

# The effect of Benson relaxation method on anxiety in the emergency care

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## Abstract

**Objective:** To analyze clinical and sociodemographic properties of the patients as measured by the “Hospital Anxiety and Depression Scale-HADS” including the subscale regarding anxiety (HAD-A) in emergency department (ED) and to detect the effect of a session of Benson relaxation method (BRM) on high anxiety level.

**Methods:** Adult patients presented to the state hospital ED in seven days were recruited in this prospective study. Patients with high ( $\geq 8$ ) scores were randomized to the treatment or control groups. They were asked to pursue BRM to alleviate anxiety.

**Results:** Six hundred thirty-four patients were recruited (mean age 44.1 and 52% were female). Patients with acute exacerbation or with psychiatric illness, with a systemic disease and higher acuity level had higher HAD-A scores ( $P < .05$ ). BRM group had a mean score change higher than controls ( $7.2 \pm 2.9$  vs  $3.4 \pm 2.6$ ,  $t$  test,  $P = .026$ ).

**Conclusions:** Patients who underwent BRM had larger decreases in HAD-A scores than others.

**Abbreviations:** ANOVA = analysis of variance, BRM = Benson relaxation method, ED = emergency department, HAD-A = hospital anxiety and depression subscale regarding anxiety, HAD-D = hospital anxiety and depression subscale regarding depression, HADS = hospital anxiety and depression scale, SPSS = statistical package for social sciences.

**Keywords:** anxiety disorder, Benson relaxation method, clinic, emergency department, emergency medicine, hospital anxiety subscale, patient

## Key points

- High acuity, presence of pathological finding, systemic disease, higher acuity were significantly associated with higher anxiety scores.

- BRM appears to be useful for alleviating anxiety in the course and management of most patients in the ED.
- The application of BRM can improve the patients’ HAD-A scores in comparison to others who were not treated via the technique in the ED.
- The emergency healthcare providers can undertake BRM technique in the ED and these patients subjected to BRM tends to have a remarkable decline in HAD-A scores.

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## 1. Introduction

Disease states induce excessive stress on the body and modulate the spirit and mind with its distinct characteristics. Mental health is reported to be affected by perceived stress.<sup>[1]</sup> Anxiety syndromes are widespread in healthcare and are accompanied by severe psychosocial illness. Inappropriate coping in patients with anxiety decreases life of quality and paves the way to physical, mental, emotional, and socioeconomic problems.

The patients’ anxiety levels can be reliably identified in patents admitted to the emergency department (ED) using an easy-to-use screening instrument like “Hospital Anxiety and Depression Scale- HADS”. It is performed by the patient himself or herself and consists of subscales with respect to anxiety- and depression-related signs and symptoms (HAD-A and HAD-D, respectively) with 7 points each and has been utilized to highlight the presence of anxiety and depression in hospitals.<sup>[2–5]</sup> HAD-A subscale produces a point from items #1,3,5,7,9,11 and 13, whereas the other ones yield a score for depression. The point interval lies within the array from 0 to 21. The reliability and validity

researches were performed by Aydemir and colleagues in Turkish patient samples.<sup>[6]</sup>

For ages, people have sought all possible ways to alleviate anxiety. Pharmacological methods are expensive, sometimes painful and may result in adverse consequences. Relaxation or meditation is one of the most helpful adjunctive techniques without medications to render expedient improvement.<sup>[7]</sup> Meditation has its effect on a wide array of physiological and psychic entities and manifestations, including diminished anxiety, pain, and depression, improved mood and self-confidence, and alleviated stressful perceptions.<sup>[8]</sup>

'Relaxation response' was defined by Benson et al as a physiologic and homeostatic state which counteracted to that is triggered by stress.<sup>[9,10]</sup> There are various pathways to yield the Relaxation Response; for example, visualization, muscle relaxation, energy healing, massage, acupuncture, different breathing techniques, meditation, prayer, and yoga. The relaxation response is associated with reduced oxygen utilization, diminished sympathetic nervous system tone.<sup>[11,12]</sup> The Benson relaxation method (BRM) is a non-pharmacological, behavioral method devised to cope with anxiety. Among relaxation methods, BRM is among the easiest to learn and apply to a given patient.<sup>[13]</sup> A typical session for BRM covers the following steps: sitting in a comfortable position, closing the eyes, deeply relaxing all the muscles, beginning at the feet and progressing up to the face, breathing through nose while becoming aware of one's own breathing, continuing this practice for 20 minutes, and finally sitting quietly for several minutes, at first with closed eyes and later with eyes open.

Despite the recognition of the importance of alleviation of stress and anxiety in the acute injuries and illnesses, there is scarce information about the impact of behavioral methods such as BRM on anxiety and/or pain in the acutely ill patients such as those in the ED. The present study aims to evaluate clinical and sociodemographic characteristics of the sample as measured by the validated anxiety screening instrument (HAD-A) in acute situations (i.e., ED) and to detect the effect of a brief session comprising on-site application of BRM on patients with high level of anxiety.

## 2. Objective

To analyze clinical and sociodemographic properties of the patients as measured by the "Hospital Anxiety and Depression Scale-HADS" including the subscale regarding anxiety (HAD-A) in emergency department (ED) and to detect the effect of a session of Benson relaxation method (BRM) on high anxiety level.

## 3. Methods

The research was undertaken in the state hospital ED with an annual census of 360K cases. Before recruitment of the enrollees, the protocol of the research has been examined and approved by the Ethical Board of the institution.

All enrolled patients in the sample presented to the 5-layer triage system and received a rank of 2 to 5 (except for real life-threatening emergencies) in the ED within a predefined seven days' study period (10th July, 2016 to 17th July, 2016) constituted the study group. Those with serious diseases (e.g., ASA Grade 3 and 4), those who reported symptoms for more than a day, those with communication problems, illiterate patients, those with psychotic behavior (empiric criterion of

aggressive and uncooperative behavior despite being warned by healthcare personnel or security guards), pregnancy and nursing, and those refusing to take part in the research were discarded from the study. Emergency physicians on duty in the ED were primarily responsible regarding decisions on triage and other critical points.

All patients in the sample gave informed consent before taken into analysis. Separate sheets including HAD-A questions have been given to the enrollees and they have signed the best answer for each item. HAD-A datasheet was filled in by the patients in a distinct area in the ED. Patients with HAD-A scores equal to and higher than 8 were randomized to the treatment or control groups using random numbers table and sealed envelopes. The patients in the intervention arm were asked to do BRM as directed by the responsible emergency physician. Two hours later, all patients recorded to have high ( $\geq 8$ ) HAD-A scores were asked to respond to HAD-A questionnaire again and their scores were noted by the physicians in charge of their care in the ED.

## 4. Analysis

Ingredients of the datasheets have been analyzed via Statistical Package for Social Sciences (SPSS) for Windows 18.0. Descriptive data were analyzed with respect to sociodemographics, and clinical records were conducted using HAD-A scores above and below the threshold values. Independent samples *t* test was used to compare means of parametric values, while chi-squared test was done for categorical and ordinal data. The 95% confidence intervals were taken for the analysis. *P* values below .05 were accepted to reach statistical significance.

## 5. Results

Three thousands two hundreds forty-one patients were admitted within the 7-day period with predefined criteria. Among these, 562 pediatric cases were discarded from analysis. 478 were excluded because of signs for longer than one day, 169 for ASA Grade III or IV diseases, 98 for communication problems, 347 for illiteracy, 33 for being pregnant, 575 for simple wound care, minor complaints and other causes, 3 for psychosis, 313 for rejection of taking part in the study, 32 for insufficient data. In total, 2607 were excluded for all reasons. Finally, the remaining 634 patients were taken into the analyses.

The sample of the study had a mean age of  $44 \pm 16.3$  (range = 18–91) and 52.7% ( $n = 334$ ) were women. Females' mean age was similar to that of the males ( $43.7$  vs  $44.5$ , *t* test,  $P = .54$ ). The study patients' mean HAD-A score was found to be  $5.82 \pm 3.9$  (range: 0–21). Among all, 132 patients (20.8%) had scores higher than or equal to 8. Those with scores  $< 8$  and  $\geq 8$  had similar mean ages with each other ( $44.3 \pm 15.9$  and  $43.2 \pm 17.8$ ; *t* test,  $P = .49$ ). Table 1 depicts the demographic distribution and clinical properties of patients. Three-fourths of these patients with high HAD-A scores ( $n = 99$ ) were discharged from the ED and one fourth ( $n = 33$ ) were admitted to the hospital.

Female and male patients had similar mean HAD-A scores:  $6.0 \pm 4.1$ ;  $5.53 \pm 3.72$ , ( $P = .14$ ). Also, rates of patients with points less than 8 did not differ significantly with regard to gender ( $n = 255$ , 76.3% and  $n = 247$ , 82.3%, respectively (Chi-squared = 3.43,  $P = .06$ ).

Table 1 shows the distribution of the patients' health insurances with respect to HAD-A scores. Mean HAD-A score of the patients with insurance were not significantly different

**Table 1**  
**Patient characteristics related to HAD-A scores.**

Patient characteristics		Mean HAD-A Score $\pm$ SD	HAD-A Score <8 n (%)	HAD-A Score $\geq$ 8 n (%)	P*
Gender	Female (334, 52.7%)	6.0 $\pm$ 4.1	255 (76.3%)	79 (23.7%)	Chi-squared = 3.43, P = .06
	Male (300, 47.3%)	5.5 $\pm$ 3.7	247 (82.3%)	53 (17.7%)	
Education status	Literate & primary (n=228, 35.9%)	5.7 $\pm$ 3.8	194	34	Pearson chi-square = 7.7, P = .021
	Secondary & high school (n=267, 42.1%)	5.9 $\pm$ 4.1	201	66	
	University & doctorate (n=139, 21.9%)	5.6 $\pm$ 3.7	107	32	
Insurance	Private insurance (n=51, 8.0%)	6.7 $\pm$ 3.9	36	15	Pearson chi-square = 5.67, P = .129
	paid service (n=28, 4.4%)	4.4 $\pm$ 3.6	25	3	
	State insurance (n=504, 79.4%)	5.7 $\pm$ 3.8	404	100	
	Other (n=51, 8.0%)	6.7 $\pm$ 5.2	37	14	
Presentation-chief complaint	De novo acute medical condition (n=433, 68.2%)	5.5 $\pm$ 3.8	351	82	Pearson chi-square = 18.8, P = .000
	Acute exacerbation of chronic medical illness (n=107, 16.8%)	7.0 $\pm$ 4.4	72	31	
	trauma-related (n=91, 14.3%)	5.6 $\pm$ 3.5	77	14	
	Psychological condition (n=7, 1.1%)	9.8 $\pm$ 4.9	2	5	
Marital Status	Married (n=371, 58.5%)	5.7 $\pm$ 3.8	305	66	Chi-squared = 4.98, P = .029
	Single (n=263, 41.5%)	6.0 $\pm$ 4.1	197	66	
Household income	<4000 YTL (n=494, 78%)	5.6 $\pm$ 3.9	399	95	Chi-squared = 3.4, P = .077, t test, P = .096
	>4000 YTL (n=140, 22%)	6.3 $\pm$ 3.9	103	37	
Disposition	Discharged (n=505, 79.6%)	5.5 $\pm$ 3.9	406	99	Pearson chi-square = 2.22, P = .14, t test, P = .002
	Admitted (n=129, 20.4%)	6.7 $\pm$ 4.1	96	33	
Triage category	1 (n=90, 14.2%)	7.7 $\pm$ 4.1	57	33	Pearson chi-square = 23.9, P = .0001
	2 (n=209, 33.0%)	6.0 $\pm$ 4.2	158	51	
	3 (n=335, 52.8%)	4.6 $\pm$ 3.1	287	48	
Systemic disease	Present (223, 35.1%)	6.6 $\pm$ 4.4	167	56	Pearson chi-square = 3.84, P = .052, (t test, P = .000)
	Absent (411, 64.9%)	5.4 $\pm$ 3.6	335	76	

\* Chi-square.

from others (ANOVA,  $F=3.11$ ,  $P=.026$ ). Similarly, insurances have not exerted any effect on the percentage of HAD-A points lower and higher than the threshold score of 8 (chi-square = 5.67,  $P=.129$ ).

The difference between mean HAD-A scores of married and single patients were not statistically significant ( $t$  test,  $P=.36$ ). However, single patients had a higher rate of those with HAD-A scores equal to or higher than 8 (chi-squared = 4.98,  $P=.029$ ).

Table 1 demonstrates the relation of the subjects' educational status and anxiety score. The educational status of the study patients had no remarkable impact on the anxiety points ( $P=.75$ ). On the other hand, the percentages of the patients higher than 8 were significantly lower in literate patients and primary school graduates when compared to others (chi-square = 7.7,  $P=.021$ ) (Table 1).

Anxiety scores did not differ in accord with monthly household income. Patients with low (<4000 YTL) income had similar mean HAD-A scores when compared to the others ( $t$  test,  $P=.096$ ). Similarly, the percentages of those above 8 were not significantly different between low- and high- income patient groups (chi-square = 3.4,  $P=.077$ ) (Table 1).

Patients allocated in the Triage Category III (i.e., the least severe diseases) produced an average HAD-A points of  $4.65 \pm 3.11$  whereas Category II  $6.05 \pm 4.22$  and Category I  $7.71 \pm 4.17$  (ANOVA;  $P=.000$ ). The higher degree of urgency has been identified in an individual, the bigger HAD-A point has been

noted. Similarly, those in the Category III had a smaller percentage of those with points lower than 8 than the other group (Pearson chi-square = 23.9,  $P<.0001$ ) (Table 1).

Four hundred thirty-three patients (68.2%) were admitted into the ED with a primary symptom due to a "de novo" entity (average HAD-A point =  $5.5 \pm 3.8$ ). Mean scores were not similar with the other (ANOVA,  $P<.001$ ). PostHoc Tukey's disclosed those admitted to the ED with de novo medical disease produced a lower sum of points when compared to patients with acute exacerbation ( $P=.014$ ) and patients with psychiatric disease had a higher HAD-A point when compared to patients with newly identified acute illness ( $P=.008$ ). Similarly, patients presented with psychic symptoms had a higher percentage of points equal to or higher than 8 than the other group ( $P=.014$ ).

A total of 223 patients (35.1%) had a previously documented illness. Those had a mean anxiety score of  $6.6 \pm 4.4$  whereas the other group's mean was  $5.4 \pm 3.6$ . Detection of a systemic illness was accompanied by more severe HAD-A points ( $t$  test,  $P=.000$ ). Those with a systemic disease had not any significant difference in terms of the percentage of enrollees' anxiety points lower than and above the threshold value, 8 ( $P=.052$ ).

The majority ( $n=505$ , 79.6%) of the patients were sent home directly from the ED, while 129 (20.4%) were hospitalized. Average HAD-A point of the sent-home cases was  $5.3 \pm 3.9$  whereas mean point of the hospitalized cases was  $6.7 \pm 4.1$  ( $t$  test,  $P=.002$ ). Admission to hospital had no impact on the percentage

of patients' points lower and higher than the threshold value, 8 (chi-square = 2.22,  $P = .14$ ) (Table 1).

In the present sample, 498 patients (78.5%) had at least one pathological finding on examination. Those individuals had an average point of  $6.0 \pm 4.0$  whereas other group averaged  $5.1 \pm 3.6$  ( $t$  test,  $P = .017$ ). In total, 390/498 (78.3%) of those with abnormal finding vs. 112/136 (82.3%) of those without had a HAD-A score less than ten (chi-squared = 1.05,  $P = .34$ ) (Table 1). The detection of one or more abnormal finding was accompanied by a trend to have an anxiety point equal to or more than 8.

The patients with high anxiety scores were randomized to either of 2 treatment arms: After randomization via sealed envelopes, 65 patients were asked to perform BRM, while the other 67 patients served as the control group. Male-to-female ratios in the groups were 43/65 and 36/67 (Pearson chi-square = 2.1,  $P = .15$ ). Mean ages of patients who have undergone BRM and controls were  $43.2 \pm 17.6$  and  $43.2 \pm 18.1$  ( $P = .87$ ).

After 2 hours, those patients who underwent BRM had a mean score change higher than those who did not ( $7.2 \pm 2.9$  vs  $3.4 \pm 2.6$ ,  $t$  test,  $P = .026$ ). Mean score change in female and male patients subjected to BRM were similar:  $7.75 \pm 2.8$  and  $8.17 \pm 2.4$ , respectively ( $t$  test,  $P = .6$ ). Likewise, patients with low and high income had no significant difference with regard to mean score change  $7.93 \pm 2.9$  vs  $7.86 \pm 2.06$ , respectively,  $t$  test,  $P = .9$ ). Following application of BRM, patients with pathological examination finding had no significant difference when compared to those without; respecting mean score change ( $8.13 \pm 2.6$  vs  $6.87 \pm 2.85$ , respectively,  $t$  test,  $P = .2$ ). Similarly, patients with a history of systemic disease had no significant difference when compared to those without after BRM; regarding mean score change ( $8.2 \pm 2.9$  vs  $7.7 \pm 2.5$ , respectively,  $t$  test,  $P = .5$ ).

## 6. Discussion

The present study is a continuum of the study by Koyuncu and Karcioğlu in a similar Turkish population.<sup>[15]</sup> The present results demonstrated application of BRM improved patients' HAD-A scores in comparison to others who did not receive the protocol. The findings of this study indicated that using cost-effective, and easy techniques with minimal risk by healthcare givers can render the patients to alleviate stress and brings certain benefits if undertaken routinely in emergency care setting.

The findings of this study are in accord with the growing evidence in that BRM helps to alleviate anxiety in the treatment and course of patients with acute complaints in the emergency setting. It is unique in Turkish inner-city ED population to delineate efficacy of BRM and to detail its effect in clinical and sociodemographic subgroups.

Anticipation of painful procedures, consequences of acute injuries or illnesses can incite anxiety reaction. Results of clinical application of HADS and its subscales may well be affected by cultural influences, the conditions of the individual taking the survey, and other factors. Aydemir and colleagues conducted the validity and reliability research on 136 patients compared with controls without diseases.<sup>[6]</sup> Cronbach alpha coefficient for anxiety scale was 0.8525 which highlights the validity and reliability of the HAD Scale's Turkish version in those with medical diseases. This study is the first one testing the effect of BRM session on HAD-A scores in the acute care setting in Turkey.

The validity, reliability and accuracy of HADS were investigated in a number of reports from various geographical

characteristics for psychiatric comorbidities in various clinical circumstances, cancer and chest pain.<sup>[14-18]</sup> Researchers postulated that HADS is an instrument which can be effectively used and available in acute setting as an initial screening tool for mood disorders and anxiety.

Relaxation response can be used to alleviate distress and anxiety as well as conventional pharmacological treatment, education, and music therapy in different groups of patients in various clinical scenarios. For example, Rambod et al showed the role of BRM in sleep quality improvement of the patients on dialysis.<sup>[19]</sup> In another study from Iran, Pasyar et al randomized hemodialysis patients for intervention of BRM and a control group.<sup>[20]</sup> There was significant improvement in the BRM group regarding blood urea nitrogen, phosphate and interdialytic weight gain.

Some authors pointed out alternative methods for relaxation. For example, Serafini et al. conducted a systematic review on the role of repetitive transcranial magnetic stimulation (rTMS) in improving neurocognition in patients with treatment-resistant depression (TRD). Although most studies were reportedly limited by their sample sizes, heterogeneity, or potentially biased designs, the researchers cited that the technique may be considered a valuable and promising technique for cognitive enhancement in TRD.<sup>[21]</sup>

Saudi Arabian researchers of an observational prospective study on a translated survey of HADS reported that most patients were younger than 30 years and around 25% of the sample demonstrated high levels of anxiety.<sup>[22]</sup> Married and widowed individuals possessed a bigger percentage of anxiety than single patients. The finding is contrary to findings elicited from this study in which patients with different marital status had similar rates of patients with HAD-A scores lower and higher than 8.

The impact of BRM on the anxiety and hemodynamic reaction was evaluated in 144 patients who underwent surgical operations.<sup>[20]</sup> The intervention group received BRM, a 30 minutes before surgery. The blood pressure, pulse and respiratory frequencies dropped significantly in the intervention group compared to controls. The average HAD-A points were lower among the treatment cases when compared to the controls in both males and female patients. These findings are in accord with the present report.

Meditation theories from the western world comprise Jungian, Benson relaxation response, and transpersonal psychology.<sup>[8]</sup> Likewise, in a prospective randomized control study, Huang et al reported that biofeedback-assisted relaxation therapy is efficient to increase event-free survival in patients with cardiac insufficiency and could be translated into clinical circumstances.<sup>[23]</sup> Similarly, Rambod et al used BRM in their randomized trial and indicated that the technique resulted in improvement of the patients' sleep quality while on hemodialysis.<sup>[19]</sup> In another study on hemodialysis patients, authors put forth that instructing BRM is accompanied by reducing stress and anxiety levels.<sup>[24]</sup> BRM was also proven to be effective in the patients undergoing coronary angiography which reduced the level of anxiety.<sup>[25]</sup>

Researchers tested the efficiency of relaxation methods in those with acute and chronic pain. Relaxation has been found efficient in alleviation of discomfort in various pain scenarios.<sup>[26,27]</sup>

Dixhoorn et al investigated the impact of relaxation methods on the healing after a cardiac ischemic event. Intensive relaxation methods augments normalization following an ischemic cardiac disease and promotes secondary prevention. The authors concluded that the technique could be a substantial contribution

to cardiac rehabilitation, accompanied by exercise, and education.<sup>[28]</sup>

Likewise, listening to guided meditation significantly reduced suffering after breast biopsy; music and meditation alleviated anxiety and weakness without impairing physician-patient communication.<sup>[29]</sup> These literature data are similar to the findings in this research, that is, patients subjected to BRM had a mean score change higher than those who have not.

Many trials indicated that BRM is a safe technique without untoward effects with marked benefits on anxiety before operations and hemodynamic responses in patients undergoing surgical operations.<sup>[30]</sup> In a study, designed with pre and post-test eras, post cesarean section women were randomized to BRM and conventional treatment arms for pain management.<sup>[31]</sup> The findings showed that BRM could reduce pain intensity following cesarean section. "Jaw relaxation" technique applied bedside by nurses was also claimed to alleviate the suffering and anxiety of with burn patients and associated physical and psychological burden.<sup>[32]</sup>

Many researches have also been published supporting the use of BRM as a cost-efficient and safe method on various chronic diseases.<sup>[33-35]</sup> Also, Hosseini et al, pointed out that psychological training with standard protocols resulted in similar decreases with the use of drugs in alleviating the magnitude of anxiety in adults undergoing hemodialysis.<sup>[36]</sup>

Carroll et al reviewed 29 experimental and quasi-experimental studies that investigated these 3 treatment arms.<sup>[37]</sup> The authors noted that non-pharmacological interventions had an impact to diminish psychological distress in those adults who underwent cardiac catheterization.

### 6.1. Limitations

The study is conducted in a single-center in a metropolitan ED, so generalizability of the results may be limited. Also, difficult milieu in the ED may have inflicted the performance of the anxiety inquiry. In relation to data collection, the mood of the investigator could have an effect on the answers. To overcome this drawback, experienced emergency physicians were responsible for data collection. Possible effects of medication were not specifically investigated in this study.

## 7. Conclusion

Increased propensity to have high HAD-A scores and probable factors accompanied with this phenomenon should be evaluated further in wider, population-based researches. Patients subjected to BRM tends to have a more remarkable decline in HAD-A scores compared to the others. Future studies are necessary to describe different relaxation techniques which can be effectively adopted and practiced in those patients subjected to emergency care for acute illness.

### Author contributions

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