



# The Effect of Benson Relaxation Technique on Anxiety and Quality of Life in Patients with Thalassemia Major: A Clinical Trial

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**Abstract** Thalassemia major is the most common chronic blood disease in the world, especially in Asia and Iran, and it gives rise to anxiety and reduces quality of life [QOL] in patients. The purpose of this study was to determine the effect of Benson relaxation technique on anxiety and QOL in patients with thalassemia major. This semi-experimental clinical trial study was conducted on 140 patients with thalassemia major in two intervention groups [n = 70] and control group [n = 70] in Ali Asghar Hospital, Zahedan. The data were collected using a demographic information form, the Spielberger State-Trait Anxiety Inventory [STAI], and the World Health Organization Quality of Life-BREF [WHOQOL-BREF] and self-report checklist. The control group received routine care, whereas the intervention group, we first completed the questionnaires; then, Benson relaxation technique was taught to each patient in three one-hour sessions in the presence of a family member for three consecutive days. Finally, they were asked to practice this technique twice a day for 12 weeks. The questionnaires were completed again one and three months after the intervention.

Data analysis showed no significant difference between the mean scores of anxiety and QOL and its dimensions in the two groups at baseline [ $P > 0.001$ ]. One and three months after the relaxation technique, however, the intervention group experienced a statistically significant difference in the mean scores of anxiety and QOL and its dimensions [ $P < 0.001$ ]. The results confirmed that Benson Relaxation Technique reduces anxiety and improves the QOL of patients with thalassemia major.

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**Keywords** Thalassemia major · Benson relaxation · Anxiety · Quality of life

## Introduction

Thalassemia is the most common hemoglobin disorder in the world. It occurs due to a defect in the synthesis of one of the globin chains. It is a health problem in the Mediterranean region, the Middle East, and Southeast Asia [1], and has been reported in more than 60 countries [2]. There are roughly 300 million patients with thalassemia in the world [3]. Recent studies have shown that approximately 300–400 thousand children with thalassemia are born annually in developing countries [4]. The prevalence of thalassemia in different parts of Iran ranges from 1 to 10%, with higher prevalence occurring in the northern and southern parts of the country [5]. About two million thalassemia carriers have been registered in Iran, which makes this disease a public health problem. With 2700 thalassemia major patients, Sistan and Baluchestan Province has the highest proportion [1:1000] of the total affected population among the provinces of Iran [6].

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One of the reasons for this disease is the lack of premari- tal screening. The symptoms of thalassemia major usually appear when the child is several months old [7]. The definitive and curative treatment option at present is allogeneic- stem cell transplantation (SCT). Not all may be ideal candidates for SCT, depending on the donor availability or the concomitant co-morbidities (especially iron overload related complications) [8]. The inherited nature of the disease, the manifestation of the disease in the early years of life, the appearance of deformity, the expectation of premature death, and the need for continuous treatment have a great impact on the patient's mental development and the family's peace and well-being [7]. Patients' physical disorders, social tensions, and financial burden, as well as problems related to education, work, and profession subject them to psychological trauma [9]. Some studies suggest that 80% of patients with thalassemia major have at least one psychiatric disorder [10]. The most reported psychiatric disorders in these patients are anxiety and depression [2]. Mohammadi et al. (2016) found that 49% of thalassemia patients experience anxiety and there is a correlation between mental disorders and QOL in these individuals [11]. The results of other studies also demonstrate that the QOL of thalassemia patients is low [12]. According to the World Health Organization, QOL is a person's understanding of their situation with respect to the culture and value system in which they live. QOL is considered as an important and effective indicator of treatment. The level of QOL can affect a person's physical health, mental state, independence, social relationships, and beliefs. Low QOL brings about depression, social isolation, decreased daily activities, dependence, and increased economic burden [13].

There are various pharmacological and non-pharmacological methods to promote QOL and deal with anxiety. Due to the high cost and side effects of pharmacological methods [14], Benson relaxation technique is one of the non-pharmacological methods [15]. This technique was introduced by Herbert Benson in 1970. He believed that eliminating tension is a key element in relaxation. In his study of various ways of relieving stress, he concluded that four basic elements reduce tension and elicit the relaxation response, including a quiet environment, a comfortable position, a mental device such as a word to focus on, and a passive attitude [16]. Gerogianni et al. (2019) found that Benson relaxation technique relieves anxiety in hemodialysis patients [15]. Hoseini et al. (2009) concluded that practicing Benson relaxation technique helps control anxiety and subsequently improve and enhance the QOL in patients with irritable bowel syndrome [17]. Chronic diseases such as thalassemia augment anxiety and diminish patient's QOL. The significance of QOL is now widely recognized, and the effectiveness of many health interventions is evaluated according to this indicator [18]. In order to reduce anxiety and improve

their QOL, patients need an appropriate approach that entails few complications and is easy to learn and practice. On the other hand, there is a lack of enough research on anxiety and QOL in patients with thalassemia and it is imperative that clinical nurses develop an effective method to address this gap. In the context of the above discussion, the present study was performed to determine the effect of Benson relaxation technique on anxiety and QOL in patients with thalassemia major.

## Methods

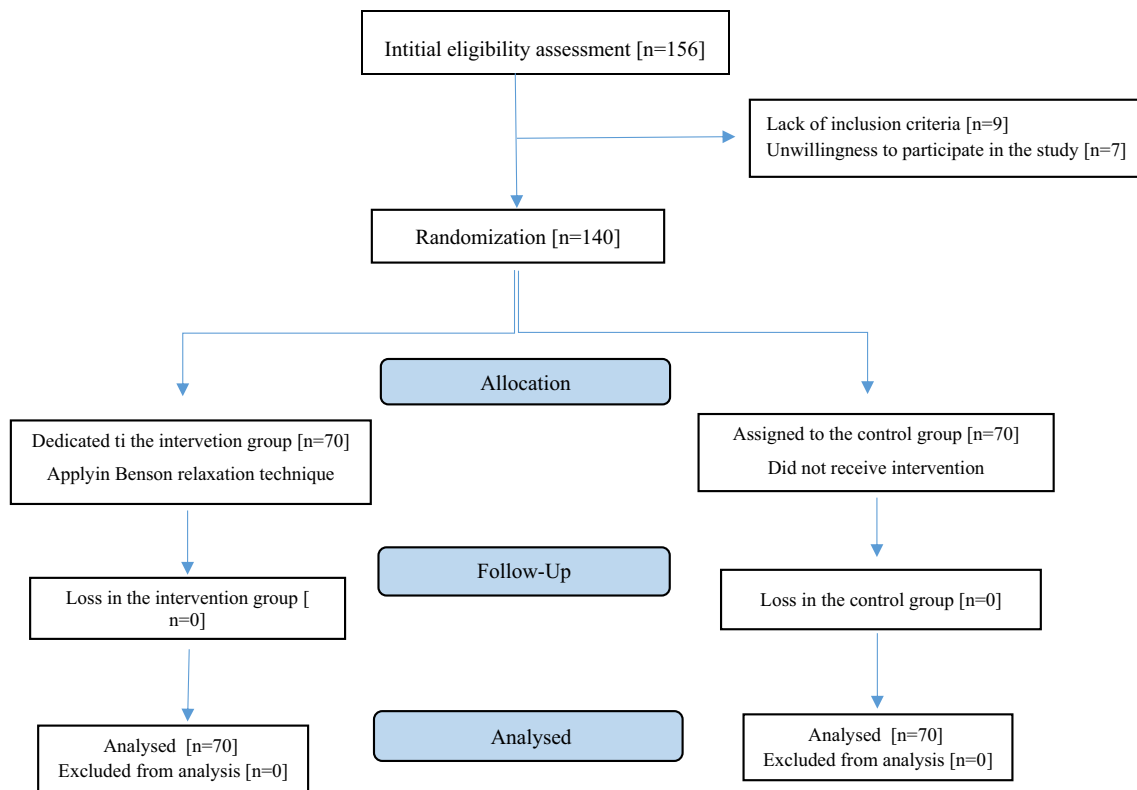
This semi-experimental clinical trial was conducted from February to June 2022 in Ali Asghar Hospital in Zahedan, located in the southeast of Iran. Totally, 140 individuals meeting the eligibility criteria were selected through convenience sampling and then randomly assigned to the intervention [ $n = 70$ ] and control [ $n = 70$ ] groups. (Fig. 1).

The eligibility criteria included the following: age over 18 years old, an open record at the thalassemia ward of Ali Asghar Hospital, no intellectual disability, no behavioral disorder, no hearing/speech impairment [according to medical records], anxiety score above 43 and QOL score below 50, and possibility of monitoring the patient for 3 months. The exclusion criteria, on the other hand, were the patient's reluctance to continue the study, incidence of severe physical complications due to the disease, and hospitalization during the study.

Considering the mean score of QOL obtained through the following formula proposed by Feyzi et al. (2015), in addition to a confidence interval of 95%, and a power of 95%, we estimated the sample size at 118 patients for both groups [19]. However, to ensure the sufficiency of the sample size and to take account of possible attrition, we recruited 70 patients for each group [total = 140].

Data collection tools included a demographic form [age, gender, education, etc.], Spielberger State-Trait Anxiety Inventory [STAI], the World Health Organization Quality of Life-BREF [WHOQOL-BREF], and a self-report checklist.

Introduced by Spielberger et al. (1970), the STAI has 40 items. Its score ranges from 40 to 160. A low score indicates calmness, a moderate score indicates moderate levels of tension and anxiety, and a high score reflects intense fear and near panic. In response to the state-anxiety questions, participants show the intensity of their feelings at a specific time on a 4-point Likert scale [not at all, somewhat, moderately so, very much so]. Also, in response to the trait-anxiety questions, they express their general feeling on a 4-point Likert scale [almost never, sometimes, often, almost always]. Using Cronbach's alpha, Spielberger et al. confirmed the reliability of this instrument in both dimensions of state anxiety [92%] and trait anxiety [90%] [20]. In Iran, using



**Fig. 1** Flowchart of the design, groups, and participants in the study

Cronbach's alpha, Khanzadeh et al. (2013) reported a 94% reliability for this instrument [21]. In the current study, the total reliability of the instrument was 89% based on Cronbach's alpha.

The WHOQOL-BREF is a 26-item questionnaire with 4 domains of "physical health, psychological, social relationships, and Environmental health"; in addition, it includes two general questions that are not related to any of these areas. Each item in WHOQOL-BREF is scored based on a 5-point Likert scale. Respondents to this questionnaire are scored between 24 and 120 [22]. WHOQOL-BREF was standardized in Iran by Nejat et al. (2006). Using test–retest, they assessed the reliability of the domains of physical health [0.77], psychological health [0.77], social relationships [0.75], and environment [0.84]. On the basis of Cronbach's alpha, they also reported the internal consistency of this instrument was 0.52 for healthy people and 0.84 for patients [23]. In the present study, Cronbach's alpha reliability of the whole instrument was 78%.

The necessary permits were obtained from the Vice Chancellor for Research and Information Technology and the Ethics Committee of Zahedan University of Medical Sciences. We also obtained a letter of introduction and subsequently presented it to the hospital authorities for gaining their approval to conduct the research at the thalassemia

ward. First, we used convenience sampling and explained the objectives and process of the research to the patients. Next, a written consent was obtained from patients who met the inclusion criteria and expressed their willingness to participate in the study. In the next step, the recruited patients were randomized into a control and an intervention group. To this end, we randomly arranged 140 envelopes that contained the name of the intervention or control group [70 envelopes for the controls and 70 others for the intervention group]. As patients were admitted and gradually recruited, they received an envelope in succession, which determined the group to which they were allocated.

If a patient was assigned to the intervention group, we would first complete for them the demographic questionnaire as well as the State-Trait Anxiety Inventory. Then, in an educational class at the hospital, the patient was trained about Benson relaxation technique in the presence of a family member during three one-hour sessions on three consecutive days. The classes were scheduled in coordination with the patient. [If a patient was not able to independently perform the technique during the designated sessions, the training continued until they acquired the ability to practice it on their own].

The first session was devoted to training Benson relaxation technique; in the second session, the patient practiced

the relaxation technique in the presence of the researcher, and the training would be repeated if necessary; in the third session, the patient’s questions about practicing the relaxation technique at home were answered and they were asked to perform it in the presence of the researcher. The intervention group were provided with [1] the audio file of the researcher’s instructions in a compact disc and [2] an educational booklet with images training Benson relaxation technique. They were asked to practice the relaxation exercises twice a day [morning and evening] for 12 weeks, between 15 and 20 min, and according to an arranged schedule under the supervision of a family member at home.

Before the study, the researcher received full theoretical and practical training about the relaxation technique under the supervision of a clinical psychologist. This technique is performed as follows: first, the patients remove all additional items [e.g., watch, bracelets, and rings] and put them aside.

To ensure the relaxation technique was practiced properly, we gave a self-report checklist to the patients to record the day, exact time, and duration they performed the technique. Furthermore, we made phone calls to the patients twice a week during the study period. One and three months after the intervention was over, the STAI and WHOQOL-BREF were completed again.

To do the pre-test for patients of the control group, we completed the demographic information form as well as the STAI and WHOQOL-BREF. This group, however, did not receive any intervention except for routine care. After one and three months, the STAI and WHOQOL-BREF were completed again for the controls. The data were analyzed in SPSS v21 using independent t-test, paired t-test, Repeated

Measures Analysis of Variance, and Chi-square test. Values below 0.05 were considered statistically significant.

**Results**

The results of the Kolmogorov–Smirnov test confirmed the normal distribution of the data; therefore, we used parametric tests. The mean and standard deviation of age was [23.66 ± 3.25] in the intervention group and [24.76 ± 3.42] in the control group. Also, the mean and standard deviation of the number of visits to the hospital for blood transfusion per month in the intervention and control groups was [1.21 ± 0.6] and [1.92 ± 0.95], respectively. There was no significant difference between the two groups in terms of the mean age and the number of visits to the hospital for blood transfusion per month [P > 0.05]. Likewise, other personal characteristics were not significantly different in the two groups (Table 1).

Repeated measures ANOVA was used to evaluate the mean and standard deviation of the scores of anxiety as well as QOL and its dimensions at baseline and one and three months post-intervention in the two groups. The results showed that in the intervention group, compared with baseline the mean anxiety score decreased and the mean score of QOL and its dimensions increased one and three months post-intervention. However, the mean scores of anxiety and QOL and its dimensions in the control group did not change considerably one and three months post-intervention compared with baseline (Table 2).

The results of repeated measures ANOVA revealed a significant interaction between time and group: the pattern of changes in the mean score of anxiety and QOL and its

**Table 1** Frequency distribution of demographic characteristics of thalassemia major patients in the intervention and control groups

Variable		Control group		Intervention group		P-value
		Frequency	Percentage	Frequency	Percentage	
Gender	Female	43	61.4	40	57.1	*0.77
	Male	27	38.6	30	42.9	
Marital status	Single	65	92.9	66	94.3	*0.29
	Married	5	7.1	4	5.7	
Education level	Illiterate or primary	5	7.1	7	10	*0.62
	High school	39	55.7	43	61.4	
	Diploma or above	26	37.2	20	28.6	
Family status	Parents alive	63	90	60	85.7	*0.97
	Parents separated or [one] deceased	7	10	10	14.3	
Economic status	Weak	6	8.6	4	5.7	**0.94
	Moderate	54	77.1	51	72.9	
	Good	10	14.3	15	21.4	
Complications of the disease	Yes	35	50	39	55.7	*0.62
	No	35	50	31	44.3	
	Total	70	100	70	100	

\*Chi-square

\*\*Exact tests based on the Markov chain Monte Carlo method

**Table 2** Comparison of mean and standard deviation of anxiety and QOL and its dimensions in patients with thalassemia major at baseline and one and three months after the intervention in the two study groups

Variable	Group	Baseline	One month post-intervention	Three months post-intervention
		Mean ± Std	Mean ± Std	Mean ± Std
Anxiety	Intervention	92.74 ± 14.94	79.74 ± 12.45	70.50 ± 11.98
	Control	90.83 ± 19.63	90.95 ± 18.88	91.74 ± 17.35
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$
Quality of Life	Intervention	45.74 ± 7.68	60.70 ± 14.55	65.30 ± 15.63
	Control	46.57 ± 4.60	45.62 ± 4.64	46.74 ± 3.55
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$
Physical health	Intervention	46.88 ± 10.65	62.34 ± 13.44	64.24 ± 13.27
	Control	46.49 ± 11.89	45.29 ± 9.98	46.19 ± 6.77
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$
Psychological health	Intervention	44.27 ± 7.66	55.45 ± 16.67	60.59 ± 18.55
	Control	45.99 ± 11.56	45.76 ± 11.55	44.68 ± 11.45
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$
Social relationships	Intervention	43.49 ± 8.84	55.45 ± 21.54	60.88 ± 21.34
	Control	44.32 ± 12.55	45.96 ± 13.68	45.64 ± 14.89
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$
Environmental health	Intervention	47.63 ± 7.90	55.29 ± 15.75	64.70 ± 16.99
	Control	47.39 ± 8.40	46.67 ± 8.95	46.39 ± 9.56
Comparison between the two groups at three points		$P < 0.001^*$	$P < 0.001^*$	$P > 0.001^*$

Bonferroni Time effect  $P \leq 0.001$ Group effect  $P > 0.05$ Time & Group  $P \leq 0.001$ 

\*Repeated measure ANOVA

dimensions at the three measurement points [baseline, one and three months post-intervention] was different in the two groups [ $P < 0.001$ ] (Table 2).

Pairwise comparisons [using Bonferroni test] showed that the mean scores of anxiety and QOL and its dimensions at baseline and one month post-intervention had a significant difference in the intervention group [ $P < 0.001$ ]. In the same group, these scores were also significantly different at baseline and three months post-intervention [ $P < 0.001$ ] as well as one and three months post-intervention [ $P < 0.001$ ].

In the control group, pairwise comparisons [using Bonferroni test] showed that the mean scores of anxiety and QOL and its dimensions were not significantly different in any of the three measurement points: baseline versus 1 month post-intervention; baseline versus 3 months post-intervention; and 1 month versus 3 months post-intervention [ $P > 0.99$ ]. The results indicated no statistically significant difference in the mean scores of anxiety and QOL and its dimensions at baseline in the two groups [ $P > 0.001$ ].

But 1 and 3 months after Benson relaxation technique was implemented, the intervention and control groups displayed

a significant difference in the mean scores of anxiety and QOL and its dimensions [ $P < 0.001$ ].

## Discussion

The present study addressed the impact of Benson relaxation technique on anxiety and QOL of patients with thalassemia major. The results revealed a significant difference in the mean anxiety score of these patients at three measurement points: baseline and one and three months after the intervention. Indeed, the implementation of Benson relaxation technique reduced anxiety level in the intervention group compared with the control group.

Likewise, Abu Maloh et al. (2022) reported the implementation of Benson relaxation technique led to a decrease in the level of anxiety in hemodialysis patients [24]. Ibrahim et al. (2022) also showed that Benson relaxation technique could be a safe and low-cost strategy to improve physiological parameters and sleep quality and alleviate anxiety in patients [25].

Consistent with the present study, the results of the studies by Salehipour et al. (2021), and Saifan et al. (2021)

support that Benson relaxation technique could allay patients' anxiety [26, 27].

Benson's approach can promote personal and social performance by improving the autonomic nervous system and relaxing the muscles. Ultimately, this technique reinforces a person's positive feelings and reduces mental disorders such as anxiety [28].

In contrast, Sahrayi Zarghi et al. (2020) reported that Benson relaxation technique could not reduce the anxiety of patients with acute coronary syndrome, and there was no significant difference between the intervention and control groups [29]. Also, comparing the effect of Benson relaxation technique and nature sounds on the anxiety of patients with heart failure, Seifi et al. (2016) indicated that the mean scores of anxiety in the three groups of Benson relaxation, nature sounds, and control were not significantly different [30]. The results of the above two studies are not in line with the present study. This inconsistency could be related to variations in the target populations and their anxiety level, in addition to the duration of implementing Benson relaxation technique in each study.

We also found a significant difference between the mean score of QOL at baseline and 13 three months post-intervention. In fact, the implementation of the relaxation technique raised the QOL of patients in the intervention group compared with the control group.

Rasouli Lemaraski et al. (2018) explored the effect of muscle relaxation technique on the QOL of patients with heart disease; the results showed that implementation of the relaxation program significantly increased the QOL in the intervention group [31]. In line with the present study, Mowla et al. (2020) observed that Benson relaxation can improve the QOL of caregivers of children with chronic diseases [32]. On the other hand, Dikmen et al. (2019) reported the relaxation technique alone could not increase the QOL of cancer patients [33]. This incompatibility with the present study may be due to differences in the nature of the disease and patients' characteristics in each study.

Furthermore, we noted that Benson relaxation technique enhanced the physical health domain of QOL in the intervention group. Similarly, Molazem et al. (2021) confirmed that Benson's approach could promote physical health and improve the QOL of hemodialysis patients [34]. Wandell et al. (2012) concluded that relaxation exercises contribute to improved physical performance in diabetes patients [35], which is in agreement with the results of the present study.

We also found that Benson relaxation technique improved the psychological health domain of QOL in the intervention group. Pangariban et al. (2020) observed that relaxation can improve psychological health in Hemodialysis patients [36]. Bommareddi et al. (2014) studies suggest that Benson relaxation has a positive effect on HIV patients psychological health [37]. However, Feyzi et al. (2015) concluded

that Benson relaxation technique could not promote mental health in Hemodialysis patients [19]. This incompatibility with the present study could be attributed to differences in the target populations as well as the duration and the number of times the relaxation technique was performed in each study.

Finally, the results of the present study exhibited that implementing Benson relaxation technique promotes the domains of environment and social relationships [of QOL]. Consistent with our study Madadkar Dehkordi and Basiri Moghadam [2018] suggested that progressive muscle relaxation has a positive effect on all dimensions of QOL, including social relationships and environmental health [38].

One of the limitations of this study concerns the implementation of the relaxation technique by the patient at home. In this regard, to ensure that the program was performed, we provided a checklist to a family member of the patients to record the day, exact time, and duration of the technique as practiced by the patient. In case the technique was not performed, they were asked to record the reason.

Given that Benson relaxation technique is an easy and free method that can be easily practiced at home at any time, nurses can instruct it to patients with thalassemic major and encourage them to perform it so as to reduce their anxiety and improve their QOL.

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**Author Contributions** MG designed the study, interpreted the data, drafted the paper and analysed the data, provided critical revision of the paper and approved the final version. SS designed the study, acquired of laboratory data and drafted the paper. FK helped in acquiring the clinical data, interpretation of data and revising the manuscript critically. All authors have approved the final submitted version of the manuscript.

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**Declarations**

**Conflict of interest** The authors declare no conflicting interests.

**Ethical Standard** Permission to conduct this trial was issued by the Ethics Committee of Zahedan University of Medical Sciences [IR.ZAUMS.REC.1400.357 (<https://b2n.ir/b66029>)]. The research protocol was also registered in the Iranian Clinical Trials Registration Organization on 2022/01/16 [IRCT20200926048842N2].

**Informed Consent** Written informed consent was obtained from all subjects and patients prior to participation in the trial. All data were kept confidential and unique study identifiers were used to assure anonymity. Collected data were kept in a locked file to which only the primary investigator had access. After completion of the study,

all educational materials from the programme were also supplied to individuals in the control group.

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