Research Article

A STUDY TO ASSESS THE PRE HYPERTENSION AND EVALUATE THE EFFECTIVENESS OF CURRY LEAVES ON REDUCTION OF BLOOD PRESSURE AMONG ADULTS IN A SELECTED IN URBAN AREA AT VIJAYAPUR

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A R T I C L E   I N F O

A B S T R A C T

Aim: Assess the Pre hypertension and evaluate the effectiveness of curry leaves on reduction of Blood pressure among adults. **Materials and methods:** 60 samples are selected by purposive sampling technique after recording blood pressure. Curry leaves juice was prepared as per direction of Ayurvedic physician and given to pre hypertension patients on every day morning, data were analyzed by using descriptive and inferential statistics methods like f test, chi square test, mean, median, SD, post hoc test, Mann Whitneys U test, Wilcoxon signed rank test. **Results:** There is significant difference between baseline and immediate after giving curry juice as systolic blood pressure (Z=4.787P=0.001*) and significant difference between baseline and immediate after giving curry juice as diastolic blood pressure (Z=4.487P=0.001*). The chi square value shows that there is a significant association between habits with pre test hypertension scores of experimental group (X^2=15.876 p=0.0032*) *and* type of family with pre test hypertension scores of experimental group (X^2=11.380 p=0.0007*). **Conclusion:** The study concludes that curry leaves juice is a cost effective method for treating prehypertension patients. Some more studies can be conducted in the future with large scale to generalize the results and same studies can be conducted among moderate and severe hypertensive patients with control group.

INTRODUCTION

Hypertension is one of the most common health problem in the developing countries. High blood pressure is a common condition in which the long-term force of the blood against when artery walls is high enough that it may eventually cause health problems like heart diseases and also leading causes of death. So it need to control and prevention of complication related Hypertension. As per the 2017 census in worldwide 1.1 billion people are living with Hypertension and year 7.5 billion people are going to die due to HTN.

Most people with high blood pressure have no signs or symptoms, even if blood pressure readings reach dangerously high levels. A few people with high blood pressure may have headaches, shortness of breath or nosebleeds, but these signs and symptoms aren't specific and usually don't occur until high blood pressure has reached a severe or life-threatening stage.

Globally more than 500 years of there is using alternative or correspondence system of medicine to provide health care services to the People. In the book of Ayurveda clearly mention that herbal extract like curry leaves are very help to control the hypertension and other than so many heart related diseases also, and even this curry leaves are not harmful to human being.

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MATERIALS AND METHODS

Statement of the problem: A study to assess the Pre hypertension and evaluate the effectiveness of curry leaves on reduction of Blood pressure among adults in a selected in urban area at Vijayapur.

Objectives of the study

a) To select two groups, Experimental group (Group 1) and Control group (Group 2)
b) To assess the pretest blood pressure before giving curry leaves on both Group.
c) To evaluate the effectiveness of curry leaves on reduction of blood pressure on Group1.
d) To find out the association between pretest blood pressure level with Selected demographic variables on Group 1.

Hypothesis

The following hypothesis will be tested at 0.05 level of significance
H₁: There is a significant difference between pre test and post blood pressure level among group 1 (Experimental group)
H₂: There is a significant difference between post test blood pressure level in group 1 and group 2

H₃: There is a significant association between pre test blood pressure level with selected demographic variables in group 1 and group 2

Source of data The data will be collected from pre hypertension clients residing in at selected in urban area at Vijayapur.

Research design Quasi experimental research design: non randomized pre test and post test control group design will be used for this study.

Setting The study will be conducted in selected urban area at Vijayapur.

Population Population for the study comprises of 60 pre hypertension client of selected urban area at Vijayapur.

Instruments intended to be used

Data will be collected by the pre hypertensive client by using instrument includes.
Part-I: Social demographical variables.
Part II: Blood pressure monitoring

Data collection method

1. Permission will be obtained from concerned authorities.
2. 60 Pre hypertensive Client will be selected. Purpose of the study will be explained and consent will be taken from the pre hypertensive client
3. Pre test knowledge and practice of giving curry leaves water will be assessed by checking blood pressure.
4. Introduction of individual practical programme.
5. The post test will be conducted by after giving curry leaves water practice after 10 days.

Variables

1. **Independent variables:** Curry leaves water.
2. **Dependent variable:** Blood pressure
3. **Demographical variables:** Age, gender, economic status, religion, type of family, marital status, dietary pattern.etc

Delimitations

Study is delimited for:

*Sample size is limited to 60 samples.
*Study area is limited to selected urban area at Vijayapur.

Pharmaceutical preparation method of Kwatha (decoction)

According to Chakrapanidatt 1 opines that kashaya is prepared by adding 4 parts of water and reducing it to one fourth,Chakrapanidatta commenting on this states that generally the dravya become ghanastava when approximately $3/4^{th}$ parts of water gets evaporated. We are preparing kwatha by using method of Chakrapanidatt 1, taking 10gm of fresh curry leaves approximately $3/4^{th}$ of water (40ml) boil with low flame to boiling temperature (max 100C) after these process we getting decoction of 35-38ml.

Methods of preparation of curry leave water

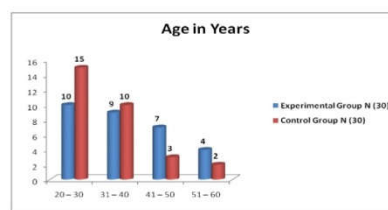| STEPS	PREPARATION
STEP-1	Place 40ml of purified water into the bowel.
STEP-2	Add 10gm of fresh Curry leaves into the bowel
STEP-3	Boil with low flame to boiling temperature (Max 100c) in bowel.
STEP-4	After we get 35-38ml Decoction or Kwatha
STEP-5	Filter the Decoction with the help of strainer (Removing the leafes). Now it's become Curry leaves water.

Administration of Curry Leaves Water

Administered the Curry leaves water at morning without breakfast and water to the Experimental group patient, 35-38ml of curry leaves water.

RESULTS

Variables

Table.1 Distribution of patients according to Age (Years)

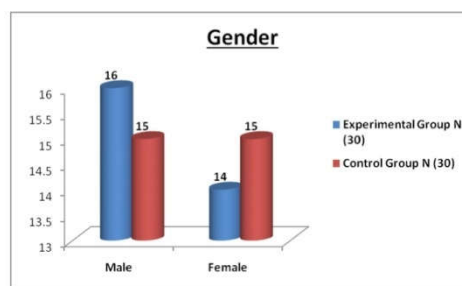| Age	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
20 – 30	10	33.33%	15	50%	
31 – 40	09	30.00%	10	33.33%	X^2=3.319
41 – 50	07	23.33%	03	10%	p=0.3450
51 – 60	04	13.33%	02	6.66%	

Fig no 1 Multiple Cylindrical diagram shows that distribution of samples according to age group

The above table and diagram shows that 33.33% of samples belongs to 20-30 years of age group, 30% belongs to 31-40 years age group, 23.33% belongs to 41-50 years of group and 13.33% belongs to 51-60 years of age group in experimental group. In control group 50% of samples belongs to 20-30 years of age group, 33.33% belongs to 31-40 years, 10% belongs to 41-50 and 6.66% belongs to 51-60 age group. The chi square value shows that no significant association between age in years with pre test hypertension scores of experimental group (X^2=3.319 p=0.3450)

Table 2 Distribution of patients according to Gender

| Gender	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Male	16	53.33%	15	50%	X^2=0.0667
Female	14	46.66%	15	50%	p=0.7961

Fig no 2 Multiple cylindrical diagram shows that sample distribution according to gender wise

The above table and diagram shows that 53.33% are male and 46.66% are females in experimental group where as in control group 50% each are present as male and female respectively. The chi square value shows that no significant association between gender with pre test hypertension scores of experimental group (X^2=0.0667 p=0.7961)

Table 3 Distribution of patients according to marital status

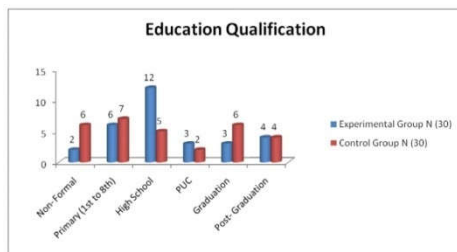| Marital Status	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Married	28	93.33%	23	76.66%	$X^2=3.268$
Unmarried	02	6.66%	07	23.33%	p=0.0706
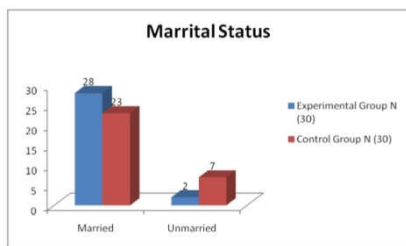
Fig no 3 Multiple bar diagram shows that sample distribution according to marital status

The above table and diagram shows that 93.33% are married and 6.66% are unmarried in experimental group where as in control group 76.66% are married and 23.33% are unmarried. The chi square value shows that no significant association between marrital status with pre test hypertension scores of experimental group ($X^2=3.268$ p=0.0706)

Table 4 Distribution of patients according to educational qualification

| Educational Qualification	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Non- Formal	02	6.66%	06	20%	
Primary (1st to 8th)	06	20%	7	23.33%	
High School	12	40%	05	16.7%	
PUC	03	10%	02	6.7%	$X^2=6.159$
Graduation	03	10%	06	20%	p=0.2910
Post-Graduation	04	13.33%	04	13.33%	

Fig no 4 Multiple cylindrical diagram shows that sample distribution according to education qualification.

The above table and diagram shows that 6.66% are having no formal education, 20% samples are having primary education,40% are having high school education, 10% completed their pre university college education, 10% are graduate and 13.33% are Post graduate in experimental group where as in Control group 20% are having no formal education, 23.33% are having primary education, 16.7% are having high school education 6.7% are having pre university education, 20% are having graduate education and 13.33% are having post graduate education. The chi square value shows that no significant association between educational qualification with pre test hypertension scores of experimental group ($X^2=6.159$ p=0.2910)

Table 5 Distribution of patients according to Occupation

| Occupational	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Gov. Job	05	16.66%	01	3.33%	
Self	04	13.33%	09	30%	
Private	07	23.33%	05	16.66%	
Student	01	3.33%	04	13.33%	$X^2=6.890$
un-Employment	13	43.33%	11	36.66%	p=0.1418
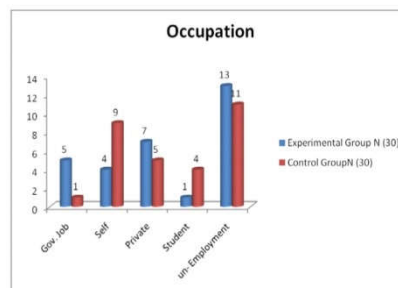
Fig no 5 Cylindrical bar diagram shows that sample distribution according to occupation in both the group

The above table and diagram shows that 16.66% samples are having govt job, 13.33% are self employed, 23.33% are having private job, 3.33% are student and 43.33% are unemployed in experimental group where as in control group 3.33% are having gov job, 30% are having self employment, 16.66% are having private job, 13.33% are student and 36.66% are unemployed. The chi square value shows that no significant association between occupation with pre test hypertension scores of experimental group ($X^2=6.890$ p=0.1418)

Table 6 Distribution of patients according to Family in-come in per month

| Family In-Come in per month	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Less than 5000 rupees	01	3.33%	01	3.33%	
5000 – 10000 rupees	14	46.66%	20	66.66%	$X^2=2.559$
More than 10000 rupees	15	50%	09	30%	p=0.2782
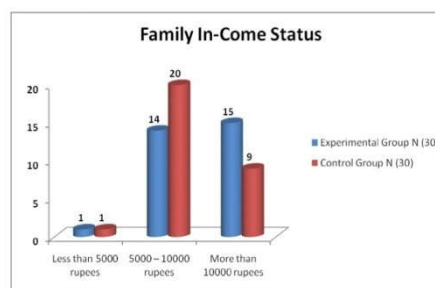
Fig No 6 Multiple cylindrical diagram shows that sample distribution according to family income status.

The above table and diagram shows that In experimental group 3.33% of samples had <5000 rupees income, 46.66% had 5000-10000 rupees and 50% of samples had more than 10000 rupees as income where as in control group 3.33 samples had < 5000 rupees income, 66.66% had 5000-10000 rupees income and 30% had more than 10000 rupees income. The chi square value shows that no significant association between family

income status with pre test hypertension scores of experimental group (X^2=2.559 p=0.2782)

Table 7 Distribution of patients according to History of illness in family

| History of illness in family regarding HTN	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Yes	06	20%	10	33.33%	X^2=1.364
No	24	80%	20	66.66%	p=0.2429
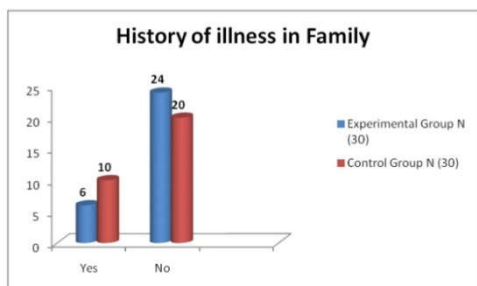
Fig No 7 Cylindrical bar diagram shows that sample distribution according to history of illness in the family

The above table and diagram shows that 20% of samples in experimental group had history of hypertension illness in the family and 80% samples had no history of illness of hypertension. Where as in control group 33.33% of samples had hypertension illness as history in the family and 66.66% of samples had no history of hypertension illness as a family history. The chi square value shows that no significant association between History of illness in family with pre test hypertension scores of experimental group (X^2=1.364 p=0.2429)

Table 8 Distribution of patients according to Habits

| Habits	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Smoking	03	10	00	00%	
Drinking	01	3.33	00	00%	
Tobacco	02	6.66	09	30%	X^2=15.876
All of above	07	23.33	00	00%	p=0.0032*
No habits	17	56.66	21	70%	

*: Significant difference
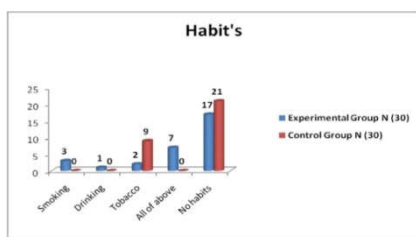
Fig no 8 Cylindrical bar diagram shows that sample distribution according to habits in both the group

The above table and diagram shows that In experimental group 10% of samples had smoking as a habit, 3.33% are having drinking habit, 6.66% are having tobacco chewing habit, 23.33% are having all the habits and 56.66% are not having any habits where as in control group 30% had tobacco chewing habit and 70% are not having any habit like smoking, drinking alcohol etc. The chi square value shows that there is a significant association between habits with pre test hypertension scores of experimental group (X^2=15.876 p=0.0032*)

Table 9 Distribution of patients according to Types of family

Types of family	Experimental Group N (30)	Percentage (%)	Control Group N (30)	Percentage (%)	Chi square test
Nuclear	23	76.66%	10	33.33%	X^2=11.380
Joint	07	23.33%	20	66.66%	p=0.0007*

*: Significant difference
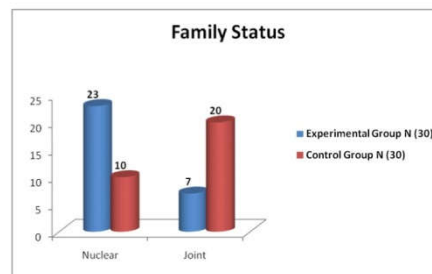
Fig no 9 Cylindrical bar diagram shows that distribution of samples according to type of family

The above table and diagram shows that In experimental group 76.66% of samples belongs to nuclear family and 23.33% belongs to joint family. Where as in control group 33.33% belongs to nuclear family and 66.66% belongs to joint family. The chi square value shows that there is a significant association between type of family with pre test hypertension scores of experimental group (X^2=11.380 p=0.0007*)

**Table 10** Comparison of BP between Baseline and Immediate after giving Curry juice in Experimental group

Comparison of	Baseline		Immediate after giving Curry juice		Wilcoxon signed rank test
	Mean	SD	Mean	SD	
Systolic	138.87	6.501	119.57	4.869	Z=4.787 P=0.001*
Diastolic	92.83	9.791	80.37	4.206	Z=4.487 P=0.001*

The above table depicts that there is significant difference between baseline and immediate after giving curry juice as systolic blood pressure (Z=4.787P=0.001*) and significant difference between baseline and immediate after giving curry juice as diastolic blood pressure (Z=4.487P=0.001*). The mean and SD in baseline systolic BP is 138.87 and 6.501 respectively. The mean and SD in immediate after giving curry juice Systolic BP is 119.57 and 4.869 respectively. The mean and SD of baseline diastolic BP is 92.83 and 9.791 respectively. The mean and SD of immediate after giving curry juice diastolic BP is 80.37 and 4.206 respectively.

Table 11 Effect of treatment in Systolic BP in Experimental group

Assessment Observations Recorded on	Deceptive statistics Systolic BP			Friedman test	P value
	Range	Mean (Median)	±SD		
Before treatment	125-148	138.87 (141.0)	6.5		
Immediate after intervention	108-127	119.57 (120.5)	4.87		
After Day 1	110-130	119.20 (120)	4.22		
After Day 3	110-130	124.40 (126)	5.95	Z=104.66	P<0.001*
After Day 5	120-136	127.27 (128)	4.22		
After Day 7	120-136	129.27 (130)	3.62		

*: Significant difference
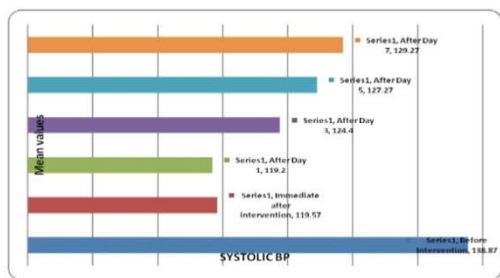
Fig No 11 The simple bar diagram shows that Systolic BP level in Experimental group after giving curry juice as a treatment

The above table and diagram explains that there is a significant effect of treatment in reducing systolic blood pressure in experimental group. (Z=104.66, P<0.001*). The deceptive statistics systolic BP shows that mean, median and SD of systolic BP in before treatment is 138.87 (141) ± 6.5, immediate after intervention is 119.57(120.5) ± 4.87, after day 1 is 119.20(120) ± 4.22, after day 3 is 124.40 (126) ± 5.95, after day 5 is 127.27(128) ± 4.22, after day 7 is 129.27(130) ± 3.62.

Table 12 Post hoc test

Comparison between	P value
BT vsImmediate after intervention	P<0.001*
BT vsAfter 1Day of Intervention	P<0.001*
BT vs After 3Days of Intervention	P<0.001*
BT vs After 5 days of Intervention	P<0.001*
BT vs After 7Days of Intervention	P>0.05
Immediate after intervention vs After 1Day of Intervention	P>0.05
Immediate after intervention vs After 3Days of Intervention	P>0.05
Immediate after intervention vs After 5Days of Intervention	P<0.01*
Immediate after intervention vs After 7Days of Intervention	P<0.001*
After 1Day of Intervention vs After 3Days of Intervention	P>0.05
After 1Day of Intervention vs After 5Days of Intervention	P<0.001*
After 1Day of Intervention vs After 7Days of Intervention	P<0.001*
After 3Days of Intervention vs After 5Days of Intervention	P>0.05
After 3Days of Intervention vs After 7Days of Intervention	P>0.05
After 5Days of Intervention vs After 7Days of Intervention	P>0.05

*: Significant difference

The above table shows that as per post hoc test there is significant difference between blood pressure before treatment and immediate after intervention **(P<0.001*),** BT vs After 1Day of Intervention **(P<0.001*),** BT vs After 3Days of Intervention **(P<0.001*),** BT vs After 5 days of Intervention **(P<0.001*).** Immediate after intervention vs After 5Days of Intervention **(P<0.01*),** Immediate after intervention vs After 7Days of Intervention **(P<0.001*).** After 1Day of Intervention vs After 5Days of Intervention **(P<0.001*),** After 1Day of Intervention vs After 7Days of Intervention **(P<0.001*).**

Table 13 Effect of treatment in Diastolic BP in Experimental group

Assessment Observations Recorded on	Deceptive statistics Diastolic			Friedman test	P value
	Range	Mean (Median)	±SD		
Before treatment	70-104	92.83(95.0)	9.79		
Immediate after intervention	71-89	80.37(81)	4.21		
After Day 1	70-90	80.67(80)	5.83		
After Day 3	70-100	85.0(85)	6.29	Z=62.471	P<0.001*
After Day 5	70-100	83.0(80)	7.02		
After Day 7	80-100	88.33(90)	4.61		
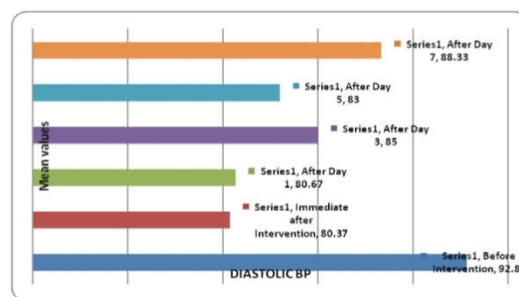
Fig no 12 Simple bar diagram shows that effect of curry leaves juice on diastolic blood pressure among experimental group.

The above table and diagram shows that there is a significant difference in diastolic blood pressure after giving intervention (Z=62.471, P<0.001*). The mean, median and SD in before treatment is 92.83(95.0) ± 9.79, immediate after intervention is 80.37(81) ± 4.21, after day 1 is 80.67(80) ± 5.83, after day 3 is 85.0(85) ±6.29, after day 5 is 83.0(80) ± 7.02, after day 7 is 88.33(90) ± 4.61.

Table 14 Post hoc test

| Comparison between	P value
BT vsImmediate after intervention	P<0.001*
BT vsAfter 1Day of Intervention	P<0.001*
BT vs After 3Days of Intervention	P<0.05*
BT vs After 5 days of Intervention	P<0.001*
BT vs After 7Days of Intervention	P>0.05
Immediate after intervention vsAfter 1Day of Intervention	P>0.05
Immediate after intervention vs After 3Days of Intervention	P>0.05
Immediate after intervention vs After 5Days of Intervention	P<0.05*
Immediate after intervention vs After 7Days of Intervention	P<0.001*
After 1Day of Intervention vs After 3Days of Intervention	P>0.05
After 1Day of Intervention vs After 5Days of Intervention	P<0.001*
After 1Day of Intervention vs After 7Days of Intervention	P<0.001*
After 3Days of Intervention vs After 5Days of Intervention	P>0.05
After 3Days of Intervention vs After 7Days of Intervention	P>0.05
After 5Days of Intervention vs After 7Days of Intervention	P<0.05*

*: Significant difference

The above table shows that as per post hoc test there is significant difference between diastolic blood pressure before treatment and immediate after intervention is (P<0.001*), BT vs After 1Day of Intervention (P<0.001*), BT vs After 3Days of Intervention (P<0.05*), BT vs After 5 days of Intervention (P<0.001*). Immediate after intervention vs After 5Days of Intervention (P<0.05*), Immediate after intervention vs After 7Days of Intervention (P<0.001*). After 1Day of Intervention vs After 5Days of Intervention (P<0.001*), After 1Day of Intervention vs After 7Days of Intervention (P<0.001*). After 5Days of Intervention vs After 7Days of Intervention (P<0.05*).

Table 15 Comparison of Systolic BP Between Experimental Group and Control group

Assessment Observations Recorded on	Descriptive statistics			Test Statistics	
	Group	Mean (Median)	± S.D.	Mann Whitney U test	P value
Before Intervention	Experimental	138.87 (141.0)	6.5	223.500	P=0.001*
	Control	133.43 (133)	4.43		
Immediate after Intervention	Experimental	119.57 (120.5)	4.87	55.000	P=0.001*
	Control	133.13 (135)	7.51		
After Day 1 of Intervention	Experimental	119.20 (120)	4.22	5.500	P=0.001*
	Control	135.93 (139)	4.71		
After Day 3 of Intervention	Experimental	124.40 (126)	5.95	99.500	P=0.001*
	Control	134.53 (136)	6.21		
After Day 5 of	Experimental	127.27 (128)	4.22	148.000	P=0.001*

|					
Intervention	Control	134.67 (136)	6.94		
After Day 7 of	Experimental	129.27 (130)	3.62	173.500	P=0.001*
Intervention	**Control**	136 (137)	5.78		

*: Significant difference
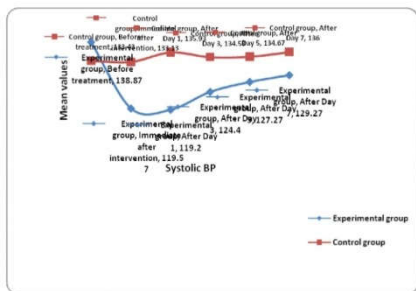
Fig no13 The line diagram shows that Comparison of Systolic BP Between Experimental Group and Control group

The above table and diagram shows that there is a significant difference in systolic blood pressure between experimental group and control group. Mann Whitney U test shows that before intervention systolic blood pressure among experimental and control group is (223.500, P=0.001*), Immediate after intervention among two group shows that (55.00, P=0.001*), after day 1 of intervention shows that (5.500, P=0.001*), after day 3 of intervention shows that (99.500, P=0.001*), after day 5 of intervention shows that (148.000, P=0.001*), after day 7 of intervention shows that (173.500, P=0.001*). The mean, median and SD of experimental group before intervention is 138.87(141.0) ± 6.5 where as in control group 133.43(133) ± 4.43. Mean, median and SD of experimental group immediate after intervention is 119.57(120.5) ± 4.87 where as in control group 133.13(135) ± 7.51, Mean, median and SD of experimental group after day 1 of intervention is 119.20(120) ± 4.22 where as in control group 135.93(139) ± 4.71, Mean, median and SD of experimental group after day 3 intervention is 124.40(126) ± 5.95 where as in control group 134.53(136) ± 6.21. mean, median and SD of experimental group after day 5 intervention is 127.27(128) ± 4.22 where as in control group 134.67(136) ± 6.94. Mean, median and SD of experimental group after day 7 intervention is 129.27(130) ± 3.62 where as in control group 136(137) ± 5.78.

Table 16 Comparison of Diastolic BP Between Experimental Group and Control group

Assessment Observations Recorded on	Descriptive statistics			Test Statistics	
	Group	Mean (Median)	± S.D.	Mann Whitney U test	P value
Before Intervention	Experimental	92.83 (95.0)	9.79	90.500	P=0.001*
	Control	75 (74)	5.79		
Immediate after Intervention	Experimental	80.37 (81)	4.21	159.000	P=0.001*
	Control	75.60 (74)	6.79		
After Day 1 of Intervention	Experimental	80.67 (80)	5.83	239.000	P=0.001*
	Control	74.33 (70)	7.74		
After Day 3 of Intervention	Experimental	85.0 (85)	6.29	237.500	P=0.001*
	Control	79.30 (80)	8.28		
After Day 5 of Intervention	Experimental	83.0 (80)	7.02	214.500	P=0.001*
	Control	75.33 (70)	10.74		
After Day 7 of Intervention	Experimental	88.33 (90)	4.61	110.000	P=0.001*
	Control	77.63 (80)	7.77		

*:Significant Difference
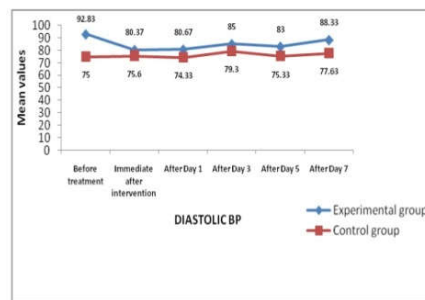
Fig no 14 The line diagram shows that Comparison of Diastolic BP Between Experimental Group and Control group

The above table and diagram shows that there is a significant difference between diastolic blood pressure among experimental and control group. The Mann Whitney U test shows that there is a significant difference in diastolic blood pressure among experimental and control group (90.500, P=0.001*), Immediate after intervention shows that (159.000,P=0.001*), after day 1 of intervention is (239.000,P=0.001*), After day 3 of intervention (237.500, P=0.001*), after day 5 of intervention is (214.500, P=0.001*), after day 7 of intervention is (110.000, P=0.001*). Mean, median, SD of experimental group before intervention is 92.83(95.0) ± 9.79 where as in control group is 75(74) ± 5.79. Mean, Median and SD of experimental group immediate after intervention is 80.37(81) ± 4.21 where as in control group 75.60(74) ± 6.79. Mean, Median and SD of experimental group after day 1 of intervention is 80.67(80) ± 5.83 where as in control group 74.33(70) ± 7.74. Mean, median and SD of experimental group after day 3 of intervention is 85.0(85) ± 6.29 where as in control group 79.30(80) ±8.28. Mean, median and SD of experimental group after day 5 of intervention is 83.0(80) ± 7.02 where as in control group 75.33(70) ± 10.74. Mean, median and SD of experimental group after day 7 of intervention is 88.33(90) ± 4.61 where as in control group 77.63(80) ±7.77.

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