



# Effectiveness of Cognitive-Behavioral Therapy on Distress Tolerance and Coping with the Child's Illness in Parents of Children with Thalassemia Major

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## Abstract

**Background and Objective:** Major Thalassemia can be considered one of the biggest chronic physical disorders, which causes some psychological and social problems to patients and their families. This study aimed to investigate the effect of cognitive-behavioral therapy on the distress tolerance and level of coping with a child's illness among the parents of children with major thalassemia.

**Materials and Methods:** This study was conducted based on a semi-experimental design with pretest and posttest. The statistical population consisted of all parents of Children with major thalassemia in Zahedan, Iran, during 2016. A total of 40 parents were selected based on convenience sampling and randomly divided into two experimental (n=20) and control groups (n=20). They were then requested to complete the distress and resistance questionnaires, and they participated weekly in eight 90-min intervention sessions based on cognitive behavioral therapy. Data were analyzed in SPSS software (version 20) through multivariate covariance analysis.

**Results:** The results show that cognitive-behavioral therapy improves distress ( $F=9.82$ ,  $P<0.004$ ), tolerance ( $F=5.12$ ,  $P<0.030$ ), absorbed ( $F=7.43$ ,  $P<0.010$ ), assessment ( $F=4.73$ ,  $P<0.037$ ), and adjustment ( $F=6.70$ ,  $P<0.014$ ) dimension scores, and has an effect on group membership. Moreover, cognitive-behavioral therapy improved the level of coping with the disease dimension ( $F=32.61$ ,  $P<0.0001$ ) and the first factor ( $F=5.53$ ,  $P<0.025$ ). Additionally, this technique had a significant effect on posttest scores and group membership.

**Conclusion:** The results showed that cognitive-behavioral therapy increased the level of distress tolerance and improved the level of coping with the child's disease, compared to the control group. Evidence suggests that the parents of children with major thalassemia patients face many problems that can lead to high levels of anxiety and depression, tolerance of distress at a low level, despair and disappointment, as well as guilty feelings.

**Keywords:** Cognitive-behavioral therapy, Coping, Distress tolerance, Major thalassemia

## Background

Thalassemia is one of the most common chronic heritable diseases worldwide, which can be observed in almost all races and causes many problems for the patient, family, and health system. Thalassemia major can be considered one of the biggest chronic physical disorders in Iran [1]. Regular visits to hospitals and clinics impair the normal trend of patients' life, limit their social life, and increase the mental stress and tension in the family [2]. Furthermore, parents confront mental distress when their children become ill. In most cases, the anxiety and distress of the parents are related to the severity of the disease and the therapeutic methods of the child [3].

Distress tolerance is one of the common topics for research in the field of the emotional disorder [4]. Moreover, it is a variable of individual differences, which refers to the capacity of experience and resistance to emotional disturbance [5]. Distress tolerance has increasingly been seen as an important factor in the growth of new insights on the onset and maintenance of mental health [6]. People with low endurance distress in a wrong attempt are engaged in behavioral disorders to deal with their negative emotions [7]. Furthermore, they attempt to relieve emotional pain by showing some malicious behaviors, such as drugs and alcohol consumption [8]. The emotions and physiological arousal caused

by the stressful situation force the person to take strategies to deal with them, which is referred to as coping [9].

If individuals can better deal with their resources, they are less susceptible to vulnerable situations [10]. Studies in the field of health psychology have shown the positive effect of using compatible coping strategies, such as stress management based on cognitive-behavioral theory [11]. These treatments can play a role in coping, immunization, and prevention of the onset of various diseases and their complications by creating positive psychosocial factors [12]. With this background in mind, it is of utmost importance to improve the psychological status and positive psychological characteristics among the parents of children with thalassemia [13].

### Objectives

This study aimed to answer the question of whether the recognition of behavioral therapy can affect distress tolerance and the level of coping with the child's illness among the parents of children with thalassemia major.

### Materials and Methods

This study was conducted based on a semi-experimental design with a pretest-posttest and a control group. The statistical population of the study included all parents of children with major thalassemia who referred to Ali Asghar Hospital, Zahedan, Iran, from November to February 2016. The sample size of 30 cases in each group was determined based on the effect size, alpha, and statistical power of 0.25, 0.05, 0.80, respectively. However, due to the absence of some participants, the number of participants in each test group was reduced to 20 cases in each group.

The inclusion criteria were literacy and residency with a spouse in Zahedan, Iran, during the study. On the other hand, the parents who were absent in more than two sessions of training, and those who were exposed to severe stressors, such as the death of a family member and pregnancy during the research procedure, were excluded from the study. In total, 40 parents of children with major thalassemia who referred to the Thalassemia Department of Ali Asghar Hospital, Zahedan, Iran, were selected using the available sampling method and assigned into two groups of experimental (n=20) and control (n=20).

In order to collect information, the researchers introduced themselves to the clients and explained the research objectives and procedures. Following that, the parents were invited to participate in the intervention sessions respecting the ethical considerations. Subsequently, those who met the

inclusion criteria (parents of a child with major thalassemia and running the pretest) and were willing to participate in the research were enrolled in this study. Regarding the ethical considerations, the participants were informed of the voluntary nature of the study, and they were allowed to leave the study at any time and for any reason. Furthermore, they were assured of the confidentiality and anonymity of their data to observe privacy. It is worth mentioning that all the questionnaires were administered and analyzed by the researcher himself.

The subjects were randomly divided into experimental and control groups, and it was agreed that the intervention sessions would be held for the control group after the completion of the research. The experimental group participated in eight 90-min intervention sessions per week based on the cognitive psychotherapy in the hall of Hazrat Ali Asghar Hospital, Zahedan, Iran, on Wednesdays from 12 to 14:30.

The previous assignments were collected and discussed in each session, and a new weekly assignment was given to the parents. After completing eight training sessions, a posttest was administered to both groups. The sessions aimed to determine the effectiveness of the intervention based on behavioral-cognitive therapy in the improvement of distress tolerance, level of coping styles, as well as enhancement of coping with a child's illness. It is worth mentioning that it was tried to organize the sessions in the form of question and answer, as well as group discussions. Moreover, at the end of each session, assignments were assigned to the participants, and they were requested to complete them at home. At the beginning of the next session, the assignments were checked and the contents of the previous sessions were reviewed. It is of importance to mention that the intervention sessions based on cognitive-behavioral therapy lasted two months (Table 1).

### Distress Tolerance Scale

This self-assessment index was developed by Simmons and Gather with 15 items and 4 sub-scales to measure the ability to withstand emotional distress [14]. The items are rated on a five-point Likert scale of 1=strongly agree, 2=slightly agree, 3=to the same extent agree and disagree, 4=slightly disagree, and 5=completely disagree. It should be noted that item 6 is scored reversely, and high scores indicate a high distress tolerance [14]. The criterion validity and good initial convergence of this tool have already been confirmed in previously conducted studies. The internal consistency of the total scale was estimated at 0.71; moreover, the

**Table 1.** Contents of the Treatment Sessions

Sessions	Description
Session 1	Getting acquainted with members, as well as expressing the logic and aims of the training sessions for the parents of children with thalassemia
Session 2	Discussions on thalassemia and its impact on the caregiver's life
Session 3	Defining stress, as well as adaptive coping and relaxation training
Session 4	Problem-solving and problem design
Session 5	Identifying and rating moods, ways to recognize irrational thoughts.
Session 6	Teaching the re-evaluating of the thoughts and accompanying challenges
Session 7	Time Management training
Session 8	Anger management training and doing exercises to control anger

corresponding values for the tolerance, absorption, evaluation, and adjustment subscales were 0.54, 0.54, 0.56, and 0.58, respectively [15]. In this study, Cronbach's alpha coefficients for these scales were 0.72, 0.82, 0.78, and 0.70, respectively. In addition, the Cronbach's alpha coefficient of the total scale was determined at 0.82.

**Coping Health Inventory for Parents**

This 45-item scale was developed by Hamilton et.al to measure the ability of a family to cope with an acute or chronic illness of one of the children. The internal consistency of the questionnaire has been estimated by two separate studies at 0.79 and 0.71 using Cronbach's alpha [16]. Based on the results obtained from several studies that utilized this scale, researchers have provided natural scores as a method for comparison [17]. Three proficient translators translated this tool into Persian using the translation back method, which is a suitable and acceptable technique for translating research tools into other languages. A pediatric nurse with an MA degree and a psychologist confirmed the face validity of the Persian version of this scale. Eventually, 10 mothers of children with chronic illness were requested to complete the checklist, and they were asked about

the clarity of the phrases, followed by minor revisions based on their comments. The data were analyzed in SPSS software (version 22) through descriptive (mean±SD) and inferential (analysis of covariance) statistics.

**Results**

The mean (SD) ages of the experimental and control groups were 40.3 (6.1) and 41 (5.7) years (age range: 25 to 55), respectively. Table 2 tabulates the mean (SD) of the dependent variables in the experimental and control groups.

The results of multivariate covariance analysis with control of pretest scores showed that none of the controlled variables had a significant effect on posttest scores; however, the effects of the adjustment dimension were significant in this regard (Table 3).

Table 4 shows the results of multivariate covariance analysis by controlling the pretest scores. According to the results, distress (F=9.82, P<0.004), tolerance (F=5.12, P<0.030), absorbed (F=7.43, P<0.010), assessment (F=4.73, P<0.037), and adjustment dimensions (F=6.70, P<0.014) had a significant effect on the posttest scores and the group membership.

**Table 2.** Mean (SD) of the dependent variables in the experimental and control groups

Variables		Experimental group		Control group	
		Pretest	Posttest	Pretest	Posttest
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Distress tolerance	Tolerance	3.75 (1.1)	6.05 (2.32)	4.15 (1.26)	4.60 (1.35)
	Attraction	4.20 (1.50)	6.40 (2.50)	3.80 (1.10)	4 (1.85)
	Assessment	9.80 (3.73)	12.85 (4.33)	8.20 (1.60)	9.55 (1.46)
	Regulation	5.30 (3.16)	6.90 (2.17)	4.05 (1.09)	5.35 (1.34)
Improvements in the level of coping with the disease	First Factor	33.50 (5.90)	40.25 (7.91)	31 (3.30)	30.60 (2.68)
	Second Factor	29.05 (7.25)	34.05 (7.08)	28.40 (2.68)	28.05 (2.89)
	Third Factor	17.25 (2.67)	18.80 (2.84)	16.30 (2.20)	16 (1.79)

**Table 3.** Multivariate covariance results of the experimental and control groups at the posttest

Source	Special amount	F	df Error	df hypothesis	P	Eta	Statistical power
Special amount	.69	3.26	4	30	.025	.303	.768
Distress (pretest)	.933	.54	4	60	.709	.067	.161
Tolerance (pretest)	.965	.28	4	30	.891	.034	.102
Absorption (pretest)	.791	1.98	4	30	.123	.209	.525
Evaluation (pretest)	.906	.78	4	30	.550	.094	.219
Adjustment (pretest)	.645	4.12	4	30	.009	.355	.868
Group	.808	1.78	4	30	.159	.192	.477

**Table 4.** Results of multivariate covariance of cognitive-behavioral therapy on the improvement of distress tolerance at the posttest

Source	Dependent variables	SS	df	MS	F	P	Eta	Statistical power
Group	Distress Dimension	396.939	1	396.939	9.824	.004	.229	.86
	Tolerance Dimension	18.283	1	18.283	5.12	.030	.134	.59
	Absorbed Dimension	32.592	1	32.592	7.434	.010	.184	.75
	Assessment Dimension	36.757	1	36.757	4.732	.037	.125	.52
	Adjustment Dimension	15.022	1	15.022	6.706	.014	.169	.71

**Table 5.** Results of multivariate analysis of covariance for coping with the disease at the posttest

Source	Special amount	F	df of Error	Df hypothesis	P	Eta	Statistical power
Special amount	.485	8.24	4	31	.001	.51	.99
Coping disease (pretest)	.797	1.98	4	31	.122	.203	.52
First factor (pretest)	.822	1.68	4	31	.179	.178	.45
Second factor (pretest)	.580	5.61	4	31	.002	.420	.95
Third factor (pretest)	.554	6.24	4	31	.001	.446	.97
Group	.290	18.97	4	31	.0001	.710	1.00

**Table 6.** Results of multivariate covariance of cognitive-behavioral therapy on the improvement of distress tolerance at the posttest

Source	Dependent variables	SS	df	MS	F	P	Eta	Statistical power
Group	Coping with the Disease	1141.346	1	1141.346	32.61	.0001	.49	1.00
	First Factor	189.279	1	189.279	5.53	.025	.14	.62
	Second Factor	68.88	1	68.88	3.15	.085	.085	.40
	Third Factor	3.280	1	3.280	1.91	.176	.053	.269

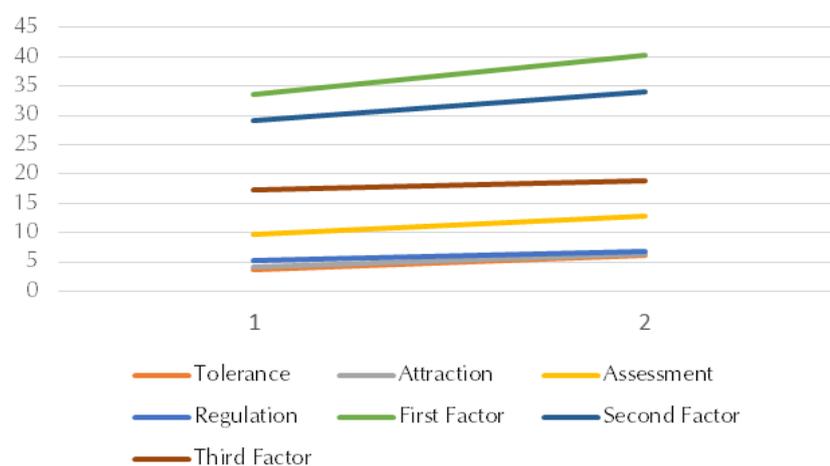
**Figure 1.** Difference between pretest and posttest in terms of variables in the experimental group

Table 5 summarizes the results of multivariate covariance analysis by controlling the pretest scores of coping with the disease and its dimensions. The controlled variables (coping with the disease and the first factor) had no significant effect on the posttest scores; however, the effects of the third factor (Squat ETA of 0.446 and power test of 0.974) and the group membership (ETA of 0.710 and test power of 1.00) was significant showing very good adequacy of the sample size.

Table 6 indicates the significant effect of cognitive-behavioral therapy on the improvement of coping with the disease dimension ( $F=32.61$ ,  $P<0.0001$ ) and first factor ( $F=5.53$ ,  $P<0.025$ ); moreover, the cognitive-behavioral therapy shows a significant effect on the posttest scores and group membership.

## Discussion

Thalassemia major is one of the diseases that require continuous care of parents, regular blood transfusions, and iron transplantation to survive. The results of this study showed an increase in the mean score of the distress tolerance in the experimental group after the intervention, compared to the control group. Kolivand et al. [15] showed the effect of the cognitive-behavioral intervention on distress reduction among patients with chronic pain. The results of a study conducted by Yazdanimehr et al. [16], Hadjistavropoulos et al. [17], and Fitzpatrick et al. [18] showed the effectiveness of cognitive-behavioral therapy in increasing the adaptability of the parents of children with chronic diseases. Cognitive-behavioral therapy holds that extreme thinking and data analysis

distortion usually exacerbates depression and anxiety [18].

Li et al. reported the effectiveness of cognitive-behavioral therapy in alleviating anxiety among patients with coronary heart disease [19]. Similarly, Daniels reported the positive effects of this method on the outcomes of chronic conditions, such as thalassemia [20]. According to a study conducted by Kazantzis et al., cognitive-behavioral therapy had no significant effect on anxiety among patients with mood disorders [21]. However, the depression scores were significantly decreased in both groups, which was more significant in the experimental group (4.77 vs. 0.76). This method of therapy changes the way of thinking and benefits from the principles of conditional reinforcement [22]. During this treatment, a person with major thalassemia learns using cognitive techniques that s/he should try to achieve a better position. This continuously improves the patient's follow-up treatment condition, and at the same time, calmness and awareness [23].

Previous studies also reported the positive effects of cognitive-behavioral therapy on depression among different populations [24]. Jeyantham et al. reported that cognitive-behavioral therapy had no significant effect on depression among patients with chronic coronary heart disease [25]. Despite a more significant decrease in the mean score of depression in the experimental group, between-group differences were not statistically significant at the posttest stage. An explanation for such insignificant between-group differences may be the relatively short course of the study.

In explaining these findings, it can be said that this treatment helps people understand that negative emotions may occur but they are not a permanent part of the person. This perspective strengthens ones' life expectancy and allows the individuals to focus on solving problems rather than responding to events involuntarily and recklessly, thereby bringing meaning to ones' life. In this study, interventions based on cognitive-behavioral therapy lead the patients to more adaptation and acceptance of treatment by correcting their misconceptions about medical treatment or complications of the disease. If individuals with chronic diseases have a positive opinion of themselves, they will have a better feeling about their disease. On the other hand, if there is a sense of uncertainty about the new identity, the methodology group behavior can be effective in the treatment of depression. Furthermore, group discussion is an effective factor in the improvement of the mental images of adolescents with thalassemia.

Regarding the limitations of this study, one can name the differences among participants concerning their reactions to depression, anxiety, and treatments. Moreover, states such as fatigue, anxiety, and sleeplessness might have affected the participants' responses to the items. Therefore, it is recommended that further studies investigate the effects of cognitive-behavioral therapy on the other patient outcomes, such as quality of life, adherence to treatment, anger, coping, and adjustment. The results should be interpreted with caution due to the small number of participants and administration in one center. Accordingly, it is recommended that this study be replicated with a larger sample size using a multi-center design.

### Conclusions

The results showed that cognitive-behavioral therapy increased the level of distress tolerance and improved the level of coping with the child's disease in the experimental group, compared to the control group. Evidence suggests that the parents of children with major thalassemia face many problems that can be lead to high levels of anxiety and depression, tolerance of distress at a low level, despair and disappointment, as well as guilty feelings.

### Compliance with ethical guidelines

Regarding the ethical considerations, the participants were informed about the research objectives and procedures. Moreover, informed consent was obtained from them. They were also assured about the confidentiality of their information, and they were allowed to leave the study whenever they wish, and if desired, the results of the research would be available to them.

The study protocol was approved by the Ethics Committee of Hormozgan University of Medical Sciences, Bandar Abbas, Iran (IR.HUMS.REC.1397.339).

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### Conflicts of Interest

The authors declare that they have no conflict of interest regarding the publication of the study.

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