

Effect of Relaxation Technique on Blood Pressure, Stress and Quality of Life among Hypertensive Females in Damanhour City

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Abstract

Background: Progressive Muscle Relaxation (PMR) is the simplest and most effective method to decrease muscle tension, reduce the level of stress, anxiety and lower blood pressure. **The aim of the study** is to evaluate the effect of relaxation technique on blood pressure, stress and quality of life among female patients with hypertension in Damanhour City. **Design:** Quasi experimental design (two groups) research design was adopted to carry out this study. **Setting:** This study was conducted in the outpatient clinic at the National Institute of Medicine in Damanhour. **Sample:** A purposive sample of 60 female patients was included in the study. **Tools of data collection:** Three tools were used for data collection Tool I: Structured Interview Schedule for female patients' basic data. It consists of three parts. Tool II: Perceived Stress Scale (PSS). Tool III: Quality of Life Scale (WHOQoL-BREF- 26). **Result:** The systolic blood pressure mean score among the study group was 153.30 ± 6.564 in the initial assessment, and dropped to 126.50 ± 4.883 after 2 weeks of the relaxation techniques and then decreased to 124.63 ± 5.196 after 4 weeks, with a statistically significant difference between them ($F=246.49$, $P=0.000$). **Conclusion:** Based on the results of the present study it can be concluded that progressive muscle relaxation program proved to be significantly effective in decreasing levels of stress and controlling blood pressure level as well as increase the level of quality of life among the study group. **Recommendation:** Awareness about stress as a risk for hypertension should be done among masses. Measures to mitigate stress should be emphasized in the initiatives for prevention and control of hypertension. Include different relaxation technique in treatment plan of hypertensive patients. Use different instructional/mass media to illustrate risk factors, manifestations and controlling factors of hypertension and stress including relaxation technique.

Keywords: Hypertension, Relaxation Technique, Stress, Quality of Life

Introduction

Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental, and behavioral factors. The main types of NCDs are cardiovascular diseases (such as heart attacks, strokes, and hypertension), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and diabetes (**Global Burden of Disease Study 2019 (GBD 2019)**).

Hypertension, also known as high or raised blood pressure, is a condition in which the blood in the vessels have persistently raised pressure. It is a serious medical condition and can increase the risk of heart, brain, eye, kidney, and other diseases. It is a major cause of premature death worldwide, with upwards of 1 in 4 men and 1 in 5 women-over a billion people-having the hypertension. The burden of hypertension is felt disproportionately in low- and middle-income countries, where two thirds of cases are found, largely due to increased risk factors in those populations in recent decades. The estimated prevalence of hypertension in Egypt in 2022 was 29.2%; 17.8 million of the adult populations have hypertension (**Belay DG, Fekadu Wolde H et al 2022**).

Many people with hypertension do not notice symptoms and may be not aware that there is a problem. Symptoms can include early morning headaches, nosebleeds, irregular heart rhythms, vision changes, and buzzing in the ears. More severe forms may exhibit fatigue, nausea, vomiting, confusion, anxiety, chest pain, and muscle tremors. If left untreated, hypertension can cause persistent chest pain (also called angina), heart attacks, heart failure, and an irregular heartbeat, retinal bleeding and cerebrovascular accident which can lead to a sudden death (**Sun, S. et al 2022**).

Hypertension and other non-communicable diseases are driven by forces that include rapid, unplanned urbanization, the

globalization of unhealthy lifestyles, and aging process. Unhealthy diets/dietary habits, a lack of physical activity, consumption of tobacco and alcohol, exposure to stress and poor coping mechanisms with stress and being overweight or obese may show up in people as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity. These are called metabolic risk factors and can lead to cardiovascular diseases and premature deaths. There are also non-modifiable risk factors, including a family history of hypertension, age over 65, and co-existing diseases such as diabetes or kidney disease (**Bhattacharya, S et al 2020**).

Hypertension can be managed by reducing and managing different stressors, regularly checking blood pressure, consulting with health professionals, treating high blood pressure, and managing other medical conditions. In addition, reducing modifiable risk factors is the best way to prevent hypertension and associated diseases of the heart, brain, kidney, and other organs, which can be done through lifestyle modifications, including weight management, a healthy diet, regular exercise, and stress management (**Schmidt BM, et al 2020**).

Lifestyle modification is a cornerstone of hypertension treatment, yet most recommendations currently focus on diet and exercise and consider stress reduction strategies. Among stress reduction strategies is the relaxation technique, which includes progressive muscle relaxation, meditation, yoga, and spiritual approaches. It may reduce blood pressure through reducing stress, increasing parasympathetic activation, and altering baroreceptor sensitivity (**Norelli, et al 2021**).

Progressive Muscle Relaxation (PMR) is the simplest and most effective method to decrease muscle tension, reduce the level of stress and anxiety, and lower blood pressure. It involves slowly tensing and then relaxing each muscle group in the body (**Manoppo ,**

A., & Anderson, E. (2019).

Significance of the study

Because of its chronicity, hypertension affects the quality of life of patients and their families. So, raising the quality of life of those patients is the ultimate goal of all health interventions. In this respect, proper management of such problems is needed through interdisciplinary teams of medical, surgical, psychiatric, and community health nurses. At the same time proper hypertension management can positively affect patient and his family, hospital staff including nurses, health care agency and the whole community as well.

The study aimed to: Evaluate the effect of relaxation technique on blood pressure, stress, and quality of life among female patients with hypertension in Damanhur City.

Research hypothesis: Hypertensive female patients who apply relaxation technique exhibit more controlled blood pressure, lower stress level and better quality of life than who not apply it.

Subject & Methods

Research design: Quasi experimental design (two groups) research design was adopted to carry out this study.

Setting: This study was conducted in the outpatient clinic at the National Institute of Medicine in Damanhour. These clinics serves patient from different districts in Damanhour city around the week.

Subjects

- The study subjects comprised sixty (60)

female patients with hypertension who attended the previously mentioned setting. The selected subjects fulfilled the following eligibility criteria; age ranging from 20 to less than 60 years old, diagnosed with hypertension for one year or more, free from other uncontrolled medical conditions.

- The subjects were divided into two equal groups randomly (30 patients each group).
- The study group received the relaxation technique program with routine hospital, and the control group received routine hospital care.

Sample size: A purposive sample of 60 female patients was included in the study. The sample size was estimated using Epi info 7 statistical program using the following parameters; expected frequency 50%, and 95% confidence level with 5% margin of error. The final sample size will be 60 patients. Each group consists of 30 female patients.

The selection of the subjects was based on the following eligible criteria:

- Diagnosed with hypertension for one year or more.
- Mentally oriented.
- Able to communicate verbally.
- Participants were included in the study if they followed the diet restriction of avoiding salty and spicy foods as well as avoiding tea, coffee, smoking, and alcohol from the beginning to the end of the study.

Tools for data collection:

Tool: Three tools were used for data collection.

Tool I: “Structured Interview Schedule for female patients basic data”; it was developed by the researchers based on a comprehensive review of the related literature. It consists of three parts:

Part 1: Socio-demographic data about the female patients, it included questions regarding age, marital status, level of education, occupation, and area of residence.

Part 2: Clinical data of the hypertensive female patients; it included questions regarding duration of hypertension, treatment, follow up pattern.

Part 3: Blood pressure measurement sheet, it is used to assess the values of systolic and diastolic blood pressure measurement over the study phases.

Tool II: Perceived Stress Scale (PSS):

It was developed by **Cohen et al in (1983)**. It is used to assess the degree to which people perceive their lives as stressful. Subjects indicate how often they have found their lives unpredictable, uncontrollable, and overloaded in the last month. It has ten questions based on five point Likert scale. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13 are considered low stress. Scores ranging from 14-26 are considered moderate stress and scores ranging from 27-40 are considered high perceived stress.

Tool III: Quality of Life Scale (WHOQoL-BREF- 26)

It was developed by World Health

Organization in (2013). It is used to assess the health-related quality of life of hypertensive patients. It consists of 26 items entails four domains. These are physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items), and two items not included in any of the domains are overall perception of QoL and general health perception. Each of these items was scored from 1 to 5 on a response scale, which is agreed as a five point Likert scale. The total score was ranging from 26 to 130 distributed as follows; scores ranging from 26 to 88 are considered poor quality of life, scores ranging from 89 to 109 are considered fair quality of life, and scores ranging from 110 to 130 are considered good quality of life.

METHODS

- An official letter was issued from the Faculty of Nursing, Damanhour University to the director of the National Institute of Medicine, Damanhour to facilitate the implementation of the study.
- A meeting was held with the director of the selected facility to obtain their approval after clarifying the purpose of the study, setting the time for the beginning of the study, and gaining their cooperation and support during data collection.
- The study tool I was developed by the researchers after an extensive review of the relevant and recent literature. While, tool II and III were adapted by the researchers.

- The content validity of the study tools was tested by a jury of five experts in the fields of community health nursing and medical surgical nursing. Their opinions and suggestions were taken into consideration.
- The reliability of the tools was tested for internal consistency using Chronbach alpha, where $r= 0.867$ for tool II, and $r= 0.911$ for tool III.
- A pilot study of 6 patients (10%) of the total sample size on similar hypertensive female patients at the National Institute of Medicine, Damanshour, at a medical outpatient clinic was conducted to evaluate the tools' content and time requirements for data collection. Hypertensive female patients who participated in the pilot trial were excluded.
- Informed written consents were obtained from the patients in the previously mentioned setting after brief explanation of the purpose and nature of the research.
- They were further divided randomly into two groups. Each group was 30 patients. The study group received the progressive muscles relaxation therapy with routine hospital, and the control group received routine hospital care.
- Hospital routine includes adherence to prescribed medications, low salt low fat diet, no smoking or alcohol and practicing at least walking daily for 15 minutes.

The program will be conducted through the following steps:

Phase I : Assessment phase:

- The researchers explained the aim of the study and its pathway to all study participants.
- Initial assessment of the selected female patients (60 patients) in the previous mentioned setting using the study tools I, II and III will be carried out before applying the nursing intervention (Progressive muscle relaxation technique).

Phase II: Planning phase:

- The program objectives and methodology were prepared according to recent relevant literature and the obtained results from the initial assessment. Simple instructional media with picture was developed to be distributed to the study group to explain the progressive muscle relaxation technique.

Phase III: Implementation phase:

- Blood pressure measurement at the same time weekly for three times (initially, after one week and after two weeks for both groups) with the same sphygmomanometer after explaining the procedure to each female, to decrease level of anxiety and gain maximum co-operation. Measurement was done in the outpatient clinic in nursing station.
- Application for the control group first to avoid contamination of the study.

- Before the progressive muscle relaxation technique, the researchers showed the participants a video of such exercises; this helped to remind them of the technique.
- Progressive muscle relaxation technique was demonstrated for the study group by the researchers for 20 minutes once. Then, the researcher observed the subjects while performing the exercise in first time at the outpatient clinic to ensure that the exercises were done correctly.
- The patients in the study group were instructed to perform the exercises twice daily (morning and evening) for four weeks and they were followed through phone to ensure their compliance of performance. The progressive muscle relaxation technique was done through tensing and relaxing muscles in the arms, hands, shoulders, neck, face, abdomen, and legs as follows;
- Subjects relax in a sitting position in a convenient place (well ventilated, quiet, and at a proper temperature).
- Train the muscles of the hand by grasping the right hand while making a fist, feeling the tension, then releasing the fist. After completion of the right hand, proceed to the left hand.
- Train the back arm muscles by straightening the arms and moving the dorsiflexion of the wrist so that the muscles in the hand and forearm are stretched back, with fingers facing the ceiling (up).
- Train the biceps muscle by grasping both hands like a fist, then bringing them to the shoulders so that the biceps muscles will be tense.
- Train the muscles of the shoulder by raising both shoulders up until they touch both ears. This movement generates strain on the shoulders, upper back, and neck.
- Exercise the forehead muscles to frown and the eyebrows until the skin wrinkles.
- Exercise the muscles of the eye with eyes closed tightly so that tension around the eyes and the muscles that control eye movements can be felt.
- Train the muscles of the jaw with a clenched jaw, followed by biting teeth, so that the tension around the jaw muscles can be reduced.
- Exercise the muscles around the mouth with pursed lips as strongly as possible so that the tension will be felt around the mouth.
- Train the neck muscles to lay the head on the back, and then emphasize the head on the back and feel the tension in the back of the neck and upper back.
- Train the anterior neck muscles and feel tension in the front of the neck.
- Arch the back, sticking out the chest, and feel the tension in upper back... and relax. Arch back, sticking out chest, and feel the tension in upper back.
- The tense condition is maintained for 10 seconds and then relaxes.

- Take a deep breath and hold it, feeling the tightness in the muscles around chest. Hold it and then relax, breathing deeply from the abdomen.
- Tighten the muscles of stomach, making them very hard. Hold and relax.
 - Straighten both of legs out in front until feel tension in the backs of thighs. Hold and then relax.
 - Tens both calf muscles by stretching feet and pointing toes up toward head. Hold and then relax. All movements were repeated twice, with each position held for 10 seconds and tense when stretched for 15-20 seconds (Herawati & Azizah (2016)).

Phase IV: Evaluation phase:

- All the subjects were evaluated using tool I part III for three times; initially before the intervention, after two weeks and after 4 weeks, while they were evaluated twice before the intervention and after 4 weeks using tool II and III for both control and study groups.
- Data collection for the study was started at the beginning of January 2022 and completed by the end of April 2022.

Ethical considerations

- Informed consents were obtained from the subjects after brief explanation of the purpose and nature of the research.
- The anonymity and confidentiality of responses, voluntary participation and right to refuse to participate in the study were emphasized. The researcher

explained the objectives of the study to the participants. Privacy was ensured.

Statistical analysis

- After data were collected, they were coded and transferred into specially designed formats so as to be suitable for computer feeding. Following data entry, checking and verification processes were carried out to avoid any errors during data entry, frequency analysis, cross tabulation and manual revision were all used to detect any errors. The statistical package for social sciences (SPSS version 25) was utilized for both data presentation and statistical analysis of the results. The level of significance selected for this study was P equal to or less than 0.05.

Results

- Table (1) shows the distribution of the studied female patients in the study and control groups according to their basic characteristics.
- Regarding age, it ranged from 20 to less than 60 years old, and less than one tenth (6.7% and 3.3%) of the study and the control group respectively aged from 20 to less than 30 years old, while less than one fifth of the study and the control group aged from 50 to less than 60 years old (13.3% and 16.7% respectively).
- In relation to marital status, one-third (33.3%) of the study group was single compared to one fifth (20.0%) of the

control group, while less than one-third (30.0%) of the study group and two fifths (40.0%) of the control group were divorced.

- Concerning the level of education, less than half (43.3%) of the study group and more than one third (36.7%) of the control group were illiterate and could just read and write. On the other hand, those patients with university education constituted 16.7% and 20.0% of the study and control group respectively.
- With respect to the place of residence, more than two fifths (43.3%) of the study and control group were living in suburban areas. While, more than one-third (36.7%) of the study group and less than half (46.7%) of the control group were living in rural areas.
- In addition, one third (33.3%) of the study group compared to more than one quarter (26.7%) of the control group were currently working.
- Table (2) portrays the comparison between the study and control groups according to their blood pressure mean scores before and after implementation of the progressive muscle relaxation technique.
- Starting with the systolic blood pressure, the table reveals that the systolic blood pressure mean score among the study group was 153.30 ± 6.564 in the initial assessment, and dropped to 126.50 ± 4.883 after 2 weeks of the relaxation techniques and then decreased to 124.63 ± 5.196 after 4 weeks, with a statistically significant difference between them ($F= 246.49$, $P= 0.000$). While in the control group, the systolic

blood pressure mean score was 149.40 ± 10.01 in the in initial assessment and dropped to 146.46 ± 9.100 and 140.80 ± 11.08 after 2 and 4 weeks respectively, with a statistically significant difference between them ($F= 5.624$, $P= 0.000$).

- In addition, statistically significance differences were noted between the study and the control group in relation to the systolic blood pressure mean scores after 2 and 4 weeks ($t^b= 10.586$, $P= 0.000$ and $t^c= 7.237$, $P= 0.000$ respectively).
- With respect to the diastolic blood pressure, the table shows that the diastolic blood pressure mean score among the study group was 87.00 ± 8.262 in the initial assessment, and decreased to 77.83 ± 5.031 after 2 weeks of the relaxation techniques and then slightly elevated to 79.50 ± 4.423 after 4 weeks, with a statistically significant difference between them ($F= 18.977$, $P= 0.000$). While in the control group, the diastolic blood pressure mean score was 90.03 ± 7.227 in the in initial assessment and dropped to 88.43 ± 6.420 and 85.76 ± 3.511 after 2 and 4 weeks respectively, with a statistically significant difference between them ($F= 3.960$, $P= 0.023$).
- Moreover, statistically significance differences were noticed between the study and the control group in relation to the systolic blood pressure mean scores after 2 and 4 weeks ($t^b= 7.118$, $P= 0.000$ and $t^c= 6.072$, $P= 0.000$ respectively).
- Table (3) reveals the comparison

between the study and control groups in relation to the levels of quality of life before and after intervention.

- Concerning quality of life (before intervention), it was observed that less than three quarters (70.0%) of the study group compared to two thirds (66.7%) of the control group had low quality of life. While, more than one quarter (26.7%) of the study group compared to one tenth (10.0%) of the control group had high quality of life before implementing the intervention, with a statistically significant difference between them ($X^2=6.797$, $P=0.033$).
- After 4 week of the relaxation technique, the majority (83.3%) of the patients in the study group compared to one tenth (10.0%) of the patients in the control group had high level of quality of life, while, none (0.0%) of the patients in the study group compared to less than two thirds (60.0%) of the control group had low level of quality of life, with a statistically significant difference between them ($X^2=36.43$, $P=0.000$).
- Moreover, a statistically significant difference was noticed between the patients' level of quality of life in the study group before the relaxation technique and in the final evaluation after 4 weeks ($X^2=32.424$, $P=0.000$).
- Table (4) reveals the comparison between the study and control groups in relation to the levels of stress before and after intervention.
- Concerning the levels of stress (before intervention), it was noticed that less than three quarters (70.0%) of the study group compared to two thirds (60.0%) of the control group had high level of stress. While, one tenth (10.0%) of the study group compared to 13.3% of the control group had low level of stress before implementing the intervention.
- After 4 week of the relaxation technique, the majority (86.7%) of the patients in the study group compared to less than one quarter (23.3%) of the patients in the control group had low level of stress, while, none (0.0%) of the patients in the study group compared to two thirds (66.7%) of the control group had high level of stress, with a statistically significant difference between them ($X^2=31.082$, $P=0.000$).
- Furthermore, a statistically significant difference was found between the patients' level of stress in the study group before the relaxation technique and in the final evaluation after 4 weeks ($X^2=39.641$, $P=0.000$).

Table (1) Distribution of the studied hypertensive females' patients among the study and control groups according to their socio demographic characteristics.

Variables	Study group (N= 30)		Control group (N= 30)		Test of Significance
	No.	%	No.	%	
Age					
- 20-	2	6.7	1	3.3	X ² = 0.949 P= 0.813
- 30-	20	66.7	18	60.0	
- 40-	4	13.3	6	20.0	
- 50-<60	4	13.3	5	16.7	
Marital status					
- Single	10	33.3	6	20.0	X ² =1.853 P=0.604
- Married	5	16.7	7	23.3	
- Divorced	9	30.0	12	40.0	
- Widowed	6	20.0	5	16.7	
Level of education					
- Illiterate /Read & write	13	43.3	11	36.7	X ² =0.861 P=0.835
- Basic education	5	16.7	7	23.3	
- Secondary /Technical education	8	26.7	6	20.0	
- University education	5	16.7	6	20.0	
Place of residence					
- Rural	11	36.7	14	46.7	X ² =1.360 P=0.507
- Urban	6	20.0	3	10.0	
- Suburban	13	43.3	13	43.3	
Occupation					
- Working	10	33.3	8	26.7	X ² =0.318 P=0.573
- Not working	20	66.7	22	73.3	

X²= Chi Square test * Significant at p ≤0.05

Table (2): Comparison between the study and control groups according to their blood pressure mean scores before and after implementation of the progressive muscle relaxation technique

Study group (n=30)			Control Group (n=30)			Test of significance
Before	After 2 weeks	After 4 weeks	Before	After 2 weeks	After 4 weeks	
Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
Systolic blood pressure						
153.30 ± 6.564	126.50 ± 4.883	124.63±5.196	149.40±10.01	146.46±9.100	140.80±11.08	t ^a = 1.785 P= 0.079 t ^b = 10.586 P= 0.000* t ^c = 7.237 P= 0.000*
t ^d = 17.943 t ^e = 18.758 t ^f = 1.436 F= 246.49	P= 0.000* P= 0.000* P= 0.156 P= 0.000*		t ^d = 1.190 t ^e = 3.155 t ^f = 2.162 F= 5.624	P= 0.239 P= 0.003* P= 0.035* P= 0.000*		
Diastolic blood pressure						
87.00±8.262	77.83±5.031	79.50±4.423	90.03±7.227	88.43±6.420	85.76±3.511	t ^a = 1.512 P= 0.136 t ^b = 7.118 P= 0.000* t ^c = 6.072 P= 0.000*
t ^d = 5.192 t ^e = 4.383 t ^f = 1.365 F= 18.977	P= 0.000* P= 0.000* P= 0.177 P= 0.000*		t ^d = 0.907 t ^e = 2.911 t ^f = 1.999 F= 3.960	P= 0.368 P= 0.005* P= 0.050* P= 0.023*		

t= Paired t test t^a, t^b t^c = student t test t^d, t^e t^f = Paired t test F= ANOVA test

t^a comparison between the study and control group before intervention

t^b comparison between the between the study and control group after intervention 2 weeks

t^c comparison between the between the study and control group after intervention 4 weeks

t^d comparison in the same group before intervention and after 2 weeks

t^e comparison in the same group before intervention and after 4 weeks

t^f comparison in the same group after intervention 2 and 4 weeks

F= comparison in the same group across study phases

Significant at p ≤0.05

Table 3: Comparison between the study and control groups in relation to the levels of quality of life before and after intervention

Items	Study group (n=30)				Control Group (n=30)				Test of significance
	Before		After 4 weeks		Before		After 4 weeks		
	No.	%	No.	%	No.	%	No.	%	
Quality of life									
Low	21	70.0	0	0.0	20	66.7	18	60.0	X ^{2a} = 6.797 P= 0.033* X ^{2b} = 36.43 P= 0.000*
Moderate	1	3.3	5	16.7	7	23.3	9	30.0	
High	8	26.7	25	83.3	3	10.0	3	10.0	
	X ² = 32.424 P= 0.000*				X ² = 0.355 P= 0.837				

- X²= Chi Square test
- X² comparison in the same before and after intervention
- X^{a2} comparison between the study and control group before intervention
- X^{b2} comparison between the between the study and control group after intervention
- Significant at p ≤ 0.05

Table 4: Comparison between the study and control groups in relation to the levels of stress before and after intervention

Items	Study group (n=30)				Control Group (n=30)				Test of significance
	Before		After 4 weeks		Before		After 4 weeks		
	No.	%	No.	%	No.	%	No.	%	
Levels of Stress									
Low	3	10.0	26	86.7	4	13.3	7	23.3	X ^{2a} = 0.659 P= 0.719 X ^{2b} = 31.082 P= 0.000*
Moderate	6	20.0	4	13.3	8	26.7	3	10.0	
High	21	70.0	0	0.0	18	60.0	20	66.7	
	X ² = 39.641 P= 0.000*				X ² = 3.196 P= 0.202				

- X²= Chi Square test
- X² comparison in the same before and after intervention
- X^{a2} comparison between the study and control group before intervention
- X^{b2} comparison between the between the study and control group after intervention
- Significant at p ≤ 0.05

Discussion

Among all non-communicable diseases cardiovascular diseases are the number one cause of death amounting to 17 million deaths worldwide each year and more than 9 million of these deaths are due to complications of hypertension (**Bagalkot, Karnataka. (2020).**

Cardiovascular disease epidemics especially hypertension is driven by demographic and socio-economic changes that influence the living, eating and working habits of population. Such changes have resulted in population-wide escalation in major risk factors for hypertension like psychosocial stress, tobacco use, physical inactivity, obesity and unhealthy dietary pattern (**Ahmad Thabit, H. (2020).**

Stress has long been listed as a potential and important cause of hypertension among other risk factors such as obesity, low physical activity and addictions. Modern life is full of hassles, deadlines, frustrations and demands. Such mental or psychosocial stress can be one of the major risk factors for hypertension. Acute stress can induce transient elevation of blood pressure. Stress can cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to produce large amounts of vasoconstriction hormones that increase blood pressure (**Jadhav SB, et al 2014, Lin S, et al 2013**). This could explain the results of the current study, where less than three quarters of the studied patients in the study group and less than two thirds of the patients in the control patients had high level of stress. Similar findings were noted by **Belay DG et al 2022 and Damtie D et al 2021 and Bhelkar S et al 2018**.

In general, chronic diseases are slow in progression, long in duration, and they require medical treatment and modifications

in life style. The majority of chronic diseases hold the potential to worsen the overall health of patients by limiting their capacity to live well, limit the functional status, productivity and health related quality of life (**Damu, K., et al 2022, Saleem F, 2012, Abdulwahed A, 2014**). This is true as the result of the current study reveals that less than three quarters of the patients in the study group and two thirds of the patients in the control group had low level of quality of life. This could be attributed to that the quality of life of people with hypertension is affected by issues related to the very existence of the disease and its chronic nature; the diagnosis of the disease; its negative impact on the patient's physical, emotional and social wellbeing; and aspects related to pharmacological treatment. In the same line, the results of **Uchmanowicz B et al 2018, Xiao M, et al 2018, and Xu, X et al 2016** showed that hypertension was associated with increased risk of having a worse health related quality of life.

Relaxation techniques are therapeutic exercises designed to assist individuals by decreasing tension, stress and anxiety. In addition to its psychological impact, stress can cause physiological responses such as increased heart rate, palpitations, excess sweating, shortness of breath, and muscle tension (**Hamdani, S.U., et al 2022**).

Being a low-risk, costless, self-applied and safe technique, relaxation techniques are frequently cited as an integral component of physical and psychological therapies to manage anxiety stress and reduce depression. Relaxation techniques are defined as "a set of strategies to improve physiological response to stress. The underlying treatment goal of all relaxation techniques is to use relaxation to decrease stress or anxiety (**Toussaint L, et al 2021**).

Progressive muscle relaxation (PMR) is

an actively engaging relaxation technique developed by Edmund Jacobson in the 1920s. PMR involves participants actively contracting muscles to create tension and progressively releasing this. The routine is repeated until participants acquire complete relaxation. This technique utilizes the principles of neuronal “top-down” and “bottom-up” processing to achieve results. In “top-down” processing, participants use areas higher in the nervous system like the cerebral cortex and the cerebellum to contract muscles and gradually release the tension. In “bottom-up” processing, the holding and releasing of bodily tension produce proprioceptive stimulation from peripheral muscles that ascends to the brain via the spinal cord and the brainstem. With both stimulatory passages activated, PMR provides participants with quick and immediate relief (**Keptner K. et al 2020**).

In the current study, the less than three quarters of the patients in the study group had high level of stress in the initial assessment and after 4 weeks of the application of progressive muscles relaxation techniques none of them had high level of stress. In the same line, **Zargarzadeh M et al in 2014 and Pv J., Lobo S. M. 2020** who found a significant reduction in stress after application of progressive muscles relaxation techniques. This noticeable effect may be related to the effect of principles of neuronal “top-down” and “bottom-up” processing which by time give immediate and continuous effect of relaxation thus reduce physical and psychological tension.

Moreover, **Pradhan J et al in 2020** found that PMR had a positive effect on reducing depression and anxiety in cancer patients.

Not only do progressive muscles relaxation techniques demonstrate stress-alleviating effects, but also it exhibits a positive influence on blood pressure. In one

study done by **Chaudhuri A et al in 2020** found that progressive muscles relaxation techniques were helpful to decrease stress and depression in patients who had coronary heart disease and also was effective in lowering the high blood pressure among them.

The same results were noted in the current study, were both systolic and diastolic blood pressure had lowered after application of progressive muscles relaxation techniques among the study group. This could be explained as systolic blood pressure is produced by the heart muscle which pushes the contents of the ventricles into the artery that has been tense. During diastolic arteries still expand because peripheral resistance of the arterioles prevents all blood from flowing into the tissues. Another factor that can reduce stress, anxiety, muscle tension and vasoconstriction is deep breathing during PMR technique which improves tissue oxygenation which decrease cardiac workload. Thus, blood pressure depends in part on strength and volume in the arteriole wall. This contraction is maintained by the vasoconstrictor nerve and is controlled by the vasomotor centre in the media oblongata. Blood pressure changes slightly along with physiological changes in motion, such as during physical exercise, when there is a mental change due to anxiety and emotion (**Manoppo A & Anderson E. (2019) and Dedy Arisjulyanto S 2018**).

In the same line, the results of **Rosdiana I et al 2019, Hafid MA in 2022 and Handayani K IN 2020** who found positive effects of progressive muscles relaxation techniques on patients with cardiovascular diseases including hypertension in form of lowering blood pressure and heart rate and palpitation.

Chronic diseases may adversely affect the patients' lives; prevent some patients from achieving goals and long-term plans

and activities of daily life. Therefore, it's challenging for people with chronic diseases, when they are attempting to pursue an active and compatible lifestyle. Several studies found that progressive muscle relaxation therapy is helpful in management of patients with hypertension as well as tension, stress, anxiety and depression associated with such chronic disease (**Atef, S., et al 2022, Wong ELY, et al 2020 and Sulistyarini I, (2013).**

The current study found that more than one quarter of the patients in the study group had high level of quality of life, compared to the majority of them after the application of progressive muscle relaxation therapy through four weeks. Similar findings were reported by **Abdel said J et al 2019, Kurniawati, D et al 2021** who found significant increase in the level of quality of life among the subjects after application of progressive muscle relaxation technique.

In brief, nurses can achieve many health goals of hypertensive patient who has elevated blood pressure, anxiety and stress and limited quality of life through teaching him PMR. Nursing role in PMR includes initial assessment of patient's profile, risk factors and current health condition. Planning and implementation of PMR for each patient and follow up application and effect on patients physical and psychological health is a core role of nurse in hospital and community.

Conclusion

Based on the results of the present study it can be concluded that progressive muscle relaxation program proved to be significantly effective in decreasing levels of stress and blood pressure as well as increase the level of quality of life among the study group.

Recommendations

- Awareness about stress as a risk for hypertension should be done among masses. Measures to mitigate stress should be emphasized in the initiatives for prevention and control of hypertension.
- Include different relaxation technique in treatment plan of hypertensive patients. Use different instructional/ mass-media to illustrate risk factors, manifestations and controlling factors of hypertension and stress including relaxation technique. Replicate the study on larger sample of hypertensive male and female patients.

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