https://menj.journals.ekb.eg
Print ISSN: 2735-3974
Online ISSN: 2735-3982
DOI:10.21608/menj.2025.451005

MNJ
Menoufia Nursing Journal
Faculty of Nursing
Menoufia University

Effect of Benson's Relaxation Technique on Symptomatic Management of Patients Undergoing Hemodialysis

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Abstract: Background: Hemodialysis causes symptoms such as pain, disturbed sleep quality and impaired ability to perform activities of daily living (ADL). Purpose: To evaluate the effect of BRT on symptomatic management of patients undergoing hemodialysis. **Design**: A quasi-experimental research design (Study & control) was utilized for this study. **Setting:** The current study was conducted at Hemodialysis unit of Menoufia University and Shebin El-Kom teaching hospitals. **Sample**: A consecutive sample of 100 patients who met the inclusion criteria was selected and divided into two groups (study & control) 50 patients in each group. **Instruments:** Four instruments were used for data collection: Structured interview questionnaire, Visual Analogue Pain Scale (VAS), the Groningen Sleep Quality Scale (GSQS) and Nottingham Extended Activities of Daily Living (NEADL) scale. **Results**: The study found a very highly statistical significant difference between the study group and control group in favor of study group in terms of pain intensity, sleep quality and ability to perform ADL with (p value <0.001) two weeks post-intervention. **Conclusions**: The study found that BRT is an effective non-pharmacological technique in reducing pain intensity, improving sleep quality and enhancing patient's ability to perform ADL for patients undergoing hemodialysis. **Recommendations**: Applying BRT for patients undergoing hemodialysis, in addition to routine hospital care is recommended for patients undergoing hemodialysis.

Keywords*: Activity, Benson's, Hemodialysis, Pain, Relaxation, Sleep.*

Introduction

End stage renal disease (ESRD) is the final stage (5 th stage) of CKD in which GFR less than 15 mL/min /1.73 m2 for a minimal period of 3 months. ESRD is irreversible loss of kidney function, which, without treatment by dialysis or kidney transplantation, is likely to lead to fatal complications. (Benjamin &Lappin, 2021).

There are about 3,730,000 patients with CKD worldwide and the annual growth of this disease is 5–6%. According to

the statistics, there are about 2.5million ESKD patients who receive renal replacement therapy (RRT), and this population is expected to double to about 4.5million by 2030 (Bikbov et al., 2020). In Egypt, according to Egyptian renal data system 2020; it is estimated that there are about 3393 ESRD patients on hemodialysis program from 80 dialysis units and from18 Egyptian governorates (cities) (Hassaballa et al., 2022).

ESRD patients on dialysis have reported many symptoms that occurred. Among those on dialysis, fatigue, sadness, sleep problems, itching, and muscle cramps were the most common symptoms. However, many symptoms may be underrecognized, underreported, or under-prioritized. Fatigue, muscle cramps related pain, and insomnia were listed as the top symptoms to treat by patients, who also believed that addressing those physical symptoms would improve their most important mood symptoms. Those included feeling sad or depressed, frustrated or angry, and anxious or nervous (Karasneh et al., 2020).

Pain is a commonly observed complaint among hemodialysis (HD) patients. Most patients have pain severity varying from moderate to severe. Pain faced by hemodialysis patients can be categorized into three categories: (a) procedure-related pain, (b) access-related pain, and (c) pain secondary to renal disease or its complications. (Sadigova et al., 2020).

Inappropriate pain management can lead to nonadherence to treatment, increased healthcare costs, and reduced quality of life. Managing pain in hemodialysis patients is often challenging due to the complex nature of ESRD and the potential risks associated with pharmacological interventions. Non-pharmacological approaches in patients with ESRD are scarce, including acupuncture, cognitive behavioral therapy, relaxation techniques, virtual reality, and other alternative methods such as biofeedback and yoga in ESRD cases (Kassim et al.,2023).

In hemodialysis patients, Activities of Daily Living (ADL) are reduced due to various complications such as low physical activity and muscle weakness. ADL include the activities of bathing, dressing, toilet, movement, and feeding, which the individual needs to perform to survive. Low physical function (weakness in the legs, balance problems, walking ability, etc.) and depressive symptoms were common in patients undergoing hemodialysis patients (Mollaoğlu & Başer 2021).

Difficulty in mobility is a predictor of mortality and loss of independence in the community-living older individuals. Falling is a common event in the elderly, which could result in injury, loss of functional independence, and impaired ADL. Nurses should determine how well individuals can perform ADL and how much help they need help in performing ADL and should take measures based on this data. (Matsufuji et al., 2021).

Insomnia is the most common sleep disorder among patients on hemodialysis and its prevalence ranges from 69 to 80%. These patients also have irregular sleeping hours, bad dreams, morning headaches, and

daytime sleepiness. Hemodialysis patients are particularly concerned about insomnia since it has a strong relation with fatigue and low quality of life, while it usually leads to depression, low immune system, and increased risk of cardiovascular problems (Benetou et al., 2022).

Insomnia is mostly affected by uremic toxin accumulation, anemia, pain, and psychological problems. It can be also caused by restless leg syndrome and itchy skin due to uremic pruritus, sleep apnea, as well as by insufficient control of diabetes. The long time on hemodialysis is possibly associated with an increasing appearance of symptoms and comorbidities, like poor sleep quality (Rehman et al., 2020)

Management of pain, sleep disturbance and limitations in physical activity among hemodialysis patients includes pharmacological and non-pharmacological interventions, but the use of non-pharmacological methods seems to be preferred over pharmacological methods because they have a lower incidence of complications (Elsayed et al., 2019).

Relaxation techniques are therapeutic exercises designed to assist individuals with decreasing tension and anxiety, physically and psychologically. There are numerous techniques for relaxation including: Breathing exercises, progressive muscle relaxation, Guided imagery or "visualization, Biofeedback-assisted relaxation, Autogenic training and Benson relaxation techniques (Norelli et al.,2023).

BRT is a person's capability to stimulate the release of chemicals and brain signals in their body that slow their muscles and organs while increasing the blood flow to their brain. It is a form of meditation that utilizes the parasympathetic nervous system to reduce the individual's reactions to stress. Benson's relaxation technique is a complementary therapy and one of the ways to reduce depression, stress, and anxiety and increase the quality of life at a low cost for patients undergoing hemodialysis (Abu Maloh et al.,2024).

Significance of study

Implementing both pharmacological and non-pharmacological based strategies to relieve patient's symptoms and suffering is one of the most important nursing responsibilities. Also it is recommended by previous studies to use BRT by nurses as a simple, cheap, and effective non-pharmacological method while taking care of hemodialysis patient (Eroglu & Gok Metin, 2022). Therefore the findings of this study may alert nurses and other healthcare providers in hemodialysis unit to use this method to minimize patient symptoms that could be reflected on patient's care. Hopefully the findings of this study can provide evidence based data that can improve nursing practice in Egypt and paves the way for further research in this topic.

The study purpose

To evaluate the effect of Benson's relaxation technique on symptomatic management of patients undergoing hemodialysis.

Research Hypotheses

- H1. Patients who apply Benson's Relaxation Technique (study group) will have lower pain intensity score than patients who don't apply it (control group).
- H2. Patients who apply Benson's Relaxation Technique (study group) will exhibit a higher quality of sleep than patients who don't apply it (control group).
- H3. Patients who apply Benson's Relaxation Technique (study group) will exhibit a higher level of performing activities of daily living than patients who don't apply it (control group).

Definition of variables:

- **Benson's relaxation technique**: is theoretically defined as an effective relaxation method that works through the regulation of the hypothalamus and reduction of the sympathetic and parasympathetic stimuli and is effective on the respiratory function, pulse rate, and heart workload. In addition, this relaxation method encompasses mindfulness techniques that can affect many physical and psychological symptoms such as pain, stress, anxiety, depression, mood, and self-esteem (Bagheri et al., 2021).
- In the present study **Benson's relaxation technique** is operationally defined as a relaxing technique that can have an effect on relieving symptoms of hemodialysis patients which include pain, poor quality of sleep and impaired level of performing activities of daily living through putting the patient in a comfortable position and closing his eyes and relaxing all body muscles by using breathing exercises and repeating a calming word in patient's mind.
- **Symptomatic management**: is theoretically defined as the efforts to delay, avert, or minimize the symptom experience. The strategy can be effective in three ways: (a) decreasing the frequency of the symptom experience, (b) reducing the intensity of the symptom, or (c) relieving the distress associated with the symptom (Bender et al., 2018).
- In the present study **Symptomatic management** is operationally defined as management of symptoms associated with long lasting hemodialysis which include pain, poor quality of sleep and impaired level of performing activities of daily living and these symptoms will be assessed by instruments II, III and IV respectively.

Methods:

Design

A quasi-experimental research design (study and control) was utilized to examine the effect of Benson's relaxation technique on symptomatic management of patients undergoing hemodialysis.

Setting

The study was conducted at Menoufia University and Shebin El-Kom teaching hospitals at the hemodialysis unit, Menoufia Governorate, Egypt.

Sampling

A purposive sample of 100 patients who met the inclusion criteria was divided into two groups of 50 patients for each group and willing to participate in the study.

Inclusion criteria:

- Aged 18 years old to 65 years old.
- Able to communicate effectively.
- Undergoing hemodialysis for at least six months (to ensure the patient has a chronic kidney disease and is scheduled for maintenance hemodialysis) 3 times per week (4 hours for each session).

Exclusion criteria:

- Patients with cognitive or physical disabilities (e.g. paralysis, coma) because disabilities may affect the assessment of the patient's ability to perform activities of daily living.

Sample size

The sample size was determined by setting the test power to 80% and the confidence interval to 95%, with an accepted margin of error of 5%, using the equation:

Sample size = $\mathbf{2SD^2 (Z_{\%} + Z_{\beta})^2 / d^2}$

SD = standard deviation (calculated after pilot study)

SD = 1.84

$\mathbf{Z_{\%}} = Z_{0.05/2} = 1.96$ (Type I error at 0.95 level)

$\mathbf{Z_{\beta}} = Z_{\beta 0.20} = 0.842$ (80% power, from Z table)

d = Effect size (different between means of experimental and control groups)

$\mathbf{n} = 2\ (1.84)^2 \text{ X } (1.96 + 0.842)^2 / (0.73)^2$
= 99.76 patients

Based on the above equation, the sample size was 100 patients.

Instruments of the study:

Four instruments were used for collecting the data in this study. These instruments were:

<u>Instrument one</u>: - Characteristics of patients structured interview questionnaire:

The researcher developed it after reviewing related literature (e.g Abu Maloh et al., 2024 & Abdel Monem et al., 2022) to evaluate socio-demographic and medical data. It consisted of two parts.

- **Part one: Social characteristics:** It included questions such as age, gender, marital status, level of education, occupation, residence, family income ...etc.
- **Part two: Medical data**: It included information about past and present medical history such as duration of illness, duration of hemodialysis session, family history and previous surgery….etc.

<u>Instrument two</u>: Visual Analogue Pain Scale (VAS)

It is an adopted scale by Bain et al. (2005) to rate the subjective level of pain intensity of patients. The measurement ranged from zero to ten, in which zero means no pain while a score from 1 to 3 denoted mild pain, a score from 4 to 6 indicated moderate pain, a score from 7 to 9 illustrated sever pain, and a score of 10 was given for worst pain.

Instrument three: The Groningen Sleep Quality Scale (GSQS):

It was developed by Hajonides et al., (1981) and used by the researcher to assess a patient's previous night's sleep quality. It consisted of 15 statements about the previous night's sleep quality that were answered with true or false. The sum of this scale yielded a generalized score of the previous night's sleep quality. A higher score in the GSQS means more disturbed sleep.

Scoring system:

Groningen Sleep Quality Scale total scores range from 0 to 14, with a higher score indicating lower subjective quality of sleep. The first question doesn't count toward the total score. One point if the answer is "True" for questions 2, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15. One point if the answer is "False" for questions 8, 10, 12. A score of 0–2 indicates normal refreshing sleep, whereas a score of 3-5 indicates moderately disturbed sleep and a score of 6 or higher indicates poor sleep quality.

Instrument four: - Nottingham Extended Activities of Daily Living (NEADL) scale:

It was developed by Nouri and Lincoln (1987) to assess (ADL). NEADL is a valid reliable questionnaire that consisted of twenty-two items and four domains as follows: mobility (6 items), kitchen (5 items), domestic (5 items), and leisure (6 items) activities.

Scoring System: Every item was scored based on a four-point Likert scale including (i) not performed (0 points); (ii) with help (1 point); (iii) on my own with difficulty (2 points); and (iv) on my own easily (3 points). The total NEADLS scores range from 0 to 66 points. Note that higher scores indicate higher levels of function and independence.

Validity of instruments:

Face validity was done for the developed instruments by a panel of five experts (professors and assistant professors) in the field of Medical - Surgical Nursing (faculty of nursing, Menoufia University) and four head nurses in hemodialysis units in Menoufia University and Shebin El Kom Teaching Hospitals to review the instruments for objectivity, comprehensiveness, clarity, relevance, and simplicity.

Reliability of instruments:

- Reliability of the first three instruments (I, II and III) were tested using a test- retest method to ascertain consistency. The period between both tests was two weeks. The results were (0.83, 0.85 and 0.88) respectively.
- Reliability of the fourth instrument was confirmed with Cronbach's alpha coefficient of 0.89.

Pilot study:

A pilot study was carried out in the Hemodialysis Unit in Menoufia University and Shebin El-Kom Teaching Hospitals before data collection on 10% of the study sample (ten patients) to test the content feasibility, to assure clarity and applicability of the instruments. Those

patients were excluded from the study sample.

Ethical Considerations:

Approval was obtained from the Research and Ethics Committee at the Faculty of Nursing, Menoufia University prior collecting the data code N: 915 (19/10/2022). Each patient was informed about the purpose of the study and its importance. The researcher emphasized that participation in the study is voluntary and confidentiality was assured through coding the data. The participants were assured that their data would not be reused in another research without their permission. An informed consent was obtained from each participant who agreed to be included in the study.

Data collection procedure:

- An official letter was submitted from the dean of the Faculty of Nursing to the administrators of Menoufia University and Shebin El-Kom teaching hospitals including purpose of the study and methods of data collection.
- The data for this study was accomplished during a period of more than 2 months starting from June 2023 and ending at August 2023.
- Patients who agreed to participate in the study and met the inclusion criteria were divided randomly into two equal groups, the first group (study group) and the second group (control group).
- Data collection was done three days per week.
- Data collection was conducted individually with each patient from 9 am to 4 pm.
- The data were collected at the patient's bed side during HD session.
- Data collection was done through 3 interviews. Each interview took about 30-40 minutes for each patient to be completed.
- The researcher first introduced himself to the subjects, the purpose of the study was explained to each subject of both study and control group then obtained informed consent from each of them voluntarily, and then conducted interviews.
- During pre-intervention the researcher collected bio-socio demographic and medical related data from the patient using instrument (I) and a baseline assessment of pain, sleep quality and activities of daily living was done using instruments II, III and IV.
- Then the researcher taught patients of study group how to perform Benson's relaxation technique during the second interview by using some illustrating pictures, brochure, booklet, and demonstration and re-demonstration.
- The technique was performed during hemodialysis sessions for 15 minutes.
- The patients was advised to practice these procedures twice a day for 15 minutes every day other than days of hemodialysis and to perform the exercises correctly; patients were given a copy of these illustrating pictures, brochure, and booklet to use it at home.

- In addition to teaching patients how to perform BRT, patients were also instructed to follow routine hospital care, which included attending hemodialysis sessions regularly, adherence to medications prescribed by the physician, while in control group the researcher instructed patients only to follow the routine hospital care.

-The instructions on Benson's relaxation technique that were given to the patient Procedure of Benson's relaxation technique:

- The instructions of BRT that were given to the patient included putting the patient in a comfortable position, closing the eyes, relaxing all muscles beginning from the soles for the feet to the top of the head moving forward up, taking a breath from the nose, and exhaling from the mouth whenever exhaling.
- During exhaling the patient must repeat one word or number (as God or one) with comfort and confidence.
- Patients were instructed to do this for 15 minutes and that he/she may open his/her eyes to check the time, but don't use an alarm. Then the patient had to open the eyes slowly and he should not move for a few minutes.
- Two weeks post-intervention, the evaluation of the studied outcomes (Pain, sleep quality, and activities of daily living) was done using the previous instruments (II, III, and IV).

Statistical analysis

The data were collected, tabulated, and analyzed by SPSS (statistical package for social science) version 27.0 on IBM compatible computer (SPSS Inc., Chicago, IL, USA).

Analytic statistics: which include the following tests.

1) Chi-square test ($\chi 2$): was used to study association between two qualitative variables.

2) Fisher's Exact test: a statistical significance test used in the analysis of 2x2 contingency tables when at least 25% of cells has expected number < 5.

3) t- test; is a test of significance used for comparison between two groups normally distributed having quantitative variables.

4) Mann Whitney U test: a non-parametric test of significance used for comparison between two groups not normally distributed having quantitative variables.

5) Spearman correlation (r): is a test used to measure the association between two not normally distributed quantitative variables or one quantitative and one qualitative ordinal variable.

Results

Table (1) shows that about half of both study and control group 46 % and 56% respectively their ages were between 50 to 65 years with mean age of study and control groups 47.22 ±9.36 years and 49.06 ±10.10 years respectively. In general, 48% and 54% of study group and control group respectively were males; 82% and 72% of study group and control group were married; 52% of study group and 64% of control group were rural residents. Concerning level of education, more than half of study and control groups (with

percentages 52% and 58% respectively) were highly educated or postgraduates. Regarding occupation, 70% and 54% of study group and control group in the current study respectively were employees. As regards income; it was enough for 78% of study group and 74% of control group.

There were no statistically significant differences between study and control group regarding all sociodemographic characteristics where the P value > 0.05.

Table (2) demonstrates that pre intervention pain score and degree of pain shows non-significant difference as all of them complaining pain ranged from mild to severe degree with the majority of them of moderate and severe pain, while in post intervention, the study group shows statistically significant decrease in pain score and pain degree (p value <0.001) as 80% of them recorded no pain or just mild pain versus only 24% in control group.

Table (3) documents a non-significant difference regarding sleep quality score in pre intervention assessment as 100% in study group and 98% in control group with disturbed sleep quality. In post intervention, the study group improved to 62% with normal refreshing sleep versus only 10% in control group with highly statistical significant difference between them (p value <0.001).

Table (4) shows that activity of daily living is non-significant between the studied groups in pre intervention assessment, while in post intervention assessment it shows highly statistical significant higher score in study group than control group (p value <0.001).

Table (5) regarding study group results, this table reveals that there is a highly significant statistical negative correlation between VAS score and GSQS score (P value = 0.002) two weeks post-intervention and a significant statistical negative correlation between VAS scores and NEADL scale (P value = 0.03) two weeks post-intervention, while there is a significant statistical positive correlation between VAS score and NEADL scale (P value = 0.04) two weeks post-intervention.

Table (1): Percentage Distribution of Both Study and Control Groups According to Their Sociodemographic Characteristics (n=100)

Sociodemographic characteristics	Studied subjects (N=100)				Test	P value
	Study group N = 50		Control group N = 50			
	No	%	No	%		
Age group						
18 - <30	3	6.0	4	8.0	X^2	
30 - <40	8	16.0	3	6.0		
40 - <50	16	32.0	15	30.0	3.32	0.51
50 - <60	21	42.0	24	48.0		
60 – 65	2	4.0	4	8.0		
Age (year)					t-test	
Mean ±SD	47.22±9.36		49.06±10.10		0.82	0.95
Range	22 – 61		19 – 63			
Gender					X^2	
Male	24	48.0	27	54.0	0.36	0.55
Female	26	52.0	23	46.0		
Marital status						
Single	4	8.0	9	18.0	X^2	
Married	41	82.0	36	72.0		
Widow	5	10.0	3	6.0	4.74	0.19
Divorced	0	0.0	2	4.0		
Residence					X^2	
Rural	26	52.0	32	64.0	1.48	0.22
Urban	24	48.0	18	36.0		
Level of education						
Illiterate	0	0.0	1	2.0	X^2	
Read & write	3	6.0	0	0.0		
Basic education	1	2.0	2	4.0	5.64	0.23
High school education	20	40.0	18	36.0		
High & post graduate	26	52.0	29	58.0		
Occupation						
Employee	35	70.0	27	54.0		
Craft work	3	6.0	3	6.0	X^2	
Don't work	0	0.0	5	10.0		
House wife	10	20.0	9	18.0	8.22	0.15
Retired	1	2.0	4	8.0		
Student	1	2.0	2	4.0		
Monthly income					X^2	
Enough	39	78.0	37	74.0	0.22	0.82
Not enough	11	22.0	13	26.0		

X^2 = chi square test

(*) Statistically significant at P ≤ 0.05 (**) Highly statistical significant at P value ≤ 0.001

Table (2): Percentage Distribution of Both Study and Control Groups According to Their Pain Level Pre-Intervention and Two Weeks Post-Intervention (n=100)

Degree of visual analogue scale (VAS)	Studied subjects (N=100)				Test	P value
	Study group N = 50		Control group N = 50			
	No	%	No	%		
Pre-intervention						
No pain	0	0.0	0	0.0	X^2 0.28	0.87
Mild pain	8	16.0	10	20.0		
Moderate pain	12	24.0	11	22.0		
Sever pain	30	60.0	29	58.0		
Mean ±SD	6.44±2.12		6.06±2.06		U 1.07	0.29
Range	2 – 9		1 – 9			
Two weeks (post-intervention)						
No pain	9	18.0	3	6.0	X^2 33.39	<0.001**
Mild pain	31	62.0	9	18.0		
Moderate pain	7	14.0	15	30.0		
Severe Pain	3	6.0	23	46.0		
Mean ±SD	1.84±1.86		5.96±2.64		U 6.48	<0.001**
Range	0 – 7		0 – 9			

X^2 = Chi square test, U = Mann Whitney U test

(*) Statistically significant at P ≤ 0.05 (**) Highly statistical significant at P value ≤ 0.001

Table (3): Percentage Distribution of Both Study and Control Groups According to Their Gorningen Sleep Quality Scale (GSQS) Scoring Pre-Intervention and Two Weeks Post-Intervention (n=100)

Gorningen Sleep Quality Scale (GSQS)	Studied subjects (N= 100)				Test	P value
	Study group N = 50		Control group N = 50			
	No	%	No	%		
GSQS category (pre)					X^2 1.01	0.315
Moderately disturbed sleep	0	0.0	1	2.0		
Poor sleep quality	50	100.0	49	98.0		
Mean ±SD	9.52±1.23		9.54±1.47		t-test 0.074	0.147
Range	7 – 13		5 – 12			
GSQS category (post)					X^2 41.94	0.000**
Normal refreshing sleep	31	62.0	5	10.0		
Moderately disturbed sleep	14	28.0	10	20.0		
Poor sleep quality	5	10.0	35	70.0		
Mean ±SD	2.4 ±2.11		8.38±3.47		t-test 10.38	0.000**
Range	0 – 7		1 – 12			

X^2 = Chi square test

(*) Statistically significant at P ≤ 0.05 (**) Highly statistical significant at P value ≤ 0.001

Table (4): Mean And Standard Deviation of Both Study and Control Groups According to Their Nottingham Extended Activities of Daily Living (NEADL) Scale Pre-Intervention And Two Weeks Post-Intervention (n=100)

Nottingham Extended Activities of Daily Living (NEADL) scale	Studied subjects (N= 100)		Test	P value
	Study group N = 50	Control group N = 50		
NEADL scale (pre) Mean ±SD Range	31.08±4.10 25 – 40	29.86±5.31 24 – 45	t-test 1.285	0.202
NEADL scale (post) Mean ±SD Range	59.68±2.55 54 – 64	24.64±3.74 20 – 35	t-test 54.672	0.000**

(*) Statistically significant at P ≤ 0.05 (**) Highly statistical significant at P value ≤ 0.001

Table (5): Correlation Matrix between Pain, Sleep Quality and Daily Living Activity Two Weeks Post-Intervention in Study Group.

Study group				
	VAS score		GSQS score	
	R	P value	r	P value
VAS score	------	--------	-0.43	0.002*
GSQS score	-0.43	0.002*	-----	--------
NEADL scale	-0.30	0.03*	0.29	0.04*

(*) Statistically significant at P ≤ 0.05 (**) Highly statistical significant at P value ≤ 0.001

Discussion:

Hemodialysis, peritoneal dialysis and kidney transplant are the most common approaches of treatment for ESRD; among which hemodialysis is the most frequently used method, with major effects on patient's health (Krismiadi et al., 2023). Using HD for patients with ESRD can result in symptoms of pain, disturbed sleep and impaired ability to perform ADL which can be managed using pharmacological and non-pharmacological interventions such as yoga, music therapy and relaxation techniques (Purba et al., 2020).

It was hypothesized that patients who apply Benson's Relaxation Technique (study group) would have lower pain intensity score than patients who don't apply it (control group) (Hypothesis I). The present study showed very highly statistical significant improvement at study group regarding the pain score and pain level in two weeks-post intervention and these findings support hypothesis I. These findings are supported by Abu Maloh et al., (2024) who studied " The Effectiveness of Benson's Relaxation Technique on Pain and Perceived Stress Among Patients Undergoing Hemodialysis: A Double-Blind, Cluster-Randomized, Active Control Clinical Trial." and found that there was a statistical significant difference between pain level at study group who used Benson's relaxation

technique in addition to routine hospital care.

From the researcher's point of view these results may be attributed to applying Benson's relaxation technique in the study group which helped to reduce pain among patients undergoing hemodialysis through relaxing patients' muscles and enhancing parasympathetic activity.

It was hypothesized that patients who apply Benson's Relaxation Technique (study group) would exhibit a higher quality of sleep than patients who don't apply it (control group) (Hypothesis II). The present study showed very highly statistical significant improvement at study group regarding sleep quality score and category two weeks-post intervention and these findings support hypothesis II.

These findings are supported by Ghandehari et al., (2025) who studied "The Effect of Benson's Relaxation on Sleep Quality in Patients Undergoing Hemodialysis" and the study results showed a statistically significant positive improvement in sleep quality after application of BRT.

In the same context Rezki et al., (2024) who studied the effectiveness of Benson relaxation technique on sleep patterns of CKD stage V patients undergoing hemodialysis under title " Efektifitas Teknik Relaksasi Benson Terhadap Pola Tidur Pasien CKD Stage V Yang Menjalani Hemodialisa" concluded that applying Benson relaxation for one week is effective in improving sleep patterns in CKD Stage V patients undergoing Hemodialysis.

From the researcher's point of view these results may be attributed to use of Benson's relaxation technique in the study group which improved sleep quality among patients undergoing hemodialysis through its ability to decrease pain level, giving chance to the patient to have a higher sleep quality.

It was hypothesized that patients who apply Benson's Relaxation Technique (study group) would exhibit a higher level of performing activities of daily living than patients who don't apply it (control group) (Hypothesis III). The present study showed very highly statistical significant improvement at study group regarding NEADL scale scores two weeks-post intervention and these findings support hypothesis III.

These findings are supported by Far et al., (2020). who studied " The effects of Benson relaxation technique on activities of daily living in hemodialysis patients; A single-blind, randomized, parallel-group, controlled trial study." and the findings suggested that using Benson's relaxation technique as a non-pharmacological intervention may effectively enhance the activities of daily living of hemodialysis patients.

Considering that reduction of fatigue is a major influential factor in enhancing the daily activities of individuals, so these results came in the same line with Krismiadi et al., (2023) who studied "Differences Between the Effects of The Benson Relaxation Technique and Deep Breath on Anxiety, Sleep Quality, and Fatigue in Hemodialysis Patients." and found that Benson's relaxation technique can reduce fatigue, hence it can improve the daily activities of individuals.

From the researcher's point of view these results may be attributed to use of Benson's relaxation technique in the study group which improved activity level among patients undergoing hemodialysis through its ability to decrease pain leve and improve sleep quality which in turn helped to improve patient's ability to perform ADL.

Regarding correlation between study variables, The present study showed that there was a statistically significant negative correlation between both groups regarding the pain scale and sleep quality two weeks post-intervention, and these findings are supported by Campanini et al., (2022), who studied "Bidirectional associations between chronic low back pain and sleep quality: A cohort study with schoolteachers." and found that there was a significant negative correlation between chronic low back pain and sleep quality.

In the same context, Miettinen et al., (2022), who studied "Sleep problems in pain patients entering tertiary pain care: the role of pain-related anxiety, medication use, self-reported diseases, and sleep disorders," concluded that pain is one of the most prominent factors that disturbs sleep quality. Moreover, Runge et al., (2024), who studied "The bidirectional relationship between sleep problems and chronic musculoskeletal pain: a systematic review with meta-analysis," found that chronic musculoskeletal pain at baseline increases the risk of sleep problems.

From the researcher's point of view these findings may be due to the presence of logical relationship between pain and sleep (The less pain, the more improved sleep quality).

Also, the present study showed that there was a statistically significant positive correlation between both groups regarding sleep quality and daily activities two weeks post-intervention, and these findings are supported by Alnawwar et al., (2023), who studied "The Effect of Physical Activity on Sleep Quality and Sleep Disorder: A Systematic Review" and found that all studied articles supported that physical activity was positively associated with sleep quality, which indicates that physical activities improve sleep quality. These articles showed that physical activities reduce the severity of insomnia and other sleep disorders.

In the same line, Hei Chow et al., (2023), who studied "The relationship between sleep and physical activity in an in-patient rehabilitation stroke setting: a cross-sectional study," found that more sleep was related to less sedentary behavior and more time spent on physical activity. From the researcher's point of view these results may be because, improved sleep quality increases patient's ability to perform activities of daily living in patients undergoing hemodialysis.

Moreover, The present study showed that there was a statistically significant negative correlation between both groups regarding the pain scale and daily activities two weeks post-intervention, and these findings are supported by Alrashdi et al., (2024), who studied " Pre- and Post-Operative Pain Intensity and Physical Activity Levels in Individuals with Acetabular

Dysplasia Undergoing Periacetabular Osteotomy: A Prospective Cohort Study," found that reduced pain intensity after periacetabular osteotomy was associated with increased physical activity levels. From the researcher's point of view these results may be because, improved sleep quality increases patient's ability to perform activities of daily living in patients undergoing hemodialysis.

Conclusion

The study concluded that Benson's relaxation technique is an effective non-pharmacological technique in reducing pain intensity, improving sleep quality, and enhancing patient's ability to perform daily living activities for patients undergoing hemodialysis.

Recommendations

- Benson's relaxation technique along with routine hospital care should be used to reduce pain intensity, improve sleep quality and improve ability to perform activities of daily living in patients undergoing hemodialysis.
- Nursing staff and newly admitted patients should be taught how to perform Benson's relaxation technique.
- A simplified, comprehensive, and illustrated Arabic guided images instructed booklet about Benson's relaxation technique should be distributed to every newly admitted patient undergoing hemodialysis

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