Original Article

Anxiety, Depression, and Perceived Social Support in Patients with Transfusion Dependent Beta Thalassemia Major

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ABSTRACT

OBJECTIVE: To assess the frequency and severity of depression and anxiety, social support and demographic characteristics that could be associated with their disease.

METHODOLOGY: This cross-sectional study with TD-BTM patients was conducted from four different thalassemia centres (Kashif Iqbal, HELP, Saylani, and Omair Sana Foundation) located in Karachi from December 2018 to May 2019, 197 young (8-18 years) males and 203 (50.8%) young females requiring at least one unit of packed red cells in a month were included with the convenient sampling technique. Psychometrically standardized tests were used.

RESULTS: Eleven percent patients suffered severe depression, and a majority (44.2%) had high anxiety. Male patients, patients with comorbid conditions, and patients not satisfied with their treatment had significantly more significant *depression*; and male patients, patients with no schooling and patients not satisfied with their treatment had significantly greater *anxiety*. Patients who were schooled belonged to lower socioeconomic status and were not satisfied with their treatment had significantly more significant support from *family*. Patients who were schooled and had no comorbid conditions were significantly supported by *friends*. Finally, patients with comorbid conditions were significantly supported by *others*.

CONCLUSION: In the TD-BTM patients we sampled, most suffered from anxiety and less so with depression. Most patients had strong family support, followed by friends and others. Assessment of depression, anxiety and social support are discussed in the context of psychotherapeutic interventions, which could attenuate full-blown mental disorders in these patients.

KEYWORDS: Anxiety, beta thalassemia major, B.M.T, depression, social support, school going, TD-BTM, transfusion dependent beta thalassemia major

INTRODUCTION

Beta Thalassemia Major (B.T.M.) is a severe recessive genetic disorder of hemoglobin structure that reduces the synthesis of beta-globin chains, rapidly breaking down red blood cells and resulting in anemia, hemolysis and iron overload in different organs[1]. Protracted hemolysis causes bone deformities and influences growth and development in affected individuals[2]. Children born with Transfusion-Dependent Beta Thalassemia Major (TD-BTM) usually develop the symptoms of severe anemia within the first year of life, requiring lifelong transfusion support for survival. Pakistan faces thalassemia as a persistent challenge as it heavily burdens the health budget, with approximately five thousand children diagnosed with this disorder annually[3].

This inherited hematological disorder has multifactorial social bellwethers such as consanguineous marriage, lack of education, and unaffordability to diagnose and treat the condition. Affected individuals face multiple challenges, including physical appearance, social behavior, self-esteem and lifestyle changes. Together, these elements spawn mental health issues in chronic TD-BTM patients[4], which perturbs their lives from daily routines to vocational competencies, particularly children more vulnerable to emotional and social problems. Additionally, various management-related factors such as treatment of iron overload, transfusion -related complications and treatments lead patients to develop clinical and psychological conditions[5,6].

Social support offered by immediate family members has a protective impact on the health and quality of life of the patient[7], and conversance of clinical condition plays a pivotal role in shaping patients'

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physical and mental wellness.

Better management and improved transfusion have added years of life to B.T.M. patients; however, various social factors influence the quality of life for a young patient, such as reduced school days and limited social and gaming activities[8]. In such circumstances, adequate emotional support and good alliance work to neutralize adverse events. We carried out this study to determine the presence of depression and anxiety in TD-BTM patients, evaluated their psychosocial support, and proposed strategies to improve early care and encourage social contacts to reduce their anxiety and depression.

METHODOLOGY

This cross-sectional study with TD-BTM patients from four different thalassemia centres (Kashif Iqbal, HELP, Saylani, and Omair Sana Foundation) located in Karachi from December 2018 to May 2019. All centres were well established and had 100-250 registered patients who came for regular transfusions and follow-ups.

197 young (8-18 years) males and 203 (50.8%) young females requiring at least one unit of packed red cells in a month were included (**Table I**) with the convenient sampling technique. Patients over 18 years and those with other comorbid mental or physical limitations were excluded from the study. The objectives and rationale of the study were discussed with the concerned authorities at the centres, and permissions were sought before the commencement of the study. The centres bore blood transfusion costs; however, patients sometimes had to pay additional charges for pharmacy, laboratory, and radiological investigations.

Data was collected by students of Jinnah Medical and Dental College Karachi by using a set of questionnaires that consisted of three parts, i.e., demographic characteristics, also validated by Hospital ID cards), The second part consisted of the Persian version of the Hospital Anxiety and Depression Scale (H.A.D.S) developed by Zigmond AS 1983[9], which consisted of 14 questions and measured anxiety (7 questions) and depression (7 questions) on the 4-point rating scale. Composite scores for anxiety and depression could range from 0-21, and a higher score indicated higher anxiety and depression. A score of 0-7 is considered healthy, 8-10 as "borderline case," and 11 or more shows "abnormal or case". Montazeri A 2003[10] in Iran reported moderately high internal consistency for depression (α = .78) and high internal consistency (α = .86) for anxiety subscales. The third part included the Persian version of the Multidimensional Scale of Perceived Social Support (M.S.P.S.S)[11] designed to measure psychosocial support from family, friends and significant others. It consists of 12 questions with a 7-point Likert scale ranging from very strongly agree to very strongly disagree. The responses in each category were scored, and then the sum was divided by 4 to obtain the mean scale score. Scores ranging from 1 to 2.9 were categorized as low support, 3 to 5 as moderate support, and 5.1 to 7 as high support.

Procedure

For each patient and/or guardian signed a consent form. Items on the demographic sheet, H.A.D.S. and M.S.P.S.S., were verbally presented to patients in Urdu who could not understand English, and their responses were recorded. They were told that all information would be kept confidential and anonymous. The data was analyzed by SPSS 25.0 (S.P.S.S. Inc., Chicago, IL, U.S.A.). Descriptive (mean, standard deviations, percentages) and inferential (t-test) statistics were calculated to make comparisons among various conditions and groups.

Ethical Review Committee (ERC)

The study was approved by the institutional ethical review committee (Jinnah Medical College Hospital, Karachi, ERC letter No. 03-B19/15-11-2018). Anonymity and confidentiality of the data and personal information about the patients were ensured throughout the study. Only the group leader and research supervisor had complete access to all the data details, including personal information about the patients.

RESULTS

Demographic Characteristics

Male-female patient ratio (1:1.2) was almost similar. Most 311(78%) of patients lived in Karachi, and others lived in cities (or suburban locales) outside Karachi; this is possibly one reason that most of the patients were enrolled in school 258(63%), and others did not 148(37%). Patients with low socioeconomic status (SES) 262(65.5%) were more in number than middle 133(34%) and high 5(1%) statuses because the parents of most 364(91.0%) patients belonged to manual labor class, while a small 36(9%) had white-collar jobs. A majority of the patients visited hospitals twice a month for blood transfusion 321(80%); others just once 79(20%), and most patients got their ferritin levels checked every six months 349(87%); others once annually 51(13%). Similarly, most patients took iron chelators 370(92.5%), while others did not for clinical or financial reasons 30(37.5%). In addition, the majority of the patients paid a visit to a general physician 256(64.1%), fewer to a hematologist 89 (22.3%) and rarer still to a cardiologist for transfusion-related complications 21(5.3%). More patients were underweight (B.M.I) 304(76%), fewer had normal weight 77(19.3%), and fewer still were overweight 16 (4.0%) and obese 3(0.8%). Parents of most patients had consanguinity in marriage 325(81%), less 75 (19%) that were not blood-related; and almost all 394 (98.5%) parents of patients had thalassemia minor; status of others 6(1.5%) were unknown. A majority, 258(64.5%) of patients, relied on charity funds and donations; however, a minority of patients had to pay it out of their (Parent) pockets 139(34.8%) (**Table I**).

Table I: Demographic and Disease-Related Characteristics of the Participants (n=400)

Characteristic	n (%)
Gender	
Male	197 (49.3)
Female	203 (50.8)
Residency	
Karachi	311 (78.0)
Outside Karachi	89 (22.0)
Educational Status	
No Schooling	148 (37.0)
Schooled	258 (63.0)
Socio-economic status	
Low	262 (65.0)
Intermediate	133 (34.0)
High	5 (1.0)
Occupation	
White color	364 (91.0)
Blue color	36 (9.0)
Serum Ferritin	
Biannual checkup	349 (87.0)
Annual checkup	51 (13.0)
Iron chelation	
Yes	370 (92.5)
No	30 (37.5)
Consulting other Physicians	
General Physician	256 (64.1)
Hematologist	89 (22.3)
Cardiologist	21 (5.3)
B.M.I. of patients	
Underweight	304 (76.0)
Normal	77 (19.3)
Overweight/Obese	19 (4.8)
Consanguinity of parents	
Yes	325 (81.0)
No	75 (19.0)
Treatment Financed	
Self-paid	139 (34.8)
Funded	258 (64.5)

Depression

For most demographic characteristics, average depression was within the normal range (0-7) on H.A.D.S., except when patients had comorbid conditions or were unsatisfied with their treatment. The following analysis compares depression across demographic characteristics that show significant differences. Male patients (M = 6.88, SD = 3.46) had significantly ($p < .03$) higher depression than female patients (M = 6.14, SD = 3.34). Patients who were not satisfied (M = 8.16, SD = 3.50) with their treatment were significantly ($p < .03$) more depressed than those who were satisfied (M = 6.42, SD = 3.40) with treatment. Patients who suffered from comorbid conditions (M = 7.37, SD = 4.12) had significantly ($p < .02$) greater depression than those with no comorbidity (M = 6.23, SD = 3.12) (**Table II**). Education, socioeconomic status and parental consanguinity did not significantly influence depression in TD-BTM patients (**Table II**). Thus, a majority (238, 59.5%) of patients were normal when assessed for depression on H.A.D.S., about a third (118, 29.5%) were borderline-depressed and about a bit more than a tenth (44, 11%) were abnormally depressed (**Figure Ia**).

Anxiety

Average anxiety in TD-BTM patients was in the borderline anxiety range (8-10+) of H.A.D.S. Male patients (M = 10.53, SD = 3.19) had significantly ($p < .005$) more anxiety than female patients (M = 9.42, SD = 3.95). Patients who were not schooled (M = 10.26, SD = 4.28) had significantly ($p < .03$) more significant anxiety than those who were schooled (M = 9.79, SD = 3.76). The patients who were not satisfied (M = 11.48, SD = 3.56) with their treatment were significantly ($p < .03$) more anxiety-ridden than those who were satisfied (M = 9.87, SD = 3.97). Socioeconomic status, parental consanguinity and comorbidity did not significantly influence depression in TD-BTM patients (**Table II**). Slightly more than a third (130, 32.5%) of the patients were normal when assessed for anxiety (H.A.D.S.), slightly less (93, 23.3%) had borderline anxiety, and a majority (177, 44.2%) had abnormal levels of anxiety (**Figure Ia**).

Social Support

Table III shows education influenced support of family; patients that were schooled (M = 15.95, SD = 7.01) had significantly ($p < .009$) greater family support than patients that were not schooled (M = 14.05, SD = 6.90), and patients with low (M = 25.11, SD = 2.56) socioeconomic status had significantly ($p < .003$) greater support of family than patients that had middle to high (M = 24.24, SD = 3.08) socioeconomic status. And finally, patients not satisfied with their T.D.B.T.M. treatment (M = 25.74, SD = 1.45) were significantly ($p < .01$) more supported by their families than patients that were satisfied with their treatment (M = 24.76, SD = 2.82). Family support was not different ($p > .05$) for gender, parental consanguinity and comorbidity. Patients who were schooled (M = 12.80, SD = 7.70) had significantly ($p < .001$) more significant support from friends than patients who were not schooled (M = 9.84, SD = 5.80). For comorbid conditions, patients that had comorbid conditions (M = 13.45, SD = 7.25) had significantly ($p <.005$) lesser support of the friends than patients than those that did not have morbid conditions (M = 15.82, SD = 6.89). Support of friends was not different ($p > .05$) for gender, socioeconomic status, parental consanguinity and treatment satisfaction. Finally, patients with no morbid conditions (M = 11.17, SD = 6.74) had significantly ($p < .01$) less support from others than patients with morbid conditions (M = 13.57, SD = 8.36). Support of others did not differ ($p > .05$) across gender, education, socioeconomic status, parental consanguinity and treatment

Table II: Depression and Anxiety Scores Spread Over Demographic Characteristics of the Patients

Variable	n (%)	Depression M (S.D.)	*P*-value	Anxiety M (S.D.)	*P*-value
Gender					
Male	197 (49.3)	6.88(3.46)	0.03	10.53(3.19)	0.005
Female	203 (50.8)	6.14(3.34)		9.42(3.95)	
Educational status					
No schooling	148(37.0)	6.84(3.66)	0.13	10.26(4.28)	0.03
Schooled	252 (63.0)	6.31(3.26)		9.79(3.76)	
Socioeconomic status					
Low	262(65.5)	6.37(3.34)	0.07	10.09(4.006)	0.40
Middle+high class	138 (34.5)	6.07(3.54)		9.74(3.903)	
Parental Consanguinity					
No	75 (18.8)	6.99 (3.07)	0.18	10.16(3.83)	0.64
Yes	325 (81.3)	6.39(3.49)		9.92(4.004)	
Co-morbid					
No	303 (75.8)	6.23(3.12)	0.02	9.74(3.806)	0.06
Yes	97 (24.3)	7.37(4.12)		10.69(4.38)	
Treatment satisfaction					
No	19 (4.8)	8.16 (3.500)	0.03	11.48(3.563)	0.04
Yes	381 (95.3)	6.42(3.403)		9.87(3.970)	

Note. All comparisons are based on independent t-tests. Alpha = .05

Table III: Support of Family, friends and Other Spread over Demographic Characteristics of the Patients

Variable	Numbers	MSPSS-family score Mean(±SD)	*P*-value	MSPSS-friends score Mean(±SD)	*P*-value	MSPSS-Others score Mean(±SD)	*P*-value
Gender							
Male	197 (49.3)	24.6(2.88)	0.135	15.31(7.09)	0.86	11.5(6.9)	0.49
Female	203 (50.8)	25.1(2.67)		15.19(7.01)		12.0(7.49)	
Educational status							
No schooling	148(37.0)	14.05(6.9)	0.009	9.84(5.8)	<0.001	6.84(3.6)	0.129
schooled	252 (63.0)	15.95(7.01)		12.8(7.7)		6.3(3.26)	
Socioeconomic status							
low	262(65.5)	25.11(2.56)		14.92(6.82)	0.20	11.32(7.061)	0.098
Middle+high class	138 (34.5)	24.24(3.08)	0.003	15.87(7.42)		12.58(7.5)	
Parental Consanguinity							
No	75 (18.8)	25.04(1.99)	0.317	15.91(6.63)	0.369	11.65(7.56)	0.893
Yes	325 (81.3)	24.7(2.93)		15.10(7.13)		11.78(7.16)	
Co-morbid							
No	303 (75.8)	24.88(2.67)	0.366	15.82(6.889)	0.005	11.17(6.74)	0.011
Yes	97 (24.3)	24.59(3.09)		13.45(7.25)		13.57(8.36)	
Treatment satisfaction							
No	19 (4.8)	25.74(1.45)	0.014	16.26 (6.332)	0.5	9.68(5.488)	0.201
Yes	381 (95.3)	24.76(2.82)		15.20(7.082)		11.86(7.300)	

Note. All comparisons are based on independent t-tests. Alpha = .05

satisfaction. High-level support for the patients came from the family (375, 93.8%), followed by friends (99, 24.85) and others (80, 20%). More moderate-level support was offered by friends (184, 46%), others (60, 15%) and lastly by family (24, 6%). More low-level support came from others (260, 65%), followed by friends (177, 29.3%) and family (1, 0.3%) (**Figure Ib)**.

Figure I: The bar chart (A) illustrates depression and anxiety (H.A.D.S. scores) in TD-BTM patients. Note fewer patients had abnormal levels of depression compared to abnormal anxiety levels. B shows that family members offered the highest support to TD-BTM patients, followed by friends and others.

DISCUSSION

Patients with TD-BTM face many problems, including disease and treatment-related issues, social support problems, financial problems, etc. Such burdens perturb the mental well-being of the patient. The results of our study reveal that 11% of patients had severe levels of depression and high (44%) anxiety. A meta-analysis of B.T.M. patients in Iran showed that

Figure I-A: Anxiety and Depression Disorder

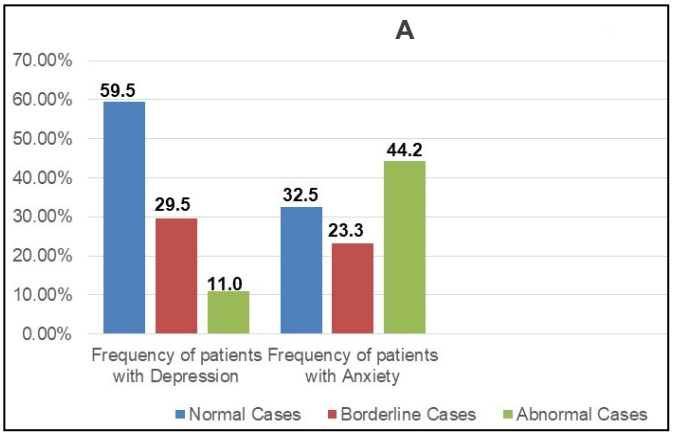
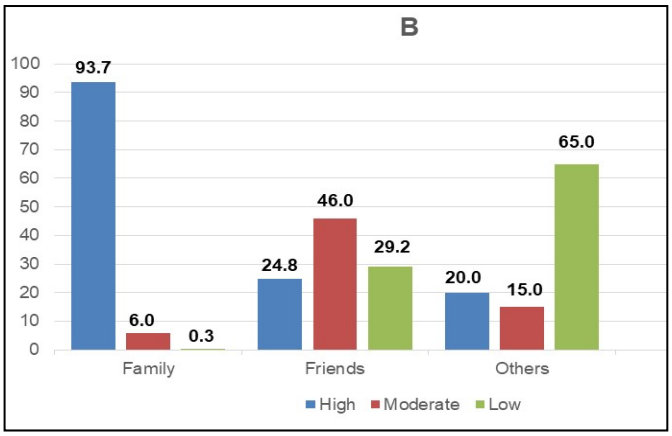


Figure I-B: Family member support to TD-BTM



the combined prevalence of depression was 42%. For mild, moderate, severe, and extremely severe depression, the pooled prevalence rates were 16%, 13%, 13%, and 3%, respectively[12]. In the Saudi Arabian study, it was observed that 11% of the participants reported experiencing severe to extremely severe levels of depression, 29% were in the moderate category, and 21% fell into the mild category[13,15].

Similarly, in our study, we made the same observation where 11% of the participants experienced depression, with 29.5% being borderline depressed. Perceived stress and cost related to medical care in thalassemia patients was high (51.7%) in one study[14], much like our study where anxiety was recorded for abnormal (44%) levels. These high levels of anxiety and moderate to high levels of depression in TD-BTM patients suggest such conditions should be evaluated and assessed by psychiatrists and clinical psychologists who can provide adequate therapeutic support before conditions for these patients escalate into clinical depression and anxiety.

In his meta-analysis, Alsaad AJ 2020[15] noted in six studies, females expressed more significant depression and anxiety than male patients. However, our data revealed the opposite: females expressed significantly lower levels of depression and anxiety than male patients (**Table II**). The above author also pointed out that some studies report more education reduces depression and anxiety in patients, and our study corroborates schooling was associated with lower anxiety than those that were not schooled; depression, however, was similar across schooled and non-schooled patients.

An essential aspect of the TD-BTM disease is the burden and distress of treatment-related factors[16], which not only leads to missing school, sports activities and compliance to iron chelation therapies; they pose additional challenges to balancing work and life. Hamdy M 2021[17] reported TD-BTM patients had a low score (M = 44.90, SD = 7.54) for quality of life (QoL This is likely attributed to the challenges of maintaining a daily life while simultaneously maintaining treatment-related challenges for a chronic disease such as thalassemia, which includes frequent hospital visits for transfusions and iron chelation therapy, as well as complications like hepatitis, cardiomyopathy, and diabetes. Although we did not specifically evaluate patients' QoL in our study, our observations indicated that treatment satisfaction and no disease comorbidities significantly reduced depression and anxiety (**Table II**).

It is expected that patients would get the highest support from their families, followed by friends and others; we saw this pattern (**Figure Ib**). A study similarly found that families received the highest score for Perceived Social Support (P.S.S.). In contrast, friends received the lowest score, and support was inversely correlated with depression and anxiety, i.e., higher support meant lower depression and anxiety[7]. Arian M 2019[18] argued that B.T.M. significantly affects health-related QoL (HRQoL) and recommended that this measure be used as an index of early assessment to provide timely therapeutic interventions for B.T.M. patients. In a comparative study at the University of Shiraz, groups of B.T.M. and Beta Thalassemia Intermedia (B.T.I.) patients showed no differences in HRQoL, suggesting the B.T.I. patients (that receive fewer transfusions) stack equally to B.T.M. patients with modest HRQoL[19].

Depression and anxiety are significant comorbidities for thalassemia patients, making this disorder even more challenging. If untreated, they can lead to poorer outcomes for other mental health issues, weak academic performance and reduced social competence[20]. The data presented in our study can assist and make hospitals and transfusion centres more cognizant of psychosocial variables to improve their valuable services that reduce complications with transfusions, chelation administrations, and serum ferritin checkups. In addition, authors believe counselling will improve coping and treatment-related adversities in TD-BTM patients. Therefore, the authors propose medical institutions and media centres should

invoke awareness programs on mental health for TD-BTM patients.

CONCLUSION

Our study suggests most (44%) TD-BTM patients expressed intense anxiety, but fewer (11%) strong depression; high anxiety is possibly due to disease symptoms, facial deformities and other social and physical disabilities the patient's experience, and though most patients are strongly supported by immediate family, friends and others, an early psychological assessment and counselling can help prevent severe mental health issues.

Ethical permission: Jinnah Medical College Hospital, Karachi, ERC letter No. 03-B19/15-11-2018.

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Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publically.

AUTHOR CONTRIBUTIONS

Asim S: Data collection, analysis, writing introduction and significant parts of manuscript
Naqvi S: Technical help throughout the project, writing
Soomro MA: Technical help throughout the project, writing
Karmani VK: Technical help such as tables and figure
Mehmood M: Technical help such as tables and figure
Sharif M: Data collection, analysis, writing
Bukhari SZS: Data collection, analysis, writing
Wahid I: Data collection, analysis, writing
Khatian A: Data collection, analysis, writing
Talat N: Data collection, analysis, writing
Ali SS: Data collection, analysis, writing introduction and significant parts of manuscript
Harani M: Technical help in writing

REFERENCES

1. Motta I, Bou-Fakhredin R, Taher AT, Cappellini MD. Beta thalassemia: new therapeutic options beyond transfusion and iron chelation. Drugs. 2020; 80(11): 1053-63. doi: 10.1007/s40265-020-01341-9.
2. Khandros E, Kwiatkowski JL. Beta thalassemia: monitoring and new treatment approaches. Hematol Oncol Clin North Am. 2019; 33(3): 339-353. doi: 10.1016/j.hoc.2019.01.003. Epub 2019 Apr 2.
3. Khaliq S. Thalassemia in Pakistan. Hemoglobin. 2022; 46(1): 12-4. doi: 10.1080/03630269.2022.2059670.
4. Tarim HS, Oz F. Thalassemia major and associated psychosocial problems: a narrative review. Iran J Public Health. 2022; 51(1): 12-18. doi: 10.18502/ijph.v51i1.8287.
5. Anwar K, Waqar S. Psychopathological tendencies and quality of life among patients with thalassemia major. Rawal Med J. 2018; 43(1): 32-38.
6. Elzaree FA, Shehata MA, El Wakeel MA, El-Alameey IR, AbuShady MM, Helal SI. Adaptive functioning and psychosocial problems in children with beta-thalassemia major. Open Access Maced J Med Sci. 2018; 6(12): 2337-41. doi: 10.3889/oamjms.2018.367.
7. Maheri A, Sadeghi R, Shojaeizadeh D, Tol A, Yaseri M, Rohban A. Depression, anxiety, and perceived social support among adults with beta-thalassemia major: cross-sectional study. Korean J Fam Med. 2018; 39(2): 101-107. doi: 10.4082/kjfm.2018.39.2.101. Epub 2018 Mar 22.
8. Chordiya K, Katewa V, Sharma P, Deopa B, Katewa S. Quality of Life (QoL) and the Factors Affecting it in Transfusion-dependent Thalassemic Children. Indian J Pediatr. 2018; 85(11): 978-983. doi: 10.1007/s12098-018-2697-x. Epub 2018 May 12.
9. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta psychiatr Scand. 1983; 67 (6): 361-70. doi: 10.1111/j.1600-0447.1983.tb09716.x.
10. Montazeri A, Vahdaninia M, Ebrahimi M, Jarvandi S. The Hospital Anxiety and Depression Scale (HADS): translation and validation study of the Iranian version. Health Qual Life Outcomes. 2003; 1: 14. doi: 10.1186/1477-7525-1-14.
11. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. J Pers Assess. 1988; 52(1): 30-41.
12. Jaafari Z, Sadidi N, Abdolahinia Z, Shahesmaeili A. Prevalence of Depression among Iranian Patients with Beta-Thalassemia Major: A Systematic Review and Meta-analysis. Iran J Med Sci. 2022; 47(1): 15-24. doi: 10.30476/ijms.2020.85941.1557.
13. Zolaly MA, Zolaly FM, Al Belowi L, Shuqdar R, Al Belowi Sr MA, Alwasaidi TA et al. Depression, Anxiety, and Stress Symptoms in Patients With Beta Thalassemia Major in Almadinah Almunawwarah, Saudi Arabia. Cureus. 2020; 12 (11): e11367. doi: 10.7759/cureus.11367.
14. Hisam A, Tariq NA, Irfan H, Arif B, Noor M. Perceived stress and monetary burden among thalassemia patients and their caregivers. Pak J Med Sci. 2018; 34(4): 901-906. doi: 10.12669/pjms.344.15420.
15. Alsaad AJ. Psychosocial Aspects of Thalassemia and Patient's Quality of Life: A Narrative Review. Majmaah J Health Sci. 2020; 8(1): 82-96. doi: 10.5455/mjhs.2020.01.009.
16. Pattanashetti M, Mugali J, Pattanashetty N, Patil

S. A study of severity of depression in Thalassemia patients. Int J Indian Psychol. 2017; 4(2): e05.
17. Hamdy M, Draz IH, El Sayed IT, Ayyad AA, Salemd MR. Assessment of Quality of Life among Beta-Thalassemia Major Patients Attending the Hematology Outpatient Clinics at Cairo University Hospital. Open Access Maced J Med Sci. 2021; 9 (E): 156-60.
18. Arian M, Mirmohammadkhani M, Ghorbani R, Soleimani M. Health-related quality of life (HRQoL) in beta-thalassemia major (β-TM) patients assessed by 36-item short form health survey (SF-36): a meta-analysis. Qual Life Res. 2019; 28(2): 321-334. doi: 10.1007/s11136-018-1986-1. Epub 2018 Sep 7.
19. Haghpanah S, Vahdati S, Karimi M. Comparison of Quality of Life in Patients with β-Thalassemia Intermedia and β-Thalassemia Major in Southern Iran. Hemoglobin. 2017; 41(3): 169-174. doi: 10.1080/03630269.2017.1340307. Epub 2017 Jul 25.
20. Cobham VE, Hickling A, Kimball H, Thomas HJ, Scott JG, Middeldorp CM. Systematic review: anxiety in children and adolescents with chronic medical conditions. J Am Acad Child Adolesc