Benson Relaxation Technique: Reducing Pain Intensity, Anxiety level and Improving Sleep Quality among Patients Undergoing Thoracic Surgery

Aml Ahmed Mohammed ELmetwaly[1], Entisar Gaad El moula Shaaban[2], Eman Mahmoud Hafez Mohamed[2]
[1]Medical Surgical Nursing, Medical Surgical Nursing Department, Faculty of Nursing, Mansoura University
[2]Medical Surgical Nursing, Medical Surgical Nursing Department, Faculty of Nursing, Aswan University
Email: amlelmetwaly86@mans.edu.eg

Abstract

Thoracic surgery threatens the integrity of body, such as physical, psychological, social and spiritual aspects and may cause discomfort such as pain response and sleep disturbance. **Aim:** The study aimed to determine the effect of Benson's relaxation technique on reducing pain intensity, anxiety level and improving sleep quality among patients undergoing thoracic surgery. **Design:** A quasi-experimental research design was utilized**. Setting:** The study was conducted in thoracic surgery department at Mansoura chest hospital and Mansoura University Hospital- chest department. **Subjects:** A purposive sample of 160 post thoracic surgery were recruited in this study. **Tools:** Four tools were used; Tool I: Assessment interview questionnaire sheet includes personal and health relevant data, Tool II: Short Form McGill Pain Questionnaire (SFMPQ), Tool III: Groningen Sleep Quality Scale (GSQS) and Tool V: Hospital Anxiety and Depression Scale (HADS). **Results:** There was a statistically significant effect of Benson's Relaxation Technique on reducing pain intensity, anxiety level and improving sleep quality among patients undergoing thoracic surgery. **Conclusion:** The study concluded that, Benson relaxation technique has a positive improvement in level of pain, quality of sleep and anxiety & depression among the study group who applied Benson's relaxation technique. Also, the most common factors that can affect the sleep quality level for those patients is the pain. **Recommendation:** This study recommended that, the nurses should pay more attention to Benson's relaxation technique as a simple, cheap and effective technique while taking care of post-operative patients.

Keywords: Anxiety, Benson Relaxation Technique, Depression, Pain, Sleep Quality.

Introduction

Relaxation is a nursing intervention, which has been presented in several studies as a complementary therapy method and sometimes an alternative medicinal therapy (**Rakhshani, 2015).** Relaxation techniques embrace numerous practices like guided mental imagery, progressive relaxation, self-hypnosis, biofeedback, and deep respiratory

breathing exercises. The goal to some extent the same in all to create the natural relaxation response of the body, characterized by lower vital signs like slower respiratory breathing, lower blood pressure, and better well-being **(National Center for Complementary and Integrative Health (NCCIH), 2016).**

Relaxation Response term was introduced by Dr. Herbert Benson 1970 **(Mitchell, 2013).** Benson's relaxation is a method that specialize in the senses which have an effect on a wide range of physical and psychological symptoms like pain, anxiety, mood and self-confidence, depression, and lessens stress **(Hinkle and Cheever, 2017).** This technique ought to be performed in a relaxed surrounding environment, calm relaxed state, mental concentration, and in a positive attitude to form a real effect **(Fateme, et al., 2019).**

A large majority of patients undergoing surgeries expertise pain post-operatively, which isn't solely unbearable and unendurable, however may contribute to complications and delayed recovery **(Glowacki, 2015)**. In addition, patients who are undergoing surgeries, anxiety is gift up to a minimum of per week before the surgery and continues within the postsurgical phase**.** A surgical stress seems to be the mainly catalyst for sleep disorder and pain. Whereas pain triggers sleep

disorder leading to poor sleep quality which in turn increases pain intensity and vice versa **(Aktas and Yilmaz, 2017)**.

Benson's relaxation is a light- emitting technique leading to complete relaxation of all body muscles and a method that is easy to use for sleep disorders treatment. Benson's relaxation which is a sort of subjective stress management decreases the anxiety level, mood disturbance, body discomfort, activity of autonomic nervous system and as a minimum it might have an effect on sleep quality. Moreover, relaxation therapy reduces the time needed to fall asleep, sleep-onset latency, and also the frequency of waking up **(Masry, Aldoushy, & Ahmed, 2017).**

Achieving the best effective desired physical, psychological, social and spiritual well beings outcomes, the role of thoracic nursing specialty is to support and educate patients, who are suffering from thoracic diseases and undergoing surgeries. The care delivered not solely focuses on in-hospital management treatments that patient received, but also continue to whole patient treatment journey including lifestyle modification, health concept promotion, self-empowerment and secondary prevention **(Yeung, 2016).**

Significance of the study

The most common post operative complains are pain, stress, anxiety, and sleeping disorders. Acute postoperative pain management still shows pain scores higher than three in up to thirty percent on a visual analog scale of ten for operated patients. A recent study has reported that moderate to severe postoperative pain has been experienced by over eighty percent of patients undergoing surgeries. Nearly all over the world, pain physiological response is considered to be negative, and undiminished causes a fatal unstable hemodynamic state, immune system function alteration, increased blood glucose level, and increased catecholamine, cortisol and anti-diuretic hormones excretion **(Aktas and Yilmaz, 2017).**

Furthermore, uncontrolled pain has a task in different psychosocial influences, together with depression, anxiety and sleep disturbances **(Aktas and Yilmaz, 2017).** Depression is usually associated with suppression of the immune system and cognitive impairment, which may worsen after surgery and can lead to a prolonged and incomplete recovery after surgery **(Ghoneim and O'Hara, 2016).** Therefore, nurses ought to pay additional attention to the Banson relaxation method as a simple, effortless, inexpensive and efficient technique while caring for those patients **(Roykulcharoen and Good, 2004; Kiani, Zadeh, and Shahrakipour, 2017).**

Aim of the Study

To determine the effect of Benson's relaxation technique on reducing pain intensity, anxiety level and improving sleep quality among patients undergoing thoracic surgery.

Research Hypothesis

Patients who follow Benson's relaxation technique (BRT) will have:

H (1) Reduction in severity of postoperative pain.

H (2) Reduction in severity of postoperative hospital anxiety and depression.

H (3) Better postoperative sleep quality.

Method

Study Design

A quasi-experimental design was utilized to achieve the purpose of the present study.

Settings

The current study was conducted in thoracic surgery department at Mansoura chest hospital and in chest department at Mansoura University Hospital.

Subjects

A purposive sample of (160) patients undergoing thoracic surgery. Patients are selected who met the following criteria:

- Both sexes and aged between 18 and 60 years old.
- Patients with all types of thoracic surgery.
- Patients willing to take a part in the study.

Exclusion criteria were:

- The unwillingness patient to participate in the study.
- Patients have physical disability.

- Patients with regular tranquillizer or sedative drugs.
- Patients had a previous history of psychiatric disorders.

The sample was then randomly assigned to two equal groups (study and control group) each group comprised of (80) patient.

The first group (study group) who receive the instructions about Benson relaxation technique (BRT) and began to implement the technique post operation by two hours after regaining their consciousness then by three days later.

The second group (control group) who exposed only to regular routine medical and nursing care and didn't participate in any physical therapy program during the time of the study.

Sample size:

The sample size was estimated to be 160 patients calculated by epidemiological information (EPI info.) program version 6.02 keeping in mind the total number of thoracic surgery patient admitted to chest department, alpha error 5% (=confidence level=95%) Beta error 20% (=study power=80%).

$$\text{Sample Size} = \frac{Z2*(p)*(1-p)}{C2}$$

Where: Z=Z value (e.g. 1.96 for 95% confidence level), P = Percentage picking a choice, presented as decimal, (.5 used for sample size needed), C = Confidence interval, presented as decimal.

Tools of Data Collection

Data collection was compiled using four tools:

Tool I: An interview questionnaire sheet: The researchers developed and used this tool later than extensive review of literatures and integrated two parts:

Part 1: Personal characteristics as; sex, age, marital status, educational level, residence and job status.

Part 2: Health relevant data and include: present complaints, previous hospitalization, previous surgeries, and type of the previous surgery.

Tool II: The Short Form McGill Pain Questionnaire (SFMPQ):

McGill Pain Questionnaire (MPQ) was introduced by Melzack and Torgerson in 1971, is among the most widely used instruments to evaluate pain. It was modified to a shorter one (Short-Form MPQ [SF-MPQ]) in 1987. Short-Form MPQ [SF-MPQ was adapted from **Melzack, (1987)** and utilized by the researchers to assess patient's pain level which is easy to administer and usually takes about five minutes to complete.

The SF-MPQ is a fifteen-item checklist assessing:

- Sensory dimension (aching, cramping, gnawing, hot-burning, heavy, tender, throbbing, shooting, sharp, stabbing, and splitting) and consists of (eleven items).
- Affective dimension (fearful, tiring-exhausting, sickening, and punishing-cruel) of the pain experience and consists of (four items).

Scoring system:

The fifteen items are rated on a four-point pain intensity scale: zero = none, one = mild, two = moderate, and three= severe. The sum of the intensity values for the subsequent descriptors yields the total pain scores (fifteen items) **(Melzack, 1987)**.

To obtain a total score of (forty five), all items were summed, and the total score was categorized as follow**(Jensen and Karoly, 2011)**:

- Mild pain (one < fifteen).
- Moderate pain (fifteen < thirty).
- Severe pain (thirty- forty five).

Reliability:

For the internal consistency reliability, a Cronbach's alpha of r>0.75 has been illustrated by **(Melzack and katz, 2001). Grafton (2005)** examined the reliability of the SF- MPQ questionnaire in patients with rhumatic pain, it was found to be 0.85 with strong test re-test agreement.

Tool III: The Groningen Sleep Quality Scale (GSQS):

It was developed by **Mulder-Hajonides Van Der Meulen, Wijnberg, Hollander, De Diana, and Van Den Hoofdakker, (1981)** and was used by the researchers to assess patient's previous night's sleep quality. It composed of fifteen statements about the previous night's sleep, answered with true or false. The sum of this scale expressed a generalized score of the previous night's sleep quality. A higher score in the GSQS means a more disturbance of sleep.

Scoring system:

The first question isn't counted among the total score. One mark was given if the answer is "True" for questions (2, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15) and One mark was given if the answer is "False" for questions (8, 10, 12)

Groningen Sleep Quality Scale total scores were summed that ranged from zero to fourteen. Maximum higher score of fourteen points indicates poor sleep the night before.

The quality of sleep was ranged as follow:

- Good zero – five
- Fair six - eight
- Poor nine – fourteen

Reliability:

Jafarian, et al., (2008) tested the reliability of the questionnaire. They found that a Cronbach's alpha of 0.90 was calculated with high test re-test reliability. **Knufinkem, Nieuwenhuys, Geurts, Coenen, & Kompier, (2018)** also found Cronbach's a for their study sample was 0.82 which aimed to offer an insight in sleep quantity, quality and its acknowledged relation with sleep hygiene.

Tool IV; Hospital Anxiety and Depression Scale (HADS)

It was introduced by **Zigmond and Snaith (1983**), to assess the levels of anxiety and depression among patients in nonpsychiatric hospital it's a fourteen- item scale with two subscales for detecting clinically significant depression (HADS- D) and anxiety (HADS- A).

Scoring system:

It consists of seven questions related to anxiety and marked "A", and 7 questions relating to depression and marked "D". Patients are asked to choose one response from the four given for each item. Scores ranged from zero to three and the total score is twenty one is divided into four ranges **(Pais-Ribeiro, et al., 2018)**:

- **Normal** zero - seven
- **Mild** eight – ten
- **Moderate** eleven – fifteen
- **Severe** sixteen– twenty one

Reliability:

Reliability of this tool was tested by **Zigmond and Snaith, (1983)** They found that Cronbach's alpha was 0.85 for the depression and 0.86 for the anxiety subscale. The scale comprises statements which the patient rates based on their experience over the past week.

Content Validity:

For content validity of tool I, the researchers designed the tool and was revised by five medical-surgical nursing experts in Faculties of Nursing affiliated to Mansoura and Alexandria Universities using five-point Likert-type scale: one = totally disagree, two = disagree, three = undecided, four = agree, and five= strongly agree and then modifications done accordingly. The content validity index per item ranged from 0.8 to 1.0 for both relevance and clarity**.**

Pilot Study

A pilot study was conducted on 16 patients (10 %) of the total participants according to the selection criteria to assess the applicability of the tools, the feasibility of the study and for estimation the time needed for data collection. It was conducted and excluded from the study sample.

Field Work

The study was conducted through three consecutive phases: interviewing & assessment phase, implementation phase and evaluation phase which takes ten months for data collection from the start of December 2018 till October 2019.

The interviewing and assessment phase:

In this phase, the researchers clarified the purpose of the study, , the components of the tools, and the steps of the Benson Relaxation Technique (BRT). The time required to complete the questionnaire ranged from 20-35 minutes for every patient.

The implementation phase:

In this phase, the elected patients who were recruited are randomly assigned to two equal arms (80 patients per each), researchers conducted individual interviews three times throughout the study period for every patient.

First interview:

1. Each patient of both groups was interviewed preoperatively to collect baseline data about personal and health relevant data. The interview was carried out in the patient's room in hospital one day before surgery. It took about 35 - 45 minute using Tool (I, II, III and IV).
2. Then the researchers started to give the subsequent instructions to the study group regarding Benson relaxation technique using some illustrating pictures, brochure, video films, and demonstration and re-demonstration to learn patients this exercise and the way to try and do it. The instructions of Benson's relaxation technique embrace the subsequent steps:
    a. Sit quietly in a calm relaxed position.
    b. Close the eyes.
    c. Relax all body muscles deeply, starting from the soles of the feet up to the top of the head moving forward, and relax all body parts.
    d. Take a breath through the nose and exhale through the mouth while exhaling, silently repeat one word or number; God or select any word likes to be repeated, then inhale and exhale with more relax comfort and confidence.
    e. Do this for twenty minutes. Try to keep the body and muscles relaxed and repeat the desired specified word in the mind. Patient can open eyes to check the time, without using an alarm.
    f. When done, sit quietly for a few minutes, first with eyes closed and then with eyes open.
    g. Don't worry about succeeding in achieving a deep level of relaxation manner. Maintain a negative attitude and allow the relaxation to happen at its own time.
    h. When the distraction occurs, ignore it and keep continuance repeating the specified desired word. With following this practice, the response should come with slight effort.
    i. Practice this technique twice a day, but not within two hours post any meal because the digestive processes appears to interfere with the induction of expected changes.
3. This plan addressed the potentials of each patient and the obstacles to attain the settled priorities.

Second interview:

This interview conducted by the researchers for each patient, in this time each patient of the control group receive the hospital routine care while the study group starts to implement the previous instructions of Benson's relaxation technique after the recovery from the anesthesia by two hours and in the presence of the researchers to clarify any question. Each session lasts 20-35minute using tools (II, III and IV).

Third interview:

The third interview done at the third day post-operative by the researchers for each patient as mentioned before in the second interview. Each session lasts 20 - 35minute using tools (II, III and IV).

The evaluation phase:

This phase was stressed on recognizing the effect of the intervention post applying Benson relaxation technique on patient's level of pain, sleep quality, anxiety and depression, and that through making a comparison between the two groups at the two hours and day three postoperative.

Ethical Considerations and Human Rights:

- An official approval was obtained from administrative authorities to hold out the study subsequent to explanation the aim of the study.
- Approaches to confirm ethics were taken into consideration regarding confidentiality and informed consent subsequent to explanation the aim of the study.
- Patients have been informed that their participation in the study is optional and that they may withdraw at any time during the study when they decide.

Statistical Analysis

Collected raw data was revised, coded and entered into Statistical Package for the Social Sciences (SPSS) system files version 20.0. (Armonk, NY: IBM Corp). Analysis of data was conducted using Chi square test, Monte Carlo correction, Student's t test, ANOVA with repeated measures, Pearson coefficient, Friedman test, and Regression. Qualitative data were presented as number and percent. The level of significance was calculated at $p < 0.05$.

Results

Table (1); Revealed that the level of pain was significantly higher improved among study group after using Benson's relaxation technique than control group especially pre- and post-operative by three days at P_1 and P_3 value <0.001.

Table (2); Illustrated that the quality of sleep was improved among the study group who applied Benson's relaxation technique than the control group especially post-operative by two hours and three days at P_2 and P_3 value 0.002 and 0.009 respectively. On the other hand, the same table showed that there was a statistically significant effect of Benson's relaxation technique when applied among post-operative patients on reducing level of anxiety and depression in the three period of the study at P1, P2 and P3 value 0.035, <0.001 and <0.001 respectively for anxiety, and <0.001, 0.016, and <0.001 respectively for depression.

Table (3); Showed that there was statistically significant correlation effect of the level of pain on sleep quality level, anxiety and depression level on the three-study period at P <0.05. In addition to there was statistically significant correlation between sleep quality level and anxiety & depression level on the three-study period at P <0.05. while there was statistical correlation between anxiety and depression level but not significant pre-operatively by two hours and three days at P value 0.116 and 0.659 respectively.

Table (4); This table showed that the most common factors that can affect the sleep quality level for patients undergoing for thoracic surgery which reflected that, pain level was the first factor that can affect the sleep quality level at P value <0.001, while the second factor was the patient gender at P value 0.007, in addition to the third and fourth factor were patient's qualification and hospital anxiety at P value 0.034 and 0.050 respectively.

Table (1): Comparison between the studied groups according to the Short Form McGill Pain Questionnaire (SFMPQ)

	Control (n=80)						Test of Sig. (p_0)	Study (n=80)						Test of Sig. (p_0)	Test of Sig. (p_1)	Test of Sig. (p_2)	Test of Sig. (p_3)
	Before		After 2 h.		After 3 days			Before		After 2 h.		After 3 days					
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%				
The Short Form McGill pain questionnaire (SFMPQ)																	
Mild pain (1 < 15).	9	11.3	42	52.5	42	52.5		32	40.0	40	50.0	58	72.5				
Moderate pain (15 < 30)	37	46.3	16	20.0	28	35.0	Fr=49.465* (<0.001*)	39	48.8	30	37.5	22	27.5	Fr=24.267* (<0.001*)	χ^2=27.490* (<0.001*)	χ^2=8.810* (0.012*)	χ^2=13.280* (0.001*)
Severe pain (30 - 45).	34	42.5	22	27.5	10	12.5		9	11.3	10	12.5	0	0.0				
Total score	29.18±12.03		17.09±15.81		15.85±11.23		F=45.263* (<0.001*)	17.54± 8.68		14.41± 9.74		9.89± 9.37		F=17.607* (<0.001*)	t=7.018* (<0.001*)	t=1.288 (0.200)	t=3.646* (<0.001*)

χ^2: **Chi square test** MC: **Monte Carlo** **t: Student t-test** **Fr**: **Friedman test** **F: F test (ANOVA) with repeated measures**

p_0: p value for comparing between the studied periods in each group

p_1: p value for comparing between the studied groups in **before**

p_2: p value for comparing between the studied groups in **After 2 hours**

p_3: p value for comparing between the studied groups in **After 3 days**

*: Statistically significant at $p \leq 0.05$

Table (2): Comparison between the studied groups according to The Groningen Sleep Quality Scale (GSQS) and Hospital Anxiety and Depression Scale (HADS) in each period

	Control (n=80)						Test of sig. (p_0)	Study (n=80)						Test of sig. (p_0)	Test of sig. (p_1)	Test of sig. (p_2)	Test of sig. (p_3)
	Before		After 2 h.		After 3 days			Before		After 2 h.		After 3 days					
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%				
The Groningen Sleep Quality Scale (GSQS)																	
Good zero– five	50	62.5	23	28.8	51	63.8		64	80.0	26	32.5	61	76.3				
Fair six- eight	0	0.0	0	0.0	4	5.0	Fr=29.508*(<0.001*)	8	10.0	10	12.5	8	10.0	Fr=47.347* (<0.001*)	χ^2=23.448* (^{MC}p<0.001*)	χ^2=11.857* (0.003*)	χ^2=7.671* (0.022*)
Poor nine- fourteen	30	37.5	57	71.3	25	31.3		8	10.0	44	55.0	11	13.8				
Total score	5.53±6.04		9.30±5.28		4.86±5.66		F=16.321* (<0.001*)	5.83±2.25		6.95±3.81		2.91±3.32		F=34.999* (<0.001*)	t=0.416 (0.678)	t=3.228* (0.002*)	t=2.659* (0.009*)

Cont. Table (2): Comparison between the studied groups according to The Groningen Sleep Quality Scale (GSQS) and Hospital Anxiety and Depression Scale (HADS) in each period

	Control (n=80)						Test of sig. (p_0)	Study (n=80)						Test of sig. (p_0)	Test of sig. (p_1)	Test of sig. (p_2)	Test of sig. (p_3)
	Before		After 2 h.		After 3 days			Before		After 2 h.		After 3 days					
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%				
Hospital Anxiety and Depression Scale (HADS)																	
Hospital Anxiety																	
Normal zero- seven	43	53.8	47	58.8	47	58.8		53	66.3	63	78.8	70	87.5				
Mild eight- ten	17	21.3	15	18.8	21	26.3	Fr=6.723* (0.035*)	23	28.8	17	21.3	10	12.5	Fr=15.398*(<0.001*)	χ^2=13.562* (^{MC}p=0.003*)	χ^2=22.226* (^{MC}p<0.001*)	χ^2=21.124* (^{MC}p<0.001*)
Moderate eleven- fifteen	14	17.5	12	15.0	10	12.5		4	5.0	0	0.0	0	0.0				
Severe sixteen- twenty one	6	7.5	6	7.5	2	2.5		0	0.0	0	0.0	0	0.0				
Total score	7.29±5.13		7.83 ± 6.66		5.95±4.90		F=19.144* (<0.001*)	5.89±2.86		4.63±2.73		3.54±2.45		F=34.872* (<0.001*)	t=2.130* (0.035*)	t=3.975* (<0.001*)	t=3.937* (<0.001*)
Hospital Depression																	
Normal zero- seven	59	73.8	57	71.3	65	81.3		66	82.5	61	76.3	77	96.3				
Mild eight- ten	16	20.0	16	20.0	8	10.0	Fr=1.902 (0.386)	10	12.5	14	17.5	3	3.8	Fr=12.563*(0.002*)	χ^2=1.908 (^{MC}p=0.400)	χ^2=0.602 (0.740)	χ^2=10.503* (^{MC}p=0.004*)
Moderate eleven- fifteen	5	6.3	7	8.8	7	8.8		4	5.0	5	6.3	0	0.0				
Severe sixteen- twenty one	0	0.0	0	0.0	0	0.0		0	0.0	0	0.0	0	0.0				
Total score	7.19±2.04		7.73±2.06		5.48±2.74		F=20.251* (<0.001*)	5.86±1.97		6.96±1.91		6.84±0.72		F=9.967* (<0.001*)	t=4.171* (<0.001*)	t=2.429* (0.016*)	t=4.306* (<0.001*)

χ^2: **Chi square test** MC: **Monte Carlo** **t: Student t-test** **Fr**: **Friedman test** **F: F test (ANOVA) with repeated measures**

p_0: p value for comparing between the studied periods in each group

p_1: p value for comparing between the studied groups in **before** p_2: p value for comparing between the studied groups in **After 2 hours**

p_3: p value for comparing between the studied groups in **After 3 days** *: Statistically significant at $p \leq 0.05$

Table (3): Correlation between different parameters in before, After 2 h. and After 3 days period in study groups (n = 160)

		Before				After 2 h.				After 3 days			
				(HADS)				(HADS)				(HADS)	
		(SFMPQ)	(GSQS)	Hospital Anxiety	Hospital Depression	(SFMPQ)	(GSQS)	Hospital Anxiety	Hospital Depression	(SFMPQ)	GSQS)	Hospital Anxiety	Hospital Depression
The Short Form McGill Pain Questionnaire (SFMPQ)	R		0.593	0.233	0.230		0.556*	0.533*	0.406*		0.240*	0.179	0.268*
	P		<0.001*	0.037*	0.040*		<0.001*	<0.001*	<0.001*		0.032*	0.113	0.016*
The Groningen Sleep Quality Scale (GSQS)	**R**			0.364	0.239			0.540*	0.253*			0.240*	0.248*
	P			0.001*	0.033*			<0.001*	0.024*			0.032*	0.026*
Hospital Anxiety Scale	**R**				0.203				0.177				0.050
	P				0.070				0.116				0.659
Hospital Depression Scale	**R**												
	P												

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

Table (4): Multivariate Linear regression for factor affecting The Groningen Sleep Quality Scale (GSQS)

	The Groningen Sleep Quality Scale (GSQS)			
	B	**Beta**	**T**	**p**
Gender /female	1.306	0.287	2.774*	0.007*
Age (years)	0.018	0.082	0.757	0.452
Qualification	0.626	0.249	2.167*	0.034*
Have you ever been hospitalized?	0.041	0.008	0.067	0.946
You performed surgeries previously	1.144	0.255	1.811	0.074
The Short Form McGill Pain Questionnaire (SFMPQ)	0.145	0.558	6.085*	<0.001*
Hospital Anxiety	0.152	0.193	1.992*	0.050*
Hospital Depression	0.079	0.069	0.771	0.443
	R^2 =0.491, F =8.574*, p<0.001*			

R^2: Coefficient of determination Beta: Standardized Coefficients t: t-test of significance
F,p: f and p values for the model *: Statistically significant at $p \leq 0.05$

Conflict of interest

The authors declared there is no conflict of interest.

Discussion

Thoracic surgery is an exciting and complex specialty. Several cases treated can be regarded as life threatening so thoracic surgery team require expert skills in communication as well as knowledge of the specific illnesses and complications that can arise **(Myatt, 2006).** The Relaxation Response is basically differing reaction to the "fight or flight" response. According to Dr. Benson, Relaxation Response using is helpful as it counters the physiological effects of stress and the fight or flight response **(Mitchell, 2013).** Benson's relaxation method is easy and no needs to specific knowledge and skills, which led to easy used by the patient **(Barabady, et al., 2020).**

The attempt to recognize pain represents one of the eldest challenges in the history of medicine. Pain has an important role in therapeutic action, as the symptom par excellence and, therefore, as a precious and meaningful tool **(Raffaeli and Arnaudo, 2017).** The present study revealed that the level of pain was significantly higher improved among study group after using Benson's relaxation technique than control group especially pre- and post-operative by three days.

This result in accordance with **Masry, Aldoushy, & Ahmed, (2017),** Egyptian study applied on patients undergoing joints replacement surgery who found that there was an improvement in pain scores among the study group subjects at one day postoperative while there was a statistically significant difference occurred between study and control groups regarding pain intensity at 3rd postoperative day. A systematic review and meta-analysis were conducted by **Ju, Ren, Chen, & Du, (2019)** on the assessment of the efficacy of relaxation techniques for pain relief in patients undergoing abdominal surgery confirmed the same results.

This result may be due to the physiology of relaxation which provides a reduction in sympathetic nervous system tone, and an increase in the parasympathetic nervous system by descending inhibition of nociceptive transmission in the spinal cord. Furthermore, can dramatically change the effect on pain, and vice versa.

With reference to quality of sleep, the findings of the present study represent that the quality of sleep was improved among the study group who applied Benson's relaxation technique than the control group especially post-operative by two hours and three days.

Masry, Aldoushy, & Ahmed, (2017) goes in the same line with these findings as there were statistically significant differences existed between study and control groups regarding sleep quality at one day postoperative and 3rd postoperative day. Furthermore, to some extent this considered similar to the result of **Elsayed, Radwan, Elashri, & El-Gilany, (2019)** a study done on Egyptian citizen and revealed that Benson's relaxation technique has a positive effect on improving the total mean scores Pittsburgh sleep quality index significantly after applying Benson's relaxation technique indicating improvement in patient's quality of life. This finding may be explained that decreasing pain level enhance sleep quality.

This might be due to; relaxation technique mechanism works through psycho-physiological manner reveals that both the mind and the body are included in the quieting process. Progressive muscle relaxation training with lower impulses coming from the muscles to the brain, a lower level of stimulation is evident in the body organs (e.g., less tense muscles). With this modification of incoming and outgoing neural impulses come the worth benefits coupled with relaxation and rest causing sleep quality enhancement.

Focusing the attention on effect of Benson's relaxation technique on anxiety and depression, the study showed that there was a statistically significant effect of Benson's relaxation technique when applied among post-operative patients on reducing level of anxiety and depression in the three period of the study.

This finding is compatible with Egyptian study by **Abd-Elraziek, El Awady, & Talaat, (2017)** who uses Benson's relaxation technique to investigate its effect on level of anxiety, depression and stress in which, the study explores that anxiety, depression and stress

level among study group decreased post applying training program than pre.

In addition, this is also supported by **Mahdavi, Gorji, Gorji, Yazdani, & Ardebil, (2013**); **Rakhshani, (2015); Kiani, Zadeh, & Shahrakipour, (2017)** and **Elsayed, Radwan, Elashri, & El-Gilany, (2019)** who showed that Benson relaxation techniques significantly affected the decrease of anxiety level. This may be explained by, Benson's relaxation training can train the body by regulating the respiratory breathing rhythm appropriately and acceptably manner so that concentration of mind and appreciation will lead to increase chance of quick recovery and elimination of anxiety, depression or maintain and improve health.

These results are contrary to the Indian study that was conducted by **Kurniasari, Kustanti, & Harmilah, (2016),** who report that no significant in anxiety level, this may be due to the measurement of anxiety level is performed with Analog Anxiety Scale (AAS) a different measurements tool. In addition**, Feyzi, KHALEDI, Hadadian, REZAEI, & Ahmadi, (2015)** reported that there was no statistically significant change in patients' level of anxiety. This may be explained by depression and anxiety between those elderly patients with hemodialysis with high incidence and inadequate practiced period of the technique while Benson's technique needs expanded episode to be more effective.

Regarding Correlation between different parameters in before period in study groups the current study showed that there was statistically significant correlation effect of the level of pain on sleep quality level, anxiety and depression level on the three-study period. In my point of view, it is logical that there is a relationship between pain and the rest of the research elements because with the presence of pain the person is unable to fall asleep therefore the quality of sleep is affected and thus it is possible to determine the occurrence of anxiety, especially being hospitalized.

As for, the most common factors that can affect the sleep quality level for patients undergoing for thoracic surgery which reflected that, pain level was the first factor that can affect the sleep quality level at P value <0.001, while the second factor was the patient gender at P value 0.007, in addition to the third and fourth factor were patient's qualification and hospital anxiety, while age was not a significant factor regarding sleep quality.

Similar data were confirmed by **Elsayed, Radwan, Elashri, & El-Gilany, (2019)** revealed that there is a significant relation between socio demographic characteristics, and mean score of sleep quality index, anxiety and depression. From the researcher's point of view, this result may attribute to the fact that with education, the patients are able to realize the importance of practicing health promoting behaviors. These finding contradict with **Masry, Aldoushy, & Ahmed, (2017)** who reported that there was insignificant relation between sleep quality scores and age of the studied subjects throughout the study period.

The strength and the key advantage of this study over previous ones can be noted as measuring pain, sleep quality, depression, and anxiety in three different time (before and after the intervention in the interval time of before surgery by one day, two hours after surgery and three days later) using more than one tool to ensure effectiveness of non-pharmacological approaches, as Benson's relaxation technique.

Conclusion

Based on the result of the present study, it can be concluded that the Benson relaxation technique has a positive effect with a statistically significance as there was an improvement in level of pain and quality of sleep among the study group who applied Benson's relaxation technique than the control group.

On the other hand, there was a reduction on level of anxiety and depression among the study group with a statistically significant effect of Benson's relaxation technique when applied among post-operative patients. Pain level is the most common factor that can affect the sleep quality level for patients undergoing thoracic surgery followed by patient gender in addition to patient's qualification and hospital anxiety.

Recommendation

The nurses should pay more attention to Benson's relaxation technique as a simple,

cheap and effective technique while taking care of post-operative patients.

Publication and dissemination of the Benson relaxation technique to all patients undergoing to stressful procedure, to reduce pain level, anxiety & depression, and improve sleep quality.

Additional research is needed to understand the effect of Benson's relaxation technique on pain, anxiety, depression and sleep quality for patients under all stressful situations.

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