 Body Image, Stress Level and Self-Esteem of Patients with Thalassemia Major

Variable	n	%
Body Image		
Positive	33	61.1
Negative	21	38.9
Stress Level		
No Stress	38	70.4
Stress	16	29.6
Mild	7	13
Moderate	6	11.1
Severe	8	14.8
Self-Esteem Level		
High	45	83.3
Low	9	16.7

Table 3 Relationship Between Body Image, Stress Level, and Self-Esteem Among Adolescents with Thalassemia Major

Variable	Body Image				p-value*
	Positive		Negative		
	n	%	n	%	
Stress Level					
No Stress	24	72.7	14	66.7	0.63
Stress	9	27.3	7	33.3	
Self-Esteem					
High	29	53.7	16	29.6	0.261
Low	4	7.4	5	9.2	

Note: *state the statistic analyse used Chi-square, significant if p<0.05

Table 4 Relationship Between Stress Level and Self Esteem among Adolescence with Thalassemia Major

Stress Level	Self-Esteem				p-value*
	Low		High		
	n	%	n	%	
No Stress	9	16.7	24	44.4	0.274
Stress					
Light	1	1.9	6		
Moderate	1	1.9	5	11.1	
Heavy	1	1.9	7	9.3	

Note: *state the statistic analyse used Chi-square, significant if p<0.05

my attractive appearance" (51.9%) and "I like hearing appreciate my body shape" (57.4%) (data not shown).

Stress level was not association with gender (p=0.698), age (p=0.234)), or educational level (p=0.166). However, respondents aged 12 and 17 years tended to report higher stress levels. Similarly, self-esteem was not associated with

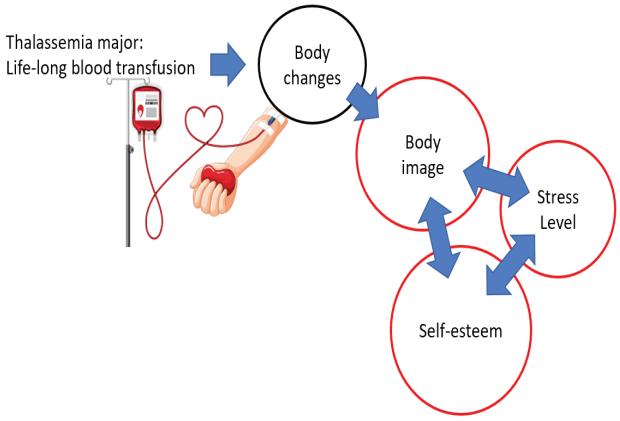

Figure 1 Conceptual Framework Describing The Relationships Between Body Image, Stress Level, And Self-Esteem Among Adolescents With Thalassemia Major

age (p=0.588) or education level (p=0.473).

Discussion

This study found no significant association between body image and stress level, body image and self-esteem, or stress level and self-esteem among adolescents with thalassemia major. Overall, most participants demonstrated favorable psychosocial characteristics, including a positive body image, no stress, and high self-esteem.

Although no significant associations were observed between the study variables, these findings may indicate that adolescents with thalassemia major in this setting have achieved a degree of psychosocial adaptation. This relatively positive profile may be influenced by adaptive coping strategies, resilience, and protective social factors such as family support, structured treatment routines, and ongoing medical care. However, these factors are proposed as possible explanations rather than causal determinants, as the cross-sectional design does not allow causal inference.

Importantly, the absence of statistically significant relationships should not be interpreted as the absence of psychosocial vulnerability. Instead, it may reflect the presence of buffering mechanisms that mitigate the potential psychological impact of chronic illness during adolescence. Further longitudinal and qualitative research is warranted to explore how resilience, social support, and individual coping processes contribute to psychosocial outcomes in adolescents with thalassemia major.

Patients with thalassemia major require lifelong blood transfusion and have higher risk of psychological problem, including stress, anxiety, and depression, which can affect quality of life.[16] Regular blood transfusion every three to four weeks may cause boredom, restrict physical activity, create uncertainty, and negatively influence body image.[17] Physical deformities may also influence interactions with family, friends, and surrounding community.

In general, adolescence tend to pay attention to their appearance.[7] Similarly, adolescents with thalassemia major often wish to work with others, be liked and accepted by peers, and pay attention to appearance and clothing.[18] A study in Bangkok showed that body image among adolescents with thalassemia was influenced by other people.[19] Those with a negative body image may compare themselves with others because they are shorter, have darker skin, or have facial deformities, which may this disturb them. Body image does not merely reflect a person's actual appearance, but also includes beliefs, perceptions, thoughts and emotions about the body.[20]

Several factors may support a positive body image are among adolescents with thalassemia. These adolescents may develop strategies to manage concerns about looking unattractive, pale or ill. Problem-focused strategies include using cosmetics and wearing bright-colored clothing to avoid looking pale. Emotion-focused strategies include distraction from distressing thoughts and greater focus on spirituality. Social support from family, friends, medical staff, and the surrounding community may also increase positive thinking and reduce emotional stress among adolescents with thalassemia.[21]

Most patients with thalassemia major patients in this study were not stressed, which is consistent with studies suggesting that support from health professionals and social environment, both financially and psychologically, may reduce stress.[22] Internal individual factors may also play an important role. Further studies are needed to develop innovative interventions to reduce stress among patients with thalassemia major. Good collaboration among patients, families and health professionals is essential to strengthen coping mechanisms.[23] However, this finding contradicts other studies showing that many patients with thalassemia major experience distress, with some reporting severe stress.[11] Therefore, mental health evaluation remains important among patients with thalassemia.[24]

Stress may be caused by disease-related stigma. Patients may avoid the community, and isolate themshelters, or avoid social interaction because of feelings of inferiority and fear of bullying. Three essential factors related to stress which are social relationship, shifting of responsible from childhood to adolescence, and inadequate quality of sleep.[25] However, this study showed no relationship between stress level and self-esteem (p=0.274). Individual responses to stress may differ depending on resilience and coping capacity; therefore, higher stress does not always lead to lower self-esteem. When stressors persist and coping mechanisms become exhausted, self-evaluation may decline and self-esteem may be reduced.[26]

Self-esteem fluctuates depending on life experiences. Negative experiences such as stress may contribute to lower self-esteem.[13] However, most patients with thalassemia major

in this study had high self-esteem (83.3%). Self-esteem begins to develop in childhood through attention from parents and the surrounding environment and may increase with age. Feelings of belonging and worth are essential factors contributing to higher self-esteem.[27] Social support from family members, including emotional, appreciation, and informational support, is also an important factor.[28] Greater and more intensive social support may be associated with higher self-esteem. The higher and the more intense social support given, the higher self-esteem. It is clear that self-esteem has internal and external factors. Factors such that influence self-esteem are among others physical, psychological, social, intelligent/ cognitive, economic and many others.[29]

Interestingly, in this study no association between self-esteem and gender and age), similar to other study, these findings suggest that self-esteem is not solely determined by gender but is shaped by a complex interplay of individual psychological characteristics and external contextual factors that may influence self-esteem.[30] Self-esteem is not influence by gender only, but many other psychological factors and external factors may play crucial role.[17] Furthermore, this study has limited to those under 19 years old, thus, they do not have knowledge on attitude about sef-esteem and self-concept. Education may have influenced the self-esteem which is not the case in our study (p=0.473). Education may have been related to self-esteem.[30] Moreover, education is related to individual awareness to their disease, so they can accept and adapt to what they experience.

Parenting patterns also influence the level of self-esteem, which consists of 2 dimensions, namely responsiveness and demands by considering aspects such as communication and affect, granting autonomy/rights in making decisions, self-disclosure, humor, and behavioral control. Communication and affect can create warm and affectionate relationships by being willing to listen and be sensitive to teenagers' needs. Parents can find out about self-disclosure by asking their children or the children can explain directly to their parents.[30] The purpose of self-disclosure is to see how much information parents know about their children's activities and friendships outside the home. A sense of humor is related to optimism about life. In addition, psychological control can overcome a person's negative attitudes that hinder the positive development of adolescents. Therefore, parenting styles and parental education are important for adolescents in the development of self-esteem.

This study faces some drawbacks. Questionnaires given to the adolescent respondents were filled in together with their mothers, so the answers might be biased. The questionnaire was distributed during lunch time which was a happy moment. It is challenging to explore their mood behaviour for psychological assessment in such a short event. Furthermore, this study has limited only to respondents under 19 years old, thus, they do not have deeper knowledge on attitude about self-esteem and self-concept yet. Moreover, low number of participants might not represent the whole group. Those who were eager to be participants might be extrovert person.

In conclusion, adolescents with thalassemia major experience substantial bodily changes due to pathological bone deformities and iron overload. However, most adolescents with thalassemia major in this study have a positive body image, high self-esteem, and no stress. There is no significant relationship between body image and stress or self-esteem, and stress level has no significant relationship with self-esteem. Further studies are required to explore factors influencing body image, stress level, and self-esteem among patients with thalassemia major. Healthy lifestyle promotion and wellness programs, including physical, psychological, religious, and social support from family, friends, and health professionals, should be consistently introduced to enhance quality of life among patients with thalassemia.

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Authors' Contributions

FK, EES, SAI, and V conceptualized and designed the study. FK, EES, SAI, and V managed data acquisition. EES, SAI, and V performed the statistical analysis. FK, EES, SAI,

and V interpreted the results. FK drafted the manuscript, while MSH and S critically revised it. All authors approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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The authors used generative artificial intelligence (AI) tools solely for language editing and improving manuscript clarity. All scientific content, analyses, and interpretations were reviewed and verified by the authors, who take full responsibility for the final content of the manuscript.

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