

Quality of life among children with beta-thalassemia major treated in Western Saudi Arabia

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ABSTRACT

الأهداف: قياس جودة الحياة في الأطفال والمراهقين المصابين بمرض بيتا الثلاسيميا العظمى.

الطريقة: أجريت دراسة مستعرضة شملت المرضى المصابين بمرض الثلاسيميا العظمى والحاضرين لوحدة الرعاية اليومية بغرض نقل الدم في مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية خلال الفترة من أكتوبر 2012م حتى فبراير 2013م باستخدام الاستبيان الخاص بدراسة جودة الحياة. اشتمل الاستبيان على محاور لقياس الأداء البدني، و الأداء العاطفي، و الأداء الاجتماعي، و الأداء الدراسي. كما تم حساب معدل كل مريض باستخدام البرنامج الإحصائي.

النتائج: اشتملت الدراسة على 46 طفلاً مصاباً بالثلاسيميا العظمى (60.9% منهم ذكور)، متوسط العمر هو 12 عام (ما بين 2-18 عام) وتم عمل نقل الدم لأغلبية المرضى 84.8% 3 مرات في الأسبوع. كان المتوسط (الانحراف المعياري) للأداء البدني 57.2 (25.9)، والأداء العاطفي 74.1 (20.3)، والأداء الاجتماعي 78.5 (24)، والأداء الدراسي 54.3 (24.2). معدل الأداء البدني كان أقل في الأطفال الذين لديهم تاريخ عائلي للثلاسيميا $p=0.003$ وأيضا ذوي الدخل المحدود $p=0.049$ ، بينما الأداء الاجتماعي كان أعلى لدى الأطفال المتلقين للتعليم $p=0.01$.

خاتمة: تتأثر جودة الحياة لدى الأطفال المصابين بالثلاسيميا بعدة عوامل منها الدخل المادي والتاريخ المرضي في العائلة. كان التعليم مصاحباً لتحسن الأداء في المرضى. يمكن تحسين جودة حياة الأطفال المصابين بالثلاسيميا بتوفير برامج داعمة وتوعوية.

Objectives: To assess the quality of life among children and adolescents with thalassemia major.

Methods: This cross-sectional study used the Pediatric Quality of Life Inventory (PedsQL). Children and adolescents with beta-thalassemia major who attended the Day Care Unit at King Abdulaziz University Hospital, Jeddah, Saudi Arabia from October 2012 to February 2013 were surveyed. The questions

highlighted 4 health status scales, namely physical functioning (PF), emotional functioning (EF), school performance (SC), and social functioning (SF). Scores were calculated for each patient and data were analyzed using the Statistical Package for Social Sciences.

Results: We recruited 46 children (60.9% males). The median age of the sample was 12 years (range, 2-18 years). Most patients (84.8%) had 3 weekly blood transfusions. The mean±SD physical functioning (PF) score was 57.2±25.9; the EF score was 74.1±20.3, SF score was 78.5±24, and SC score was 54.3±24.2. The PF score was significantly lower in patients with a family history of thalassemia ($p=0.003$), and in those whose families had low incomes ($p=0.049$). Conversely, the SF score was significantly higher in school-educated patients ($p=0.01$).

Conclusion: The quality of life of thalassemic children is affected by multiple factors, such as family income and a family history of thalassemia. Education appeared to increase patient functionality. Supportive measures could improve the quality of life in thalassemic patients.

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Thalassemia is an inherited blood disorder, which is characterized by decreased synthesis or absence of globin.¹ This synthetic defect leads to the formation of fragile abnormal red blood cells (RBC), which can be easily hemolyzed, leading to chronic anemia.² This disorder is highly prevalent among children in the Middle East, Mediterranean region, and South Asia.³ However, only few studies on pediatric quality of life (PedsQL) have been published from those areas.^{1,4,5} The management of thalassemia includes regular blood transfusion, iron chelation therapy, and appropriate management of comorbidities.⁶⁻⁸ These modalities led to an increase in the life expectancy of thalassemic children.^{6,7} Thus, emphasizing the importance of maintaining the quality of life in children with thalassemia.^{6,9} Thalassemia has a negative impact on physical functioning of children and adolescents. It can also affect social relationships and mental health, eventually leading to poor school performance and overall impairment in the health-related quality of life (PedsQL).¹⁰⁻¹² It has been reported that approximately 80% of thalassemic patients have psychiatric problems.^{3,13} It was reported previously that emotional distress and disease burden have an effect on the quality of life of patients in the form depression and anxiety-related symptoms; however, culture and the type of treatment did not.^{13,14} Pediatric quality of life measurement is a tool that is used to assess the effect of disease on a patient's well-being.^{11,15,16} Different aspects are covered in PedsQL, including physical, psychological, and social functioning as various factors can affect quality of life.¹⁷ In this study, we evaluate the quality of life in children and adolescents with thalassemia and investigate which factors can lead to the establishment of good supportive clinical programs that will improve PedsQL in these patients.¹⁰

Methods. This cross-sectional study was performed between October 2012 and February 2013 on children and adolescents with thalassemia major who presented to the Day Care Unit at King Abdulaziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia for blood transfusions. All patients were randomly selected, and written informed consent was obtained from the parents of recruited patients prior to their inclusion in the study. Inclusion criteria were age between 2-18 years, diagnosis of thalassemia confirmed by hemoglobin electrophoresis, and ability to speak either Arabic or English language, as we did not have interpretation facilities. Exclusion criteria included age <2 years or >18 years, patients with alpha-thalassemia, beta-thalassemia minor or intermedia, sickle-beta thalassemia, incomplete questionnaires, and inability

for patients or their parents to fully understand written Arabic or English. Permission to conduct the study was granted by the Ethics Research Committee of King Abdulaziz University.

Retrieved data included demographics (age, gender, ethnicity, and nationality), education level (elementary, middle school, and high school), employment status, household monthly income, city and district of residence, family history of thalassemia, and number of thalassemic patients in the family. We also documented the patients' clinical data, including growth parameters (height, weight), age at diagnosis, type of thalassemia, age at first blood transfusion, frequency of blood transfusions since diagnosis, use of iron chelating agents, as well as medications used and when they were commenced. We also recorded baseline ferritin and hemoglobin levels, the presence of other chronic diseases, the use of other long-term medications, and a history of splenectomy and at what age it was performed.

We used the English and Arabic versions of the PedsQL questionnaire, which were administered to patients depending on their mother language. In patients older than 4 years, the questionnaire was self-administered, filled by parents, or filled during an interview. In younger children aged between 2-4 years, the questionnaire was filled by parents, or it was filled during an interview by a trained interviewer. One questionnaire was given to each participant, with no child-self parent-proxy comparison.

The PedsQL model is mostly used in pediatrics, as it is easily understandable. It is a generic questionnaire consisting of 21 questions for patients aged 2-4 years, and 23 questions for those aged 5-7, 8-12, and 13-18 years. The questions are clustered to highlight 4 health status scales, namely physical functioning (PF), emotional functioning (EF), school performance (SC), and social functioning (SF). Patients had 5 answer choices, each of which was given a score. The choices were "never", "almost never", "sometimes", "often", and "almost always", with corresponding scores of 100, 75, 50, 25, and 0. Each patient was given a score from 0-100, with higher scores indicating better health or a higher level of function. Patients' answers were presented as a profile of scores calculated for each scale.¹⁶ Pediatric quality of life 4.0 is reliable, feasible, and valid to measure the health outcome of the pediatric population, as it facilitates risk assessment and tracking of community health.¹⁸ The Arabic version of PedsQL 4.0 was considered to have satisfactory psychometric properties according to a Jordanian study conducted by Arabiat et al.¹⁹

Statistical analysis. Data were analyzed using the Statistical Package of Social Sciences (SPSS Inc.,

Chicago, IL, USA). Descriptive statistics was used to compute frequencies, percentages, and means and standard deviations. Paired sample t-test and analysis of variance (ANOVA) test were used to compare different functionality scores among certain patient characteristics. Significance was set at $p < 0.05$.

Results. We recruited 46 patients (without study size calculations) aged between 2 and 18 years (median, 12 years). Of these, 19 patients (41.3%) were aged between 13 and 18 years (Table 1). Two-thirds (60.9%) were males. Only 21.7% of the patients in our study population were of Saudi nationality; the rest were of various nationalities. There was a family history of thalassemia in 64.4% of the patients. Most patients (84.8%) received blood transfusion regularly every 3 weeks. Approximately one-third of the patients (34.8%) had a history of splenectomy. Eighty-seven percent of our patients were receiving iron-chelation therapy. Of these, 37.5% were on oral chelation therapy; 52.5% were on deferoxamine, and the remaining 10% were on combined therapy. The median ferritin level was 2000 (reference range, 7-140 ng/mL). Among our transfusion-dependent patients, 3 were positive for hepatitis C virus; the incidence of hepatitis C infection in our limited-size sample was 6.5% (Table 1).

The functionality scores of our study cohort are summarized in Table 2. The mean SF score was significantly higher in school-educated patients as compared with unschooled patients (77.4 versus 55.6; $p = 0.01$). The mean PF score was insignificantly higher in school-educated children (64.3 versus 50.1; $p = 0.06$). Similarly, there was no significant difference in the mean EF score (77.1 versus 70.9; $p = 0.31$) or SC score (51.7 versus 57.5; $p = 0.44$) between the 2 groups (Figure 1). Subjects with a family history of thalassemia had significantly lower PF scores (48.9 versus 72.0; $p = 0.003$). Conversely, there was no difference in EF scores (72.3 versus 79.1; $p = 0.28$), SC scores (50.9 versus 62.1; $p = 0.16$), and SF scores (64.1 versus 78.1; $p = 0.06$) between patients with and those without a family history of thalassemia (Table 3).

Patients whose families had incomes of <1500 SAR per month had a significantly lower PF score compared with those whose families who earned 1500-3000 SAR per month (34.3 versus 60.6; $p = 0.049$). The mean EF and SF scores were also significantly lower in children whose families had lower monthly income (<1500 SAR per month). The mean EF score was 57.5 in patients of families with lower monthly incomes as compared with 77.3 in the higher income group ($p = 0.02$); the mean SF score was 38 in the lower income group as compared

with 65 in the higher income group ($p = 0.003$; Figure 2). There was no significant difference in health status scores between splenectomized and non-splenectomized subjects: PF score of 62.6 versus 54.3 ($p = 0.31$), EF

Table 1 - Demographic data of 46 patients with beta-thalassemia.

Demographic data	n	(%)
Age (years)		
2-4	5	(10.9)
5-7	4	(8.7)
8-12	18	(39.1)
13-18	19	(41.3)
Gender		
Male	28	(60.9)
Female	18	(39.1)
Nationality		
Saudi	10	(21.7)
Non-Saudi	36	(78.3)
Level of education		
Illiterate	9	(19.6)
Primary	26	(56.5)
Intermediate	10	(21.7)
Secondary	1	(2.2)
Education		
Student	23	(50.0)
Non-student	23	(50.0)
Family history of thalassemia		
Yes	29	(64.4)
No	16	(35.6)
Family income (Saudi riyals)		
<1500	5	(14.7)
1500-3000	13	(38.2)
3000-5000	10	(29.4)
5000-10,000	4	(11.8)
>10,000	2	(5.8)
Age of onset		
<6 months	7	(15.2)
6-12 months	16	(34.8)
>12 months	23	(50.0)
Frequency of blood transfusions		
Every 2 weeks	4	(8.7)
Every 3 weeks	39	(84.8)
Every 4 weeks	3	(6.5)
History of splenectomy		
Yes	16	(34.8)
No	30	(65.2)
Chronic diseases		
Yes	6	(13.0)
No	40	(87.0)
Hepatitis C virus		
Positive	3	(6.5)
Negative	43	(93.5)
Use of chelation therapy		
Yes	40	(87.0)
No	6	(13.0)
Type of chelation		
Oral	15	(37.5)
Deferiprone	11	(73.3)
Deferasirox	4	(26.7)
Deferoxamine	21	(52.5)
Combined	4	(10.0)
Ferritin level* (ng/mL)	2000	
Median (range)	258 -5000	

*The reference range is 7-140 ng/mL.

Table 2 - Mean and standard deviation of the different quality of life scores in thalassemic children.

Score	Mean	Standard deviation
Physical functioning	57.2	25.9
Emotional functioning	74.1	20.3
Social functioning	78.5	24.0
School functioning	54.3	24.2
Total	63.0	18.4

Table 3 - Correlation between family history of thalassemia and quality of life scores.

Family history	PF score	EF score	SF score	SC score	Total
Positive	48.9	72.3	64.1	50.9	58.5
Negative	72.0	79.1	78.1	62.1	72.2
P-value	0.003	0.28	0.06	0.16	0.02

EF - emotional functioning, PF - physical functioning, SC - school functioning, SF - social functioning

score of 67.7 versus 77.3 ($p=0.14$), and SF score of 68.2 versus 68.7 ($p=0.95$). When we compared the 3 groups treated with different types of iron chelation therapy, there was no statistically significant difference between them in functionality scores. Likewise, there was no difference between them in serum ferritin level.

Discussion. The prevalence of consanguineous marriages, which is high in the Kingdom of Saudi Arabia (KSA), increases the prevalence of autosomal recessive hemoglobinopathies.²⁰ The western province of KSA has a unique demographic population because of the presence of the 2 holy cities. King Abdulaziz Hematology Center accepts large numbers of poor patients under the charity umbrella and provides them with medical and social support. This is reflected in the demographic profile of our cohort, as only one-fifth of the patients were Saudis. Previous reports evaluated health-related quality of life among children with sickle cell disease. However, according to Pubmed-based literature, no previous study evaluated the quality of life in thalassemic children in the western region of KSA.²¹ We observed a PF score of 57.2, which is lower than the 69.1 reported by Ismail et al,¹⁶ who assessed the health-related quality of life in Malaysian children with thalassemia. Similarly, Caocci et al¹⁷ reported a PF of 68.4 in a cohort of thalassemic patients from Syria, Palestine, and Iraq; however, the PF scores in our study are consistent with those reported by Gharaibeh, who observed a PF score of 54.2 in a cohort of Jordanian children.²² The low PF score in our study could be explained by several factors, namely low socio-economic

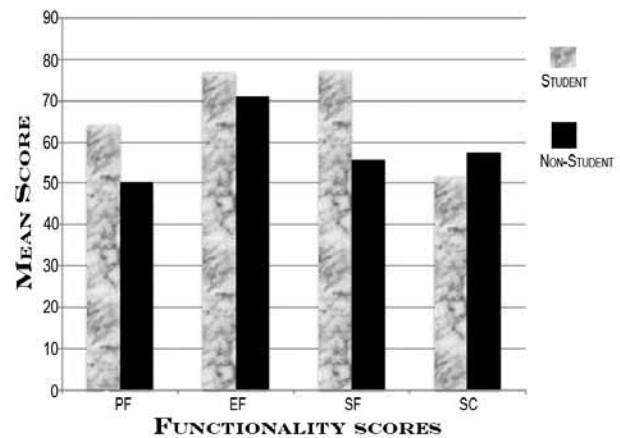


Figure 1 - Effects of education on different functionality scores. PF - physical functioning, EF - emotional functioning, SF - social functioning

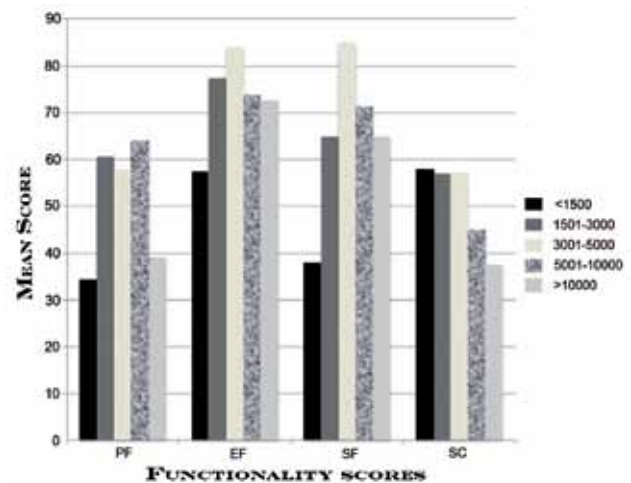


Figure 2 - Effects of household monthly income on different functionality scores. EF - emotional functioning, SF - social functioning

status and poor adherence to therapy and follow-up. Most patients in our cohort (82.3%) came from families with low monthly salaries (<5000 SAR); hence, these patients attended our hospital because it provides free healthcare. It was reported previously that patients with higher socioeconomic status had better quality of life,²³ and low socioeconomic status was a predictor of poor quality of life.²⁴ All children in our cohort were labeled transfusion-dependent, and this could explain their lower SC scores (54.3) compared with patients from other studies who had SC scores of 60.1 in Malaysia and 75.4 in Hong Kong.^{16,25} The high score in Hong Kong could be attributed to optimum treatment and to the fact that blood transfusion was scheduled on weekends to avoid school absenteeism, while our

day care does not provide services during weekends.²⁵ Consequently, children could not attend school on their transfusion days. Furthermore, the low SC score in our sample could be explained by the high frequency of patient visits, which was mainly for symptomatic anemia requiring admission. The use of stem cell transplant in the Hong Kong study does not explain the high SC score observed by the authors, as the mean±SD SC score of conventionally-treated thalassemia patients was 75.42±19.50, which is comparable with the 74.00±16.71 observed in transplanted patients.²⁵ In a recent report, La Nasa et al²⁶ reported that the long-term health-related quality of life of ex-thalassemia patients was very similar to that of the general population.

On the contrary, the mean EF score of our patients (74.1) was comparable with those obtained in other studies conducted in the Middle and Far East of Asia; EF scores of 76.9 and 75.9 were reported in Thai and Middle Eastern patients, respectively.^{10,17} Good family and friend support might explain the higher EF scores compared to PF scores observed in our cohort. The mean SF score of the patients in our study (78.5) was comparable with the 74.3 observed in studies conducted in Malaysia and 73.3 in Jordan.¹⁷ Poor physical fitness and inability for patients to participate in social events probably explains why the SF score in our cohort was slightly lower than that (SF score of 83.7) reported in the study conducted in Thailand.¹⁰ However, the authors included patients with mild cases of thalassemia, of which 42% had received blood transfusion over 3 months. The insignificant difference between splenectomized and non-splenectomized patients could be attributed to the small number of cases with a history of surgery (one-third).

Based on Pubmed-based literature, no study has compared the different functionality scores between splenectomized and non-splenectomized patients in pediatric patients. Our findings reveal that patients with a family history of thalassemia had significantly lower PF scores than their peers who had no family history of thalassemia. It is plausible that parents who have only one child with thalassemia are more attentive and caring than those who have several children with the disease.

This study is limited by small sample size, which was due to difficulties in obtaining data from non-Arabic or non-English-speaking patients.

The quality of life in thalassemic children is affected by multiple factors, such as family income and family history of thalassemia. Education should be emphasized,

as it increases patient functionality. More local studies should be conducted to further assess the quality of life in patients with thalassemia.

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Related Articles

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