ORIGINAL RESEARCH

A study to assess the effectiveness of breathing exercises on hypertension among patients with chronic renal failure

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ABSTRACT

Introduction: Hypertension, also called high blood pressure or HTN, is a persistent increase in blood pressure in the arteries, which is a chronic medical condition. It is a significant health issue and is often referred to as the "silent killer" since it usually has no warning signs or symptoms, leaving many people unaware of their condition. Hypertension is classified by the Seventh Report of the Joint National Committee of High Blood Pressure (JNC 7 Classification, 2013) as a sustained rise in blood pressure above 140/90 mmHg for adults aged 18 years or older. The prevalence of chronic kidney disease (CKD) varies from region to region, ranging from under 1% to 13%, according to reports. The International Society of Nephrology's Kidney Disease Data Center Study recently reported a prevalence of 17%. **Aim:** To assess the effectiveness of breathing exercises on hypertension among patients with chronic renal failure. **Materials and methods:** A true-experimental study was conducted to assess the effectiveness of breathing exercises on hypertension among patients with chronic renal failure. The study was carried out at GGSMC&H in Faridkot, and a total of 60 participants were enrolled, with 30 in the experimental group and 30 in the control group. The study subjects were selected using a purposive sampling technique. Data were collected using demographic profiles, and blood pressure was measured in both groups and categorized according to American Heart Association standards. Breathing exercises were implemented as an experimental intervention, and a post-test was conducted after seven days. The IBM SPSS version 26 was used for data analysis and interpretation. **Results**: The study found a statistically significant decrease in both systolic blood pressure (SBP) and diastolic blood pressure (DBP) following a breathing exercise intervention among patients with chronic renal failure. Pretest mean SBP was 136.60 and standard deviation was 6.19 and posttest mean SBP was 132.93 and standard deviation was 6.59, with a mean difference of 3.67. The paired t-test yielded a highly significant result ($t_{29}=6.495$, $p=0.001$). Pretest mean DBP was 86.06 and standard deviation was 5.34 and posttest mean DBP was 81.93 and standard deviation was 5.59, with a mean difference of 4.14. The paired t-test yielded a highly significant result ($t_{29}=8.013$, $p=0.001$). Additionally, the independent t-test showed a significant reduction in SBP in the experimental group compared to the control group ($t_{58}=2.82$, $p=0.040$). The study concludes that breathing exercises effectively reduce both SBP and DBP in patients with chronic renal failure. **Conclusion**: In conclusion, this study demonstrates that breathing exercises are effective in reducing both systolic and diastolic blood pressure among patients with chronic renal failure. The results show significant improvements in pre- and post-intervention mean scores for systolic and diastolic blood pressure. The findings suggest that breathing exercises can be an effective non-pharmacological intervention for managing hypertension in patients with chronic renal failure. The study also provides evidence to support the use of breathing exercises as a complementary therapy in conjunction with standard medical treatment for hypertension. Overall, the results of this study have important implications for improving the management of hypertension in patients with chronic renal failure and highlight the need for further research in this area. **Recommendations:** The study can be further recommended on large sample and using experimental research approach.

Keywords: Hypertension, Chronic renal failure, Breathing exercises

INTRODUCTION AND BACKGROUND OF THE STUDY

The kidneys are two reddish-brown bean-shaped organs found in vertebrates. They are located on the left and right in the retroperitoneal space, and in adult humans are about 12 cm (4+½ inches) in length.The kidney is one of the major vital organs. Proper function of the urinary system is essential.

Disorders related to kidney are cause of death throughout the country. Kidneys are the principal organs of the urinary system and their primary function is to regulate the volume and composition of extra cellular fluid (ECF) and to excrete waste products from the body. The kidneys also have several non excretory metabolic and endocrine functions, including blood pressure regulation, erythropoietin production, insulin degradation, prostaglandin synthesis, calcium etc.[1]

Hypertension (HTN or HT), also known as high blood pressure (HBP), is a long-term medical condition in which the blood pressure in the arteries is persistently elevated.[2] Hypertension is a major health problem and is called the "silent killer" because it often has no warning signs or symptoms, and many people don't realize they have it.[3-4]. Classification of hypertension for adults ages 18 and older has been provided by the Seventh Report of the Joint National Committee of High Blood Pressure (JNC 7 Classification, 2013), patients with sustained rise in blood pressure above 140/90 mmHg.[2]

CRF is defined as renal damage with moderate to severe decrease in the glomerular filtration rate (GFR) of 59- 15 ml/min/1,73m. CRF comes under the stages of chronic kidney disease (CKD). CKD involves progressive, loss of kidney function. It is defined as either the presence of kidney damage or GFR less than 60ml/min for 3 months or longer. Chronic, or irreversible renal failure is a progressive reduction of functioning renal tissue in which the remaining kidney mass can no longer maintain the body's internal environment..CRF can develop over many years, or it may result from an episode of ARF from which the client has not recovered. Chronic kidney disease (CKD) is defined as the presence of kidney damage or an estimated glomerular filtration rate (EGFR) less than 60 ml/min/1.73m^2, persisting for 3 months or more, irrespective of the cause.[5]

Breathing exercises play a important role in behavioral methods such as yoga, meditation, and biofeedback, which have had some success in treating high BP.[6]. There may be some rationale for the therapeutic effect of the breathing exercises, as the acute response to slow and stable breathing includes a number of beneficial effects on the cardiovascular system, both at the systemic and the microvascular level. These include increasing baroreflex sensitivity, heart rate variability, microvascular flow and venous return, and reducing BP and peripheral resistance.This study focuses on three types of exercises which includes equal breathing, abdominal breathing and alternate nostril breathing administered for 15 minutes, with each exercise carried out for 20 -30 times.[7]

OBJECTIVES OF THE STUDY

- To assess the pretest and posttest level of blood pressure among patients with chronic renal Failure in control group and experimental group.
- To assess the effectiveness of breathing exercises on hypertension among patients with chronic renal failure in experimental group.
- To find out association between post test level of blood pressure with selected demographic variables in control and experimental group

MATERIAL AND METHODS

Research Approach and research design: Quantitative research approach/ A true experimental pretest post test control group design.

Research setting: The study was conducted in medical ward and dialysis unit at GGSMC&H, Faridkot.

Sample and sample technique: The non-probability purposive sampling technique and sample comprised of 60 patients-30 in control group and 30 in experimental group.

Selection and Development of research tool: The tool is divided into two pieces.

Part I comprises of socio-demographic characteristics divided into three areas.

a. Family profile: This includes age, gender, and employment status. b. Health history: This includes the length of hypertension and CRF medication details, the duration of receiving haemodialysis and any issues patients encountered during dialysis, and urine output.

c. Personal habits: This includes eating habits.

The blood pressure scale was used in Part II to check the blood pressure. The measured blood pressures were classified according to the prescribed blood pressure.

Table of Categories: The American Heart Association recognizes five blood pressure ranges:

Blood pressure category	SYSTOLIC mmhg (upper number)		DIASTOLIC mmhg (lower number)
NORMAL	LESS THAN 120	And	LESS THAN 80
ELEVATED	120 – 129	And	LESS THAN 80
HIGH BLOOD PRESSURE(Hypertension) STAGE I	130 – 139	Or	80 – 89
HIGH BLOOD PRESSURE(hypertension) STAGE II	140 OR HIGHER	Or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	And/or	HIGHER THAN 120

ETHICAL CONSIDERATION

Before collecting data and receiving authorization from the medical supervisor, formal written approval was acquired from the responsible authorities. The informed written permission of each subject was obtained, and the confidentiality and anonymity of each subject were protected.

RESULT

Table 1: Frequency and percentage distribution of selected demographic variables among CRF patients in experimental and control group. N=60

S. No.	Variables	Exp. (n=30)		Ctrl. (n=30)	
		f	%	f	%
1.	**Age (years)**				
	20 -30	2	6.7	0	0
	31 -40	7	23.3	10	33.3
	41 -50	16	53.3	12	40.0
	Above 50	5	16.7	8	26.7
2.	**Gender**				
	Male	23	76.7	24	80.0
	Female	7	23.3	6	20.0
3.	**Occupation**				
	Govt. employee	6	20.0	7	23.3
	Private employee	11	36.7	8	26.7
	Self employed	7	23.3	10	33.3
	Unemployed	6	20.0	5	16.7
4.	**Duration of hypertension**				
	0 -5 years	7	23.3	1	3.3
	5 -10years	5	16.7	5	16.7
	10 -15years	13	43.3	17	56.7
	Above 15 years	5	16.7	7	23.3
5.	**Duration of taking medication for hypertension**				
	0 -5 years	10	33.3	2	6.7
	5 -10years	6	20.0	8	26.7
	10 -15years	11	36.7	15	50.0
	Above 15 years	3	10.0	5	16.7
6.	**Time period of suffering from chronic renal failure**				
	0 -2years	7	23.3	1	3.3
	2 -3years	9	30.0	7	23.3
	3 -4years	12	40.0	18	60.0
	above 4years	2	6.7	4	13.3
7.	**Duration of undergoing dialysis**				
	0 -2years	8	26.7	1	3.3
	2 -3 years	7	23.3	7	23.3
	3 -4 years	12	40.0	18	60.0
	above 4 years	3	10.0	4	13.3
8.	**Any complication during dialysis**				
	Muscle cramps	15	50.0	13	43.3
	Nausea	14	46.7	14	46.7
	Any other	1	3.3	3	10.0
9.	**Urine output perday**				
	Less than 1 lt	17	56.7	11	36.7
	Normal 1 -1.5 lt	7	23.3	13	43.3
	1.5 -3 lt	6	20.0	6	20.0
10.	**Dietary pattern**				
	Vegetarian	14	46.7	16	53.3
	Non vegetarian	8	26.7	6	20.0
	Eggetarian	8	26.7	8	26.7

Table 1 displays the socio-demographic characteristics of chronic renal failure patients. Out of 60 samples, 30 were assigned to the experimental group and 30 to the control group. In the experimental

group, there were two patients (6.7%) in the 20-30 years age group, seven (23.3%) in the 31-40 years age group, sixteen (53.3%) in the 41-50 years age group, and five (16.7%) in the above 50 years age group. In contrast, there were no patients in the 20-30 year age group, 10 (33.3%) in the 31-40 year age group, 12 (40.0%) in the 41-50 year age group, and 8 (26.7%) in the above 50 year age group in the control group. In terms of gender, the experimental group had 23 male patients (76.7%) and 7 female patients (23.3%), while the control group included 24 male patients (80.0%) and 6 female patients (20.0%). According to their occupation, there were 6 government workers (20.0%), 11 private employees (36.7%), 7 self-employed patients (23.3%), and 6 jobless patients (20.0%) in the experimental group. In contrast, the control group included seven government workers (23.3%), eight private employees (26.7%), ten self-employed patients (33.3%), and five jobless patients (16.7%).

As per duration of hypertension; in experimental group had 7 patients (23.3%) with 0-5 years of hypertension, 5 patients (16.7%) with 5-10 years of hypertension, 13 patients (43.3%) with 10-15 years of hypertension, and 5 patients (16.7%) with above 15 years of hypertension. In comparison, the control group had 1 patient (3.3%) with 0-5 years of hypertension, 5 patients (16.7%) with 5-10 years of hypertension, 17 patients (56.7%) with 10-15 years of hypertension, and 7 patients (23.3%) with above 15 years of hypertension. As per duration of taking medication for hypertension: in experimental group had 10 patients (33.3%) with 0-5 years of medication for hypertension, 6 patients (20.0%) with 5-10 years of medication for hypertension, 11 patients (36.7%) with 10-15 years of medication for hypertension, and 3 patients (10.0%) with above 15 years of medication for hypertension. In comparison, the control group had 2 patients (6.7%) with 0-5 years of medication for hypertension, 8 patients (26.7%) with 5-10 years of medication for hypertension, 15 patients (50.0%) with 10-15 years of medication for hypertension, and 5 patients (16.7%) with above 15 years of medication for hypertension.

According to the time period of chronic renal failure, the experimental group had 7 patients (23.3%) with 0-2 years of chronic renal failure, 9 patients (30.0%) with 2-3 years of chronic renal failure, 12 patients (40.0%) with 3-4 years of chronic renal failure, and 2 patients (6.7%) with more than 4 years of chronic renal failure. In comparison, the control group included 1 patient (3.3%) with 0-2 years of chronic renal failure, 7 patients (23.3%) with 2-3 years of chronic renal failure, 18 patients (60.0%) with 3-4 years of chronic renal failure, and 4 patients (13.3%) with more than 4 years of chronic renal failure. According to dialysis duration, the experimental group had 8 patients (26.7%) with 0-2 years of dialysis, 7 patients (23.3%) with 2-3 years of dialysis, 12 patients (40.0%) with 3-4 years of dialysis, and 3 patients (10.0%) with more than 4 years of dialysis. In contrast, the control group included 1 patient (3.3%) who had been on dialysis for 0-2 years, 7 patients (23.3%) who had been on dialysis for 2-3 years, 18 patients (60.0%) who had been on dialysis for 3-4 years, and 4 patients (13.3%) who had been on dialysis for more than 4 years.

According to Any complication during dialysis;in experimental group had 15 patients (50.0%) with muscle cramps, 14 patients (46.7%) with nausea, and 1 patient (3.3%) with any other complication. In comparison, the control group had 13 patients (43.3%) with muscle cramps, 14 patients (46.7%) with nausea, and 3 patients (10.0%) with any other complication. As per their urine output per day;in experimental group had 17 patients (56.7%) with less than 1 liter of urine output per day, 7 patients (23.3%) with normal 1-1.5 liters of urine output per day, and 6 patients (20.0%) with 1.5-3 liters of urine output per day. In comparison, the control group had 11 patients (36.7%) with less than 1 liter of urine output per day, 13 patients (43.3%) with normal 1-1.5 liters of urine output per day, and 6 patients (20.0%) with 1.5-3 liters of urine output per day.

According to their dietary pattern;in experimental group had 14 patients (46.7%) who followed a vegetarian diet, 8 patients (26.7%) who followed a non-vegetarian diet, and 8 patients (26.7%) who followed an eggetarian diet. In comparison, the control group had 16 patients (53.3%) who followed a vegetarian diet, 6 patients (20.0%) who followed a non-vegetarian diet, and 8 patients (26.7%) who followed an eggetarian diet. Here chi-square test was applied to find homogeneity in both the group. As result found both groups had homogeneity p value indicated non-significant.

Table 2: Frequency and percentage distribution of Pretest level of systolic blood pressure among patients with chronic renal Failure in experimental group.

N=30

S. No.	Level of systolic blood pressure	F	%	Mean	SD
1.	Elevated	5	16.7	136.60	6.19
2.	Hypertension stage I	12	40.0		
3.	Hypertension stage II	13	43.3		

According to Table 2 and Figure 3, 13 (43.3%) of the 60 patients had hypertension stage II, 12 (40.0%) had hypertension stage I, and 5 (16.7%) had an increased systolic blood pressure. The mean systolic blood pressure score was 136.60, with a standard deviation of 6.19.

Table 3:Frequency and percentage distribution of Pretest level of systolic blood pressure among patients with chronic renal Failure in control group.
N=30

S. No.	Level of systolic blood pressure	F	%	Mean	SD
1.	Elevated	6	20.0	136.46	6.38
2.	Hypertension stage I	11	36.7		
3.	Hypertension stage II	13	43.3		

Table 3 and figure 4 present thatOut of the 60 patients, 13 (43.3%) had hypertension stage II, 11 (36.7%) had hypertension stage I, and 6 (20.0%) had an elevated systolic blood pressure, The mean score of systolic blood pressure was 136.46 and standard deviation was 6.38.

Table 4: blood pressure among patients with chronic renal Failure in experimental group.
N=60

S. No.	Level of diastolic blood pressure	f	%	Mean	SD
1.	Elevated	5	16.7	86.06	5.34
2.	Hypertension stage I	12	40.0		
3.	Hypertension stage II	13	43.3		

According to table 4 and figure 5, 13 (43.3%) of the 60 patients had hypertension stage II, 12 (40.0%) had hypertension stage I, and 5 (16.7%) had an increased diastolic blood pressure. The mean diastolic blood pressure score was 86.06, with a standard deviation of 5.34.

Table 5: Frequency and percentage distribution of pretest level of diastolic blood pressure among patients with chronic renal Failure in control group.
N=30

S. No.	Level of diastolic blood pressure	F	%	Mean	SD
1.	Elevated	6	20.0	85.60	6.39
2.	Hypertension stage I	11	36.7		
3.	Hypertension stage II	13	43.3		

According to table 5 and figure 6, 13 (43.3%) of the 60 patients had hypertension stage II, 11 (36.7%) had hypertension stage I, and 6 (20.0%) had an increased diastolic blood pressure. The mean diastolic blood pressure score was 85.60, with a standard deviation of 6.39.

Table 6: Frequency and percentage distribution of posttest level of systolic blood pressure among patients with chronic renal Failure in experimental group.
N=30

S. No.	Level of systolic blood pressure	F	%	Mean	SD
1.	Elevated	11	36.7	132.93	6.59
2.	Hypertension stage I	13	43.3		
3.	Hypertension stage II	6	20.0		

Table 6 and figure 7 demonstrate that following the intervention, 13 (43.3%) of the 60 patients had hypertension stage I, 11 (36.7%) had increased systolic blood pressure, and 6 (20.0%) had hypertension stage II. The mean post-test systolic blood pressure score was 132.93, with a standard deviation of 6.38. As a result, H1 accepts that there is a decline in systolic blood pressure level in post test.

Table 7: Frequency and percentage distribution of posttest level of systolic blood pressure among patients with chronic renal Failure in control group.
N=30

S. No.	Level of systolic blood pressure	f	%	Mean	SD
1.	Elevated	3	10.0	137.00	6.42
2.	Hypertension stage I	12	40.0		
3.	Hypertension stage II	15	50.0		

According to Table 7 and Figure 8, 15 (50.0%) of the 60 patients had hypertension stage II, 12 (40.0%) had hypertension stage I, and 3 (10.0%) had an increased systolic blood pressure following the intervention. The mean post-test systolic blood pressure score was 137.00, with a standard deviation of 6.42.

Table 8: Frequency and percentage distribution of Posttest level of diastolic blood pressure among patients with chronic renal Failure in experimental group.
N=30

S. No.	Level of diastolic blood pressure	F	%	Mean	SD
1.	Elevated	10	33.3	81.93	5.59
2.	Hypertension stage I	14	46.7		
3.	Hypertension stage II	6	20.0		

Table 8 and Figure 9 show that following the intervention, 14 (46.7%) of the 60 patients had hypertension stage I, 10 (33.3%) had raised diastolic blood pressure, and 6 (20.0%) had hypertension stage II. The mean diastolic blood pressure score was 81.93, with a standard deviation of 5.59. As a result, hypothesis H1 is accepted: there is a drop in DBP levels in the post-test.

Table 9: Frequency and percentage distribution of Posttest level of diastolic blood pressure among patients with chronic renal Failure in control group.
N=30

S. No.	Level of diastolic blood pressure	f	%	Mean	SD
1.	Elevated	6	20.0	85.23	6.67
2.	Hypertension stage I	11	36.7		
3.	Hypertension stage II	13	43.3		

Table 9 and Figure 10 show that following the intervention, 6 (20.0%) of the 60 patients had increased diastolic blood pressure, 13 (43.3%) had hypertension stage II, and 11 (36.7%) had hypertension stage I. The mean diastolic blood pressure score was 85.23, with a standard deviation of 6.67.

Section III: Assessment of the effectiveness of breathing exercises on hypertension among patients with chronic renal failure in experimental group.

Table 10: Mean, mean difference, standard deviation, and t value of SBP in experimental group after the intervention of breathing exercises.
N=30

S. No.	SBP score	Mean	SD	MD	t value	Df	p value
1. 1	Pretest Score	136.60	6.19	3.67	6.495	29	0.001^{s}
2. 2	Posttest Score	132.93	6.59				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, s=significant at 0.01 level

Table 10 and Figure 11 show that the pretest mean score of SBP was 136.606.19 and the posttest mean score was 132.93 with a standard deviation of 6.59. The average difference was 3.67 points. In this case, the paired 't' test was used to determine whether or not there was a statistically significant difference. As a consequence, t29 =6.495, p=0.001 is highly significant at the 0.001 level. As a result, breathing exercises were useful in lowering SBP in individuals with chronic renal failure. As a consequence, during the post-test, the computed t value was 6.495.

Table 11: Mean ,mean difference, standard deviation and t valueof DBP in experimental group after intervention of breathing exercises.
N=60

S. No.	DBP score	Mean	SD	MD	t value	Df	*p* value
1. 1	Pretest Score	86.06	5.34	4.13	8.013	29	0.001^{S}
2. 2	Posttest Score	81.93	5.59				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, s=significant at 0.01 level

Table 11 and Figure 12 show that the pretest mean DBP score was 86.06, with a standard deviation of 5.34, and the posttest mean score was 81.93, with a standard deviation of 5.59. The average disparity was 4.14. In this case, the paired 't' test was used to determine whether or not there was a statistically significant difference. As a consequence, sound t29 =8.013, p=0.001 is highly significant at the 0.001 level. As a result, breathing exercises were successful in lowering DBP in individuals with chronic renal failure..

Table 12: Comparison of mean ,mean difference, standard deviation ,t value of SBP between experimental and control group before the intervention.
N=60

S. No.	Group	Mean	SD	MD	t value	df	P value
1. 1	Experimental	136.60	6.19	0.13	.082	58	$.935^{NS}$
2. 2	Control	136.46	6.38				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, NS=Non-significant at 0.05 level

Table 12 and Figure 13 show that the experimental mean SBP was 136.60 with a standard deviation of 6.19, whereas the control group's mean SBP was 136.46 with a standard deviation of 6.38. The average difference was just 0.013. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=0.082, p=0.935, indicating statistically insignificant at the 0.05 level.

Table 13: Comparison of mean, mean difference, standard deviation ,t value of SBP betweenexperimental and control group after the intervention. N=60

S. No.	Group	Mean	SD	MD	t value	df	P value
1. 1	Experimental	132.93	6.59	4.07	2.82	58	0.040^{S}
2. 2	Control	137.00	6.42				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, S=significant at 0.05 level

Table 13 and Figure 14 show that in the experimental group, the mean SBP was 132.93, with a standard deviation of 6.59, while in the control group, it was 137.006.42. 4.07 was the average difference. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=2.82, p=0.040 was discovered, indicating statistical significance at the 0.05 level. As a result, breathing exercises are useful in lowering SBP. As a result, the null hypothesis is rejected and the alternative hypothesis is accepted. As a result, hypothesis H2 is accepted.

Table 14: Comparison of mean ,mean difference, standard deviation, t value of DBP between experimental and control group before the intervention.
N=30

S. No.	Group	Mean	SD	MD	t value	df	P value
3. 1	Experimental	86.06	5.34	0.46	0.30	58	0.760^{NS}
4. 2	Control	85.60	6.39				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, NS=Non-significant at 0.05 level

Table 14 and Figure 15 show that the experimental mean DBP was 86.06 with a standard deviation of 5.34, whereas the control group's mean DBP was 85.60 with a standard deviation of 6.39. The average difference was just 0.46. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=0.30, p=0.760, indicating statistically insignificant at the 0.05 level.

Table 15: Comparison of mean ,mean difference, standard deviation,t- value of DBP between experimental and control group after the intervention
N=30

S. No.	Group	Mean	SD	MD	t value	df	P value
1	Experimental	81.93	5.59	3.30	2.07	58	0.042^{S}
2	Control	85.23	6.67				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, S=significant at 0.05 level

Table 15 and Figure 16 show that the experimental mean DBP was 81.935.59 while the control group's mean DBP was 85.236.67. 3.30 was the average difference. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=2.07, p=0.042, indicating statistical significance at the 0.05 level. As a result, breathing exercises are useful in lowering DBP. As a result, hypothesis H2 is accepted.

Section IV: Finding related tofind out association between post test level of blood pressure with selected demographic variables in control and experimental group.

Table 16: Association between posttest level of Systolic blood pressure with selected demographic variables in experimental group. **N=60**

S. No.	Variables	Level of SBP			χ^2 value	Df
		Elevated	HTN Stage I	HTN Stage II		
1.	**Age (years)**					
	20 -30	2	0	0	16.181^{S}	6
	31 -40	6	1	0		
	41 -50	3	9	4		
	Above 50	0	3	2		
2.	**Gender**					
	Male	9	10	4	$.499^{NS}$	2
	Female	2	3	2		

3.	**Occupation**					
	Govt. employee	3	3	0	3.204^{NS}	6
	Private employee	4	4	3		
	Self employed	2	4	1		
	Unemployed	2	2	2		
4.	**Duration of hypertension**					
	0 -5 years	7	0	0	20.656^{S}	6
	5 -10years	2	3	0		
	10 -15years	2	6	5		
	Above 15 years	0	4	1		
5.	**Duration of taking medication for hypertension**					
	0 -5 years	8	2	0	14.307^{S}	6
	5 -10years	2	3	1		
	10 -15years	1	6	4		
	Above 15 years	0	2	1		
6.	**Time period of suffering from chronic renal failure**					
	0 -2years	7	0	0	20.966^{S}	6
	2 -3years	3	5	1		
	3 -4years	1	6	5		
	above 4years	0	2	0		
7.	**Duration of undergoing dialysis**					
	0 -2years	8	0	0	20.426^{S}	6
	2 -3 years	2	4	1		
	3 -4 years	1	7	4		
	above 4 years	0	2	1		
8.	**Any complication during dialysis**					
	Muscle cramps	8	4	3	4.923^{NS}	4
	Nausea	3	8	3		
	Any other	0	1	0		
9.	**Urine output perday**					
	Less than 1 lt	8	7	2	6.261^{NS}	4
	Normal 1 -1.5 lt	0	4	3		
	1.5 -3 lt	3	2	1		
10.	**Dietary pattern**					
	Vegetarian	8	3	3	6.995^{NS}	4
	Non vegetarian	2	4	2		
	Eggetarian	1	6	1		

NB: SD=Standard deviation, df=degree of freedom, NS=Non-significant, S=significant at at 0.05level,

Table 16 shows that the chi-square test was used to find statistically significant associations with socio-demographic variables such as age (p=.007), duration of hypertension (p=.001), duration of taking hypertension medication (p=.012), time period of suffering from chronic renal failure (p=.001), and duration of undergoing dialysis (p=.001). Other characteristics such as gender, employment, dialysis complications, urine output per day, and dietary pattern were shown to be non-significant. As a result, hypothesis H2 is accepted.

Table 17: Association between posttest level of Systolic blood pressure with selected demographic variables in control group. **N=30**

S. No.	Variables	Level of SBP			χ^2 value	Df
		Elevated	HTN Stage I	HTN Stage II		
1.	**Age (years)**					
	20 -30	2	6	2	6.383^{NS}	4
	31 -40	1	4	7		
	41 -50	0	2	6		

	Above 50					
2.	**Gender**					
	Male	3	9	12	.937^{NS}	2
	Female	0	3	3		
3.	**Occupation**					
	Govt. employee	0	2	5	4.371^{NS}	6
	Private employee	0	4	4		
	Self employed	2	4	4		
	Unemployed	1	2	2		
4.	**Duration of hypertension**					
	0 -5 years	0	1	0	19.815^{NS}	6
	5 -10years	3	2	0		
	10 -15years	0	6	11		
	Above 15 years	0	3	4		
5.	**Duration of taking medication for hypertension**					
	0 -5 years	0	2	0	19.762^{S}	6
	5 -10years	3	5	0		
	10 -15years	0	4	11		
	Above 15 years	0	1	4		
6.	**Time period of suffering from chronic renal failure**					
	0 -2years	0	1	0	19.321^{S}	6
	2 -3years	3	4	0		
	3 -4years	0	7	11		
	above 4years	0	0	4		
7.	**Duration of undergoing dialysis**					
	0 -2years	0	1	0	19.321^{S}	6
	2 -3 years	3	4	0		
	3 -4 years	0	7	11		
	above 4 years	0	0	4		
8.	**Any complication during dialysis**					
	Muscle cramps	3	5	5	7.327^{NS}	4
	Nausea	0	7	7		
	Any other	0	0	3		
9.	**Urine output perday**					
	Less than 1 lt	2	3	6	2.208^{NS}	4
	Normal 1 -1.5 lt	1	6	6		
	1.5 -3 lt	0	3	3		
10.	**Dietary pattern**					
	Vegetarian	1	6	9	4.375^{NS}	4
	Non vegetarian	0	2	4		
	Eggetarian	2	4	2		

NB: SD=Standard deviation, df=degree of freedom, NS=Non-significant, S=significant at at 0.05level,

Table 17 shows that the chi-square test was used to discover statistically significant associations. Because the frequency was fewer than five, the exact fisher value was utilised to determine significance. The duration of hypertension (p=.006), duration of taking hypertension medication (p=.001), time period of suffering from chronic renal failure (p=.001), and duration of receiving dialysis (p=.001) were determined to be statistically significant. Other characteristics such as age, gender, employment, dialysis complications, urine output per day, and dietary pattern were shown to be non-significant.

Table 18: Association between posttest level of Diastolic blood pressure with selected demographic variables in experimental group. **N=30**

S. No.	Variables	Level of DBP			χ^2 value	Df
		Elevated	HTN Stage I	HTN Stage II		
1.	**Age (years)**					
	20 -30	2	0	0	22.217^{S}	6
	31 -40	6	1	0		
	41 -50	2	11	3		
	Above 50					
2.	**Gender**					
	Male	8	11	4	$.426^{NS}$	2
	Female	2	3	2		
3.	**Occupation**					
	Govt. employee	3	3	0	3.933^{NS}	6
	Private employee	3	4	4		
	Self employed	2	4	1		
	Unemployed	2	3	1		
4.	**Duration of hypertension**					
	0 -5 years	7	0	0	28.062^{S}	6
	5 -10years	1	4	0		
	10 -15years	2	5	6		
	Above 15 years	0	5	0		
5.	**Duration of taking medication for hypertension**					
	0 -5 years	8	2	0	20.040^{S}	6
	5 -10years	1	4	1		
	10 -15years	1	5	5		
	Above 15 years	0	3	0		
6.	**Time period of suffering from chronic renal failure**					
	0 -2years	7	0	0	22.841^{S}	6
	2 -3years	2	6	1		
	3 -4years	1	6	5		
	above 4years	0	2	0		
7.	**Duration of undergoing dialysis**					
	0 -2years	8	0	0	26.320^{S}	6
	2 -3 years	1	5	1		
	3 -4 years	1	6	5		
	above 4 years	0	3	0		
8.	**Any complication during dialysis**					
	Muscle cramps	7	4	4	5.317^{NS}	4
	Nausea	3	9	2		
	Any other	0	1	0		
9.	**Urine output perday**					
	Less than 1 lt	7	7	3	4.743^{NS}	4
	Normal 1 -1.5 lt	0	5	2		
	1.5 -3 lt	3	2	1		
10.	**Dietary pattern**					
	Vegetarian	8	3	3	10.342^{S}	4
	Non vegetarian	2	4	2		
	Eggetarian	0	7	1		

NB: SD=Standard deviation, df=degree of freedom, NS=Non-significant, S=significant at at 0.05level,

Table 18 shows that the chi-square test was used to discover statistically significant associations. Because the frequency was fewer than five, the exact fisher value was utilised to determine significance. Age (p=0.001), duration of hypertension (p=.001), duration of taking hypertension medication (p=.001),

time period of suffering from chronic renal failure (p=.001), duration of receiving dialysis (p=.001), and dietary pattern (p=0.024) were all shown to be statistically significant. Whereas other characteristics such as gender, employment, and complications during dialysis were found to be non-significant, urine production per day was. As a result, hypothesis H2 is accepted.

Table 19: Association between posttest level of Diastolic blood pressure with selected demographic variables in control group. **N=30**

S. No.	Variables	Level of DBP			χ^2 value	Df
		Elevated	HTN Stage I	HTN Stage II		
1.	**Age (years)**					
	20 -30	3	5	2	5.240^{NS}	4
	31 -40	3	3	6		
	41 -50	0	3	5		
	Above 50					
2.	**Gender**					
	Male	5	9	10	$.141^{NS}$	2
	Female	1	2	3		
3.	**Occupation**					
	Govt. employee	0	2	5	5.766^{NS}	6
	Private employee	1	4	3		
	Self employed	3	3	4		
	Unemployed	2	2	1		
4.	**Duration of hypertension**					
	0 -5 years	1	0	0	30.044^{S}	6
	5 -10years	5	0	0		
	10 -15years	0	8	9		
	Above 15 years	0	3	4		
5.	**Duration of taking medication for hypertension**					
	0 -5 years	2	0	0	22.392^{S}	6
	5 -10years	4	4	0		
	10 -15years	0	6	9		
	Above 15 years	0	1	4		
6.	**Time period of suffering from chronic renal failure**					
	0 -2years	1	0	0	26.304^{S}	6
	2 -3years	5	2	0		
	3 -4years	0	9	9		
	above 4years	0	0	4		
7.	**Duration of undergoing dialysis**					
	0 -2years	1	0	0	26.304^{S}	6
	2 -3 years	5	2	0		
	3 -4 years	0	9	9		
	above 4 years	0	0	4		
8.	**Any complication during dialysis**					
	Muscle cramps	4	5	4	5.538^{NS}	4
	Nausea	2	6	6		
	Any other	0	0	3		
9.	**Urine output perday**					
	Less than 1 lt	4	2	5	4.724^{NS}	4
	Normal 1 -1.5 lt	1	7	5		
	1.5 -3 lt	1	2	3		
10.	**Dietary pattern**					

	Vegetarian	3	5	8	5.645^{NS}	4
	Non vegetarian	0	2	4		
	Eggetarian	3	4	1		

NB: SD=Standard deviation, df=degree of freedom, NS=Non-significant, S=significant at at 0.05level,

Table 19 shows that the chi-square test was used to discover statistically significant associations. Because the frequency was fewer than five, the exact fisher value was utilised to determine significance. Age (p=0.001), duration of hypertension (p=.001), duration of taking hypertension medication (p=.001), time period of suffering from chronic renal failure (p=.001), and duration of having dialysis (p=.001) were shown to be statistically significant. Other characteristics such as age, gender, employment, dialysis complications, urine output per day, and food pattern were shown to be non-significant.

DISCUSSION

The purpose of this research was to determine the "efficacy of breathing exercises on hypertensive patients with chronic renal failure.This research employed a quasi-experimental design. The research participants were recruited using the purposeful sampling approach. Based on inclusion criteria, 60 patients were chosen for the research. Data was acquired using a demographic profile and a blood pressure measurement, and it was then categorised according to WHO recommendations.The patients' pretest blood pressure was measured before breathing exercises were administered to lower the blood pressure, and the posttest blood pressure was measured after the breathing exercises. The acquired data was analysed using descriptive and inferential statistics and is organised according to the study's goals.

According to the present research, out of 60 samples, 30 were assigned to the experimental group and 30 to the control group. In the experimental group, there were two patients (6.7%) in the 20-30 years age group, seven (23.3%) in the 31-40 years age group, sixteen (53.3%) in the 41-50 years age group, and five (16.7%) in the above 50 years age group. In contrast, there were no patients in the 20-30 year age group, 10 (33.3%) in the 31-40 year age group, 12 (40.0%) in the 41-50 year age group, and 8 (26.7%) in the above 50 year age group in the control group. In terms of gender, the experimental group had 23 male patients (76.7%) and 7 female patients (23.3%), while the control group included 24 male patients (80.0%) and 6 female patients (20.0%).Kathore V et al. (2019) discovered that more than two-thirds of the research population varied in age from 51 to 60 years (76% and 82% study and control groups, respectively), indicating that essential hypertension rises with age. The majority of the participants were men (86% and 82% in the research and control groups, respectively). More than half of the individuals were from metropolitan regions. The majority of patients (58% in the study group and 54% in the control group) had a university degree. Salian A et al. (2022) shown that people aged 30 to 51 years were separated into two categories. Each group contained 30 participants: 16 males and 14 females in the control group, and 20 males and 10 females in the experimental group. The majority of patients in the control group were over 51 years old, accounting for 9 patients (30%), while 9 patients (30%) in the experimental group belonged to the 30 age range, while 6 (20%) were between the ages of 31 and 40."

The breathing exercise intervention resulted in a statistically significant drop in systolic blood pressure (SBP), according to the research. With a significant mean difference of 3.67, the pretest mean score of SBP was greater than the posttest mean score. The paired 't' test revealed a very significant difference between the pretest and posttest SBP values (t29=6.495, p=0.001). This conclusion is comparable to that of Mohammad EE et al., who discovered a substantial decrease in overall hypertension score after the breathing exercise intervention. Furthermore, with a p-value of 0.000, Kathore V et al. (2019) showed a very significant drop in average systolic blood pressure following the exercise intervention. As a consequence of the findings, breathing exercises may be a useful non-pharmacological strategy for hypertension management.

With a mean difference of 4.14, our research demonstrated a statistically significant drop in diastolic blood pressure (DBP) following the breathing exercise intervention. The paired 't' test revealed a very significant difference (t29=8.013, p=0.001) in DBP levels between the pretest and posttest. This conclusion contrasts with the findings of Kathore V et al. (2019), who found no significant change in diastolic blood pressure in the control group before and after the research length. The results of the paired 't' test revealed a non-significant difference (t=1.45, p=0.153) with a p-value greater than 0.05. These findings imply that breathing exercises may be more successful than other therapies in lowering diastolic blood pressure levels, although further study is required to substantiate these findings.

Our findings revealed no statistically significant change in mean SBP between experimental and control groups, with a marginal difference of just 0.013. This outcome agrees with the non-significant findings of the independent 't' test (t58=0.082, p=0.935). However, a supporting research by Kathore V et al. (2019) discovered a significant change in average systolic blood pressure following the exercise intervention, with a p-value of 0.000. Salian A et al. (2022) found that the experimental and control groups had equivalent pretest SBP and DBP values. However, as compared to the control group, there was a substantial drop in post-exercise SBP levels in the

experimental group (p=0.01). These data imply that breathing exercises may help lower systolic blood pressure, although the outcomes may vary depending on the research design and intervention employed.

With a mean difference of 4.07, our research discovered a statistically significant difference in mean SBP between the experimental and control groups. The results of the independent 't' test revealed a significant difference (t58=2.82, p=0.040) at the 0.05 level. This conclusion contrasts with the findings of Kathore V et al. (2019), who found no significant change in systolic blood pressure in the control group before and after the research length. The results of the paired 't' test revealed a non-significant difference (t=3.93, p=0.068) with a p-value better than 0.05. However, Salian A et al. (2022) found a significant difference in SBP between the experimental and control groups, with the experimental group having a lower post-test SBP value than the control group. Furthermore, the experimental group's post-test DBP was considerably lower than the control group's. These data imply that breathing exercises may be an effective blood pressure-lowering strategy, although the outcomes may vary depending on the research design and group analysed.

Our research demonstrated no statistically significant change in mean DBP scores between the experimental and control groups, with only a 0.46 difference. At the 0.05 level, the independent 't' test findings revealed a non-significant difference (t58=0.30, p=0.760). However, there was a substantial change in mean DBP score following the breathing exercise intervention, with a mean difference of 3.30. The results of the independent 't' test revealed a significant difference (t58=2.07, p=0.042) at the 0.05 level. These data imply that breathing exercises, when compared to control therapies, may have a stronger influence on diastolic blood pressure. Furthermore, following a 5-day alternate nostril breathing exercise intervention, Kalaivani S, et al. (2019) discovered substantial decreases in both systolic and diastolic blood pressure, showing the potential usefulness of breathing exercises in improving cardiovascular health.

Kathore V et al. (2019) discovered a substantial drop in diastolic blood pressure after the exercise intervention, with the paired t-test findings indicating a very significant difference (t=27.43, p0.001). Furthermore, after one month, the unpaired t-test revealed a significant difference in diastolic blood pressure between the study and control groups (t=9.05, p0.05). Similarly, Kumari R. (2018) found that a 15-minute deep breathing exercise intervention reduced systolic blood pressure significantly. With a very significant p-value of 0.001, the post-test means and standard deviations on the first, second, third, fourth, and fifth days were considerably lower than the baseline mean score of pretest systolic blood pressure. These results imply that breathing exercises might successfully decrease blood pressure, and that regular practise may result in long-term health advantages.

CONCLUSION

The study was concluded as follow

- The majority of research volunteers, 28 out of 60 (46.6%), were between the ages of 41 and 50.
- The majority of the research participants were men, with 47 out of 60 (78.3%) being men.
- Private personnel accounted for 18 of the 60 (30%).
- 30 out of 60 (50%) hypertensive individuals with a history of 10-15 years
- 26 out of 60 (43.3%) patients with 10-15 years of hypertension drug use
- 30 of 60 (50%) individuals with chronic renal failure for 3-4 years were studied.
- 30 of 60 (50%) patients with 3-4 years of dialysis experience
- During dialysis, 28 out of 60 patients (46.6%) had muscular cramps and nausea.
- 28 of 60 (46.6%) patients had less than 1 litre of urine production per day, while 30 of 60 (50%) patients were vegetarian.
- SBP was pre-tested in experimental and control groups of individuals with chronic renal failure. SBP was 136.606.19 in the experimental group and 136.46 in the control group, with a standard deviation of 6.38. The average difference was just 0.013. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=0.082, p=0.935, indicating statistically insignificant at the 0.05 level. ✓ post- test SBP among patients with chronic renal failure in experimental and control group.
- SBP was 132.936.59 in the experimental group and 137.00 in the control group, with a standard deviation of 6.42. 4.07 was the average difference. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=2.82, p=0.040 was discovered, indicating statistical significance at the 0.05 level. As a result, breathing exercises are useful in lowering SBP. As a result, the null hypothesis is rejected and the alternative hypothesis is accepted.
- DBP was pre-tested in experimental and control groups of individuals with chronic renal failure. The experimental group's mean DBP was 86.06, with a standard deviation of 5.34, whereas the control group's was 85.60 6.39. The average difference was just 0.46. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=0.30, p=0.760, indicating statistically insignificant at the 0.05 level.
- DBP was measured post-test in individuals with chronic renal failure in both the experimental and

control groups. DBP was 81.935.59 in the experimental group and 85.23 in the control group, with a standard deviation of 6.67. 3.30 was the average difference. The independent 't' test was used to determine if there was a statistically significant difference. As a result, t58=2.07, p=0.042, indicating statistical significance at the 0.05 level. As a result, breathing exercises are useful in lowering DBP. As a result, the null hypothesis is rejected and the alternative hypothesis is accepted.

- The relationship between posttest Systolic blood pressure level and selected demographic characteristics in the control group. The chi-square test was used to determine whether or not the correlation was statistically significant. Because the frequency was fewer than five, the exact fisher value was utilised to determine significance. The duration of hypertension (p=.006), duration of taking hypertension medication (p=.001), time period of suffering from chronic renal failure (p=.001), and duration of receiving dialysis (p=.001) were determined to be statistically significant. Other characteristics such as age, gender, employment, dialysis complications, urine output per day, and dietary pattern were shown to be non-significant.
- The relationship between posttest diastolic blood pressure level and selected demographic characteristics in the experimental group. The chi-square test was used to determine whether or not the correlation was statistically significant. Because the frequency was fewer than five, the exact fisher value was utilised to determine significance. As a result, factors such as age (p=0.001), duration of hypertension (p=.001), duration of taking hypertension medication (p=.001), time period of suffering from chronic renal failure (p=.001), duration of having dialysis (p=.001), and dietary pattern dialysis were shown to be significant. Urine production per day was shown to be little.

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