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The Effectiveness of Pranayama on Blood Pressure of Hypertensive Patients

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Abstract: ***Pranayama is "breathe control, although breathing is one of our involuntary bodily functions, we can also control the breath to some extent. Hypertensive patient is, "who having persistent elevation of Systolic blood pressure above 140 mmHg and diastolic above 90 mmHg more than two time. Purpose: to assess effectiveness of pranayama on blood pressure among hypertensive patient, Pune, India Objectives: - To measure the blood pressure of hypertensive patients before and after Pranayama, to assess the related sign and symptoms of hypertensive patients before and after Pranayama, to correlate the effect of pranayama with selected demographic variables. Methods: This was a quasi experimental study of 60 hypertensive patients of selected areas of Pune during the academic year of 2014-15.The assessment of blood pressure, pulse rate and sign and symptoms were done from the hypertensive patients. A selected intervention includes pranayama was given to the patients daily early morning evening thiry minutes for 10 days, post test taken after 10th day. Results:-The blood pressure level before and after Pranayama shows highly significant difference between blood pressure from day 1, day 8, day 9 and day 10 i.e. systolic blood pressure from 154.53 mmHg (SD 7.53) to 133.2 mmHg (SD 6.14) and diastolic blood pressure from 93.8 mmHg (SD 4.99) to 82.26 mmHg (SD 5.24). Paired t-test for blood pressure before and after Pranayama shows ** p value 0.000000034, which very less than 0.01, therefore the effect of Pranayama on blood pressure of hypertensive samples is highly significant. The mean blood pressure on day 1 and day 10 shows the difference in systolic blood pressure was 21.33 mmHg and diastolic blood pressure was 11.54 mmHg. The severity of blood pressure before and after Pranayama was seen. Before Pranayama moderate blood pressure is 71.66%, mild is 19.99% and severe 8.33% and after Pranayama mild blood pressure is 54.99%, normal 36.66% and moderate is 4.99%. The severity of blood pressure before and after Pranayama in reduction of blood pressure . The mean pulse rate on day 1 and day 10 shows the difference in pulse rate 5.06/min. it also shows there is significant difference on headache, giddiness and sweating before and after Pranayama from day 1 to day 10.Therefore this study shows that there is decrease in the blood pressure level and pulse rate and symptoms from severe to normal after Pranayama. Conclusion: The current interventions Pranayama will assist in maintaining normal blood pressure among hypertensive patient and help to reduce the complications of hypertension.***

Keywords: effectiveness, pranayama, blood pressure, hypertensive patients

1. Introduction

Health and holistic health is closely related, which gives importance to physical, mental, social, spiritual and sexual health as whole. Hypertension is directly connected with circulation, respiration and function of vital organs. Complementary therapy like pranayama is directly having effect on mental and physical health. So Pranayama emphasis on promotion , prevention and curative measures and helps to maintain normal blood pressure. Alternative therapy in Nursing is also very much valuable aspect of health care system. It is mainly based on promotion, maintenance, prevention and rehabilitation of disease. [1][9]

2. Review of Literature

Hypertension is persistent elevation of systolic blood pressure above 140 mmHg and diastolic blood pressure 90 mmHg. Hypertension is a silent killer. High blood pressure results due to consumption of fat which result in obesity, tobacco chewing, smoking, mental stress and family history of hypertension. High blood pressure remains lifelong problem and by getting a regular medical checkup and taking some medication and medical treatment it can be kept under control. Hypertension is categorized into three groups according to their measurement of blood pressure as, normal 110-130/70-80 mmHg, mild-130-140/80-90 mmHg, moderate-140-160/90-100 mmHg, severe hypertension-160-above/100-above mmHg. American association of hypertension (2004-06), study done shows that 29% of Americans had hypertension (systolic blood pressure >140 mm Hg or diastolic blood pressure > 90 mm hg) in 2010, representing a 4% increase from 1991. The prevalence of hypertension has increased, especially in African-Americans and in the elderly, and is associated with substantially increased risks of stroke and cardiovascular disease. More recent data shows that even patients with high blood pressure (systolic BP 130 – 139 mm hg or diastolic BP 85 – 89 mmHg. [1][8]

Study analyzed by Camisasca p. et.al among the 1204 patients recruited between mean age group of 52.8 to 75.8, only 399 patients (33.1%) had a blood pressure lower than 140/90 mmHg and remaining 805 patients where having blood pressure more than 140/90 mmHg with the associated low, medium, high risk factors.[14]

Dr. Kalgutkar L. and Mr. Menon , stated that a growing popularity of alternative medicine has created a demand for clear and comprehensive information on many therapies available hence the setting of Indian council of social[15]science research (ICSSR) and Indian council of medical research (ICMR) has started the thinking process to bring people oriented to alternative medicine and to bring health care to forefront hence 73rd and 74th amendments of constitution are trying to make it possible to have alternative medicine in health care.

Dr.Nagarathna reviewed that, there is an increasing demand of alternative medicine as it is widely been practiced and many studies are conducted to find its effectiveness. 'yoga', which is an experimental science, provides a systematic methodology with its firm roots in a holistic philosophy, which is in total harmony with nature. This science is the offshoot of thousands of years in research by Indian sages. [2] [3][7]

Benefits of Pranayama are, it helps for a healthy digestion will improve your entire state of health - body and mind, can raise or lower blood pressure, depending upon the technique chosen and the desired result, reduce stress when encountering stress, one of our first responses is to hold the breath, or breath very shallowly.[11][12],better emotional control and equilibrium.

Although several studies emphasis the effect of pranayama on blood pressure , pulse, cardiovascular disorders, stress, respiratory disorders in combination, but it is not clear if a similar effect can be seen in only on blood pressure. Therefore the investigator decided to do this study to assess the effectiveness of Pranayama on blood pressure of in hypertension patients. [4] [5][6][9]

3. Materials and Methods

From December 2014 to April 2015, 30 hypertensive patients of selected societies Pune participated in present study. The study population was determined by based on inclusion criteria were patient with hypertension, on anti-hypertensive drugs, age group more than 21 year. Data were recorded in a questionnaire divided in to three parts. The first part covered with demographic information including age, sex, and education, place of residence, type of family, occupation, duration of disease and types of drugs taken. The second part consisted of steps of measurement of blood pressure in supine position, measurement of pulse rate and assessment of sign and symptoms. Third part consisted of observation checklist for steps of pranayama and protocol for Pranayama.

A score of 110-130/70-80 mmHg indicates normal blood pressure, 130-140/80-90 mmHg indicates mild blood pressure, 140-160/90-100 mmHg indicates moderate blood pressure and 160/100 mmHg and above blood pressure indicates severe hypertension. Scoring for pulse rate below 60/min is bradycadia and more than 100/min tachycardia. Data were statistically analyzed using pair t test and chi-square test to evaluate the effect of pranayama in relation to demographic data, a P value of less than 0.05 was considered significant. [1] [3]

4. Result

The demographic information of patients shows majority of Hypertensive patients were between the age group of 41-5yrs (36.66%) and 51-60 yrs 10(33.66%) and 18 (60%) were female, education in range of graduate 13 (43.33%), high school were 9 (30%), 21 (70%) are from joint family, occupation 12(40%) were housewife, and 5(16.66%) from private service. Clinical information of patients shows majority of 14(46.66%) suffering from hypertension since 1-5 yrs and 11(36.6%) since 6-10 yrs, 12(40%) were on antihypertensive drugs and 22(73.33%) suffering from headache and 4(13.33%) from giddiness.

Table 1: Day wise statistical distribution of blood pressure level Before and After pranayama, N= 30

Blood Pressure		*Systolic BP*		*Diastolic BP*	
		Before	*After*	*Before*	*After*
dday 8d 1 day 1	mean	154.53	144.8	93.8	88.93
	SD	7.53	7.50	4.99	4.53
	t value	16.30		8.05	
	p value	0.000073		0.0000013	
day 8	mean	148.93	142.53	90.93	86
	SD	7.82	6.70	4.66	5.03
	t value	10.24		7.29	
	p value	0.0000052		0.00000041	
day 9	mean	144.33	137.93	86.86	83.2
	SD	7.06	7.45	4.57	5.20
	t value	13.24		5.82	
	p value	0.0000032		0.000000012	
day 10	mean	139	133.2	85.33	82.26
	SD	6.22	6.14	5.64	5.24
	t value	11.78		6.85	
		0.0000026		0.0000006	

The day wise statistical distribution of blood pressure level before and after pranayama shows highly significant difference between blood pressure from day 1, day 8, day 9 and day 10 i.e. Systolic blood pressure from 154.53 mmHg (SD 7.53) to 133.2 mmHg (SD 6.14) and Diastolic blood pressure from 93.8 mmHg (SD 4.99) to 82.26 mmHg (SD 5.24). paired t-test for blood pressure before and after pranayama shows ** p value 0.000000034, which very less than 0.01, therefore the effect of pranayama on blood pressure of hypertensive samples is highly significant.
$p > 0.05$ shows no significance.
* $p < 0.05$ shows significance.
** $p < 0.01$ shows highly significance.

Table 2: Day wise distribution of BP levels before and after pranayama,N=30

Type of BP	*Day wise blood pressure*			
	day 1	day 8	day 9	day 10
BPSBP	154.53	148.93	144.33	139
APSBP	144.8	142.53	137.93	133.2
BPDBP	93.8	90.93	86.86	85.33
APDBP	88.93	86	83.2	82.26

BPBP: - Before pranayama Systolic blood pressure
APSBP: - After pranayama Systolic blood pressure
BPDBP: - Before pranayama Diastolic blood pressure
APDBP: - After pranayama Diastolic blood pressure

The above data shows that there is significant difference between blood pressure from day 1 to day 10 i.e. reduction of Systolic blood pressure from 154.53 mmHg to 133.2 mmHg and reduction of diastolic blood pressure from 93.8 mmHg to 82.26 mmHg, also it shows that there is significant difference between blood pressure day 1 to day 10 i.e. reduction of systolic from 152.26 mmHg to 132.26 mmHg and reduction of diastolic blood pressure from 93.06 mmHg to 81.2 mmHg. Therefore this shows that there is decrease in the high blood pressure to normal level.

Table 3: Blood pressure on day 1 and day 10,N=30

Blood pressure	
Day 1	Day 10
154.53/93.8 mmHg	133.2/82.26 mmHg

The above data shows the difference of blood pressure occurred before and after pranayama, the mean blood pressure on day 1 and day 10 shows the difference in systolic blood pressure is 21.33 mmHg and diastolic blood pressure is 11.54 mmHg.

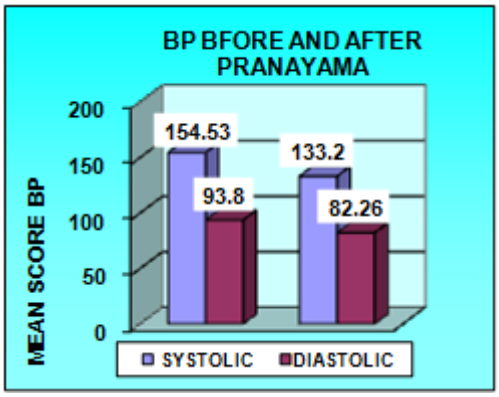

Figure 1: Bar diagram showing Blood pressure on day 1 and day 10

Table 4: Severity of blood pressure before and after the pranayama, N=30

Type of BP	*Blood pressure*	
	Before	**After**
Normal	0%	36.66%
Mild	19.99%	54.99%
Moderate	71.66%	4.99%
Severe	8.33%	0%

The above data shows that the severity of blood pressure before and after Pranayama, Before Pranayama moderate blood pressure is 71.66%, mild is 19.99% and severe 8.33%. The severity of blood pressure and after Pranayama mild is 54.99%, normal 36.66% and moderate is 4.99%. Therefore this shows that there is decrease in the blood pressure level from severe to normal level after Pranayama.

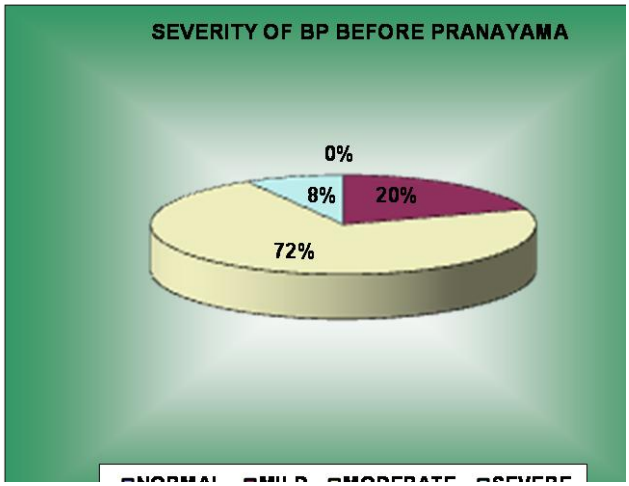

Figure 2: Pie diagram showing severity Blood pressure

Table 5: Day wise distribution of pulse rate before and after pranayama, **N=30**

Experimental group		**Pulse rate**	
		Before	**After**
Day 1	Mean	81.66	79.13
	SD	9.31	9.68
	t value	5.18	
	P value	0.00091	
Day 8	Mean	82.06	79
	SD	9.06	9.06
	t value	4.89	
	P value	0.000052	
Day 9	Mean	80.06	77.6
	SD	7.15	8.81
	t value	6.28	
	P value	0.0061	
Day 10	Mean	79.8	76.6
	SD	8.52	7.97
	t value	7.35	
	P value	0.00040	

The above data shows that there is significant difference between Pulse rate from day 1, day 8, day 9 and day 10 i.e. 81.66/min (SD 9.31) to 76.6 /min (SD 7.97). Application of paired t-test for Pulse rate Before and After Pranayama shows ** p value 0.00038, which very less than 0.01, therefore the effect of Pranayama on pulse rate of samples is highly significant.

P > 0.05 shows no significance.

* P < 0.05 shows significance.

** P < 0.01 shows highly significance.

Table 5: Pulse rate on before (day 1) and after (day 10)

DAY 1	**DAY 10**
81.66/ min	76.6/ min

The above data shows that the difference of pulse rate occurred before and after Pranayama. The mean pulse rate on day 1 and day 10 shows the difference in pulse rate 5.06/min.

Table 6: Effect of pranayama on selected symptoms of hypertension

Symptoms	Before Pranayama	After Pranayama
Head ache	24	0
Giddiness	4	0
Sweating	10	4

The above Table shows that there is significant difference on headache, giddiness and sweating before and after Pranayama from day 1 to day 10.

5. Discussion

The result of the study showed that, blood pressure from day 1, day 8, day 9 and day 10. Systolic blood pressure from 154.53 mmHg (SD 7.53) to 133.2 mmHg (SD 6.14) and Diastolic blood pressure from 93.8 mmHg (SD 4.99) to 82.26 mmHg (SD 5.24).Blood pressure from day 1 to day 10 showsm reduction of Systolic blood pressure from 154.53 mmHg 133.2 mmHg and reduction of diastolic blood pressure from 93.8 mmHg to 82.26 mmHg, The mean blood pressure on day 1 and day 10 shows the difference in systolic blood pressure is 21.33 mmHg and diastolic blood pressure is 11.54 mmHg . Before Pranayama moderate blood pressure

is 71.66%, mild is 19.99% and severe 8.33%. The severity of blood pressure and after Pranayama mild is 54.99%, normal 36.66% and moderate is 4.99%. Therefore this shows that there is decrease in the blood pressure level from severe to normal level after Pranayama.t the difference of pulse rate occurred before and after Pranayama. The significant difference between Pulse rate from day 1, day 8, day 9 and day 10 i.e. 81.66/min (SD 9.31) to 76.6 /min (SD 7.97). The mean pulse rate on day 1 and day 10 shows the difference in pulse rate 5.06/min. There is significant difference on headache, giddiness and sweating before and after Pranayama from day 1 to day 10. This shows that there is remarkable reduction in the blood pressure , pulse rate and symptoms of hypertensive patients after the interventions.

Dr.Garote et al. analyzed on 100 hypertension patients on drugs were taught the Pranayama. During a control period to 6 weeks, blood pressure did not change significantly from day to day, and averaged 145.6/91.9 mmHg. During an experimental period of twenty weeks, Blood Pressure decreased to 130.5/84.0 mmHg. [13][10]

Blackwell et al.studied on seven samples on stable dosages of hypertensive medication were taught Pranayama over a six to eight weeks period. They recorded a mean blood pressure reduction of 6 mmHg systolic/4 mmHg diastolic, and 3 mmHg systolic/4 mmHg diastolic blood pressure during a follow-up six months later, but there were changes in drug treatment during the follow-up period. [8]

The above findings support the findings of the present study, which indicates that Pranayama, can help to reduce the blood pressure among hypertensive patients.

6. Conclusion

The result of this study confirmed the high blood pressure , among hypertensive patients. In conclusion it is thought that the current interventions (Pranayama,) will assist in decreasing the blood pressure, pulse rate and symptoms among t hypertensive patients. Furthermore, it is also thought that it can add to the literature and increase understanding of individual' on prevention of hypertension and its complications.

7. Scope of the Study

So finding suggests that, this type of programme will helpful not only for the hypertensive patients but we can plan for other patients like, post myocardial infarction chronic renal failure chronic obstructive pulmonary disease, congestive heart failure and for promotion health and prevention of diseases. it will also helpful for any individual who feels somewhere deviation of normal physical and psychological health. At present we know the scenario of cardiovascular diseases worldwide. If we decease the blood pressure with Pranayama ultimately disease progress and its complications will be reduced, physical mental health will improved and percentage of hypertension will be deceased.

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