Effectiveness of Intervention Strategies on Life Style Modifications and Physiological Parameters among Hypertensive Patients

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Abstract: *Prehypertension and hypertension are one of the treatable diseases in the world. There has been strong evidence on the progression of prehypertension to hypertension, provided by the American Heart Association (AHA) in 2011. Yoga is universally accepted as ancient practice in which you use breathing techniques, exercise and mediation. Yoga is a remedy and highly effective in the treatment of high blood pressure. Methods: A quantitative research approach with quasi experimental nonequivalent pretest post test control group design was used for the study.240 subjects with grade I hypertensive patients were selected by convenience sampling method. The tools were structured interview schedule on life style, selected yoga therapy and assessment of physiological parameters such as height, weight, body mass index (BMI), waist circumference, blood pressure level and pulse. Results showed that there was a reduction in weight, pulse, systolic pressure and diastolic pressure in the post test. Conclusion: Through this study, it can be concluded that practicing yoga can reduce systolic and diastolic blood pressure.*

Keywords: Effectiveness, Intervention Strategies, Life style Modifications, Physiological Parameters, Hypertension

1. Introduction

"Hypertension is a silent, invisible killer that rarely causes symptoms". Hypertension is defined as a persistent systolic blood pressure more than 140 mm Hg and diastolic blood pressure more than 90 mm of Hg. Worldwide, 32 million people died due to non - communicable diseases and among that 16.7 million died due to cardiovascular diseases (CVD). As per World Hypertension League (WHL) 2009, 7 million people die every year due to high blood pressure and over 1.5 billion suffer from hypertension globally. The prevalence of hypertension was 59.9 and 69.9 per 1000 in male and female respectively.

The prevalence of hypertension in adults is 28% and 31% in the United States.90% to 95% have primary hypertension, due to unidentified cause.5% to 10% have secondary hypertension, due to identifiable causes such as genetic influences, lack of physical activity, hormonal changes, hemodynamic changes, narrowing of the renal arteries, renal parenchymal disease, hyperaldosteronism, certain medications, pregnancy and coarctation of the aorta.

Yoga and breathing exercises can help to relax and reduce stress levels and consequently lower high blood pressure. Progressive muscle relaxation, for patients with hypertension is important to learn to cope with stress. Progressive muscle relaxation helps to lose muscle tension which is caused by stress. Regular exercise, healthy and nutritious diet and spiritual growth (positive attitude) form the only remedy for a healthy and happy life, free from all diseases and stress.

1.1 Objectives

1) To assess the lifestyle and physiological parameters of the hypertensive patients.
2) To find out the effectiveness of intervention strategies on lifestyle modifications and selected physiological parameters among hypertensive patients.
3) To find out the relationship between life style modifications and selected physiological parameters of the hypertensive patients.
4) To find out the association between life style, selected physiological parameters and selected demographic variables of the hypertensive patients.

1.2 Empirical Hypotheses

H1. The mean posttest lifestyle modifications of hypertensive patients who received intervention strategies will be significantly higher than the mean pretest lifestyle.

H2. The mean post test lifestyle modifications of hypertensive patients who received intervention strategies in the experimental group will be significantly higher than the mean post test lifestyle modifications of the control group.

H3. The mean post test selected physiological parameters of hypertensive patients who received intervention strategies on lifestyle modifications will be significantly lower than the mean pre test physiological parameters.

H4. The mean post test selected physiological parameters of hypertensive patients who received intervention strategies in the experimental group will be significantly lower than the mean post test physiological parameters of the control group.

H5. There will be a significant relationship between life style modifications and selected physiological parameters of the hypertensive patients.

H6. There will be a significant association between life style, selected physiological parameters and selected demographic variables of the hypertensive patients in the experimental group and control group.

1.3 Research Methodology

A quantitative research approach with quasi experimental nonequivalent pretest post test control group design was used for the study. By using the simple random sampling method, four hospitals were selected by identical in diagnosis criteria, prescription of medication, treatment protocol, dietary advices, type of service rendered, and economic status of patients attending hospital and admission criteria. Out of these four, two hospitals were assigned randomly to experimental group and two hospitals to control group.

240 subjects with grade I hypertension patients were selected among which 120 samples in experimental group and 120 samples in control group were assigned by convenience sampling method. Samples were selected based on the criteria of age, grade - I hypertension and medications on calcium channel blockers.

Pre test was conducted for 30 minutes. Initially the subjects were interviewed to collect demographic data, clinical profile (weight, height, blood pressure, and pulse) and lifestyle. Afterwards the investigator assessed their pulse and blood pressure level by using asphygmomanometer. Data were collected from 16 to 20 samples per week. Followed by this selected yoga therapy was given by trained yoga master for 30minutes for seven days to the experimental group. After intervention, the subjects were asked to continue life style modification and selected yoga therapy for 60 days. The practice of selected yoga therapy was monitored by telephonic reminder and maintenance of log book by the experimental group for 60 days.

The control group was maintained by regular medication, exercise and dietary practices. Post test - I was conducted on 15th day. Post test – II was conducted on 30th day and Posttest III was conducted on 60th day in both experimental group and control group.

1.4 Research Tool

Tool consists of two parts.

Part I - Structured interview schedule on life style prepared by the investigator consisted of 25 questions which were used to assess the lifestyle modifications of the hypertensive patients.

Scoring Procedure: Maximum score was 75 marks and minimum score was Zero. The scoring procedure was done based on the following; Always – 3 marks, Sometimes - 2 marks, Occasionally - 1mark, and Never – 0 mark.

Scoring Interpretation for the lifestyle modifications of the hypertensive patients

Healthy lifestyle – 76 to 100%, Moderately Healthy lifestyle – 50 to 75%, Unhealthy lifestyle –less than 50%.

Part II - Demographic proforma

It comprised of variables such as age, sex, educational status, occupation, religion, dietary pattern, family history of hypertension.

Clinical profile

It was used to assess the patient's blood pressure, height, weight, BMI, waist circumference and pulse rate.

Intervention Strategies

It is an organized and systematically planned structured teaching program to provide information regarding life style modifications on hypertension and demonstration of selected yoga therapy among hypertensive patients.

Life Style Modification

It refers to the improvement of knowledge on hypertension and change in dietary practice, consumption of antihypertensive drugs, regular monitoring of blood pressure, practice of yoga and exercise and reduction of physiological parameters such as weight, body mass index, waist circumference, pulse, systolic and diastolic blood pressure.

Yoga therapy

In this study, the following yoga was practiced by the subjects for 30 minutes/day for 60days. Yoga are Talasana, Vrikshasana, Padmasana, Parvatasana, Vajrasana, Bhujangasana, Salabhasana, Makrasana, Uttanpadasana, Shavasana, Pranayama.

Physiological parameters

It refers to the assessment of height, weight, Body mass index (BMI), waist circumference, blood pressure level and pulse. Height and waist circumference are measured in centimeters, weight is checked in kilograms and BMI is assessed by using height and weight.

Validity and reliability of the tool

The validity of the tool was established in consultation with nursing experts, medicine, yoga specialist and biostatistician. Karl Pearson's correlation coefficient formula was used. Calibration was done for both sphygmomanometer and weighing machine. The obtained 'r' value for pulse - 0.81, Blood Pressure (systolic pressure) - 0.83, diastolic pressure – 0.80, weight – 0.820, Body Mass Index (BMI) - 0.85, height - 0.80, waist circumference - 0.86. The stability of the structured interview schedule on lifestyle modifications was done by the test - retest method by using Karl Pearson's correlation coefficient formula was 0.9.

2. Results and Discussion

Majority, 52 (43.3%) were in the age group of 41 to 50 years in the experimental and 50 (41.7%) were in the age group of 41 to 50 years in control group. Regarding sex, the majority of the samples, 70 (58.3%) in the experimental group and 64 (53.3%) in the control group were males.

Regarding educational status, 44 (36.7%) in the experimental group and 35 (29.2%) in the control group were graduates. Regarding occupational status, it shows that the majority, 39 (32.5%) in the experimental group were private employees and 36 (30%) in the control group were unemployed. Regarding dietary pattern, 112 (93.3%) in the experimental group and 110 (91.7%) in the control group were non vegetarians.

With regard to family history of hypertension, 71 (59.2%) in the experimental group and73 (60.8%) in the control group had no history of hypertension. Regarding the duration of hypertension, majority of the subjects, 67 (55.8%) in the experimental group and 75 (62.5%) in the control group had hypertension more than 1 to 5 years of duration.

Regarding the duration of taking anti hypertensive drugs, it shows that majority, 54 (45.0%) in the experimental group and 59 (49.2%) in the control group were taking antihypertensive medicines more than 1 to 5 years of duration. With regard to drugs, the majority of the subjects, 76 (63.3%) in the experimental group and 75 (62.5%) in the control group were taking two drugs per day.

Objectives 1: To assess the lifestyle and physiological parameters of the hypertensive patients.
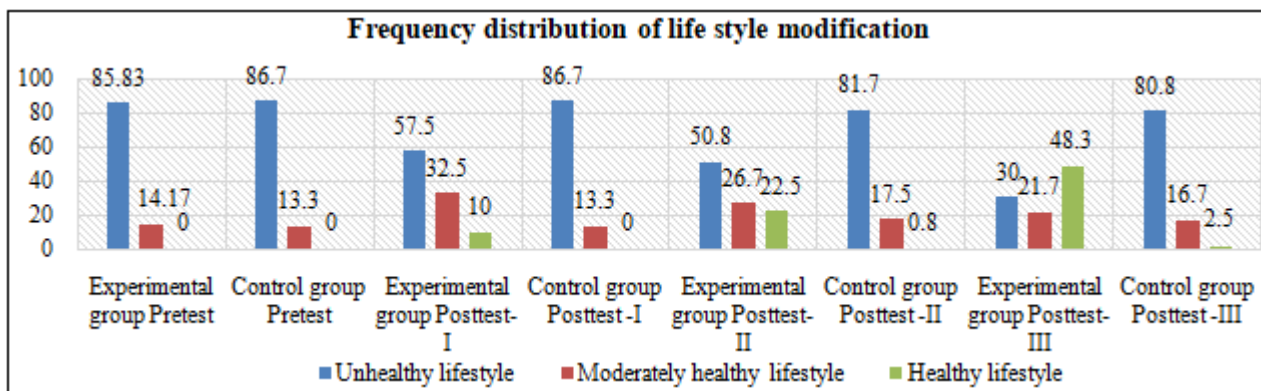

Figure 1: Mean distribution of life style modification in pretest, post test I, post test II and post test III of hypertensive patients in the experimental group and control group

Figure 1: showed that in the experimental and control group, none of them had healthy lifestyle in pretest. In the experimental group, 10% had healthy lifestyle in post test - I, 22.5% had healthy lifestyle in post test - II, 48.3% had healthy lifestyle in post test - III respectively. In the control group 2.5% had healthy lifestyle.
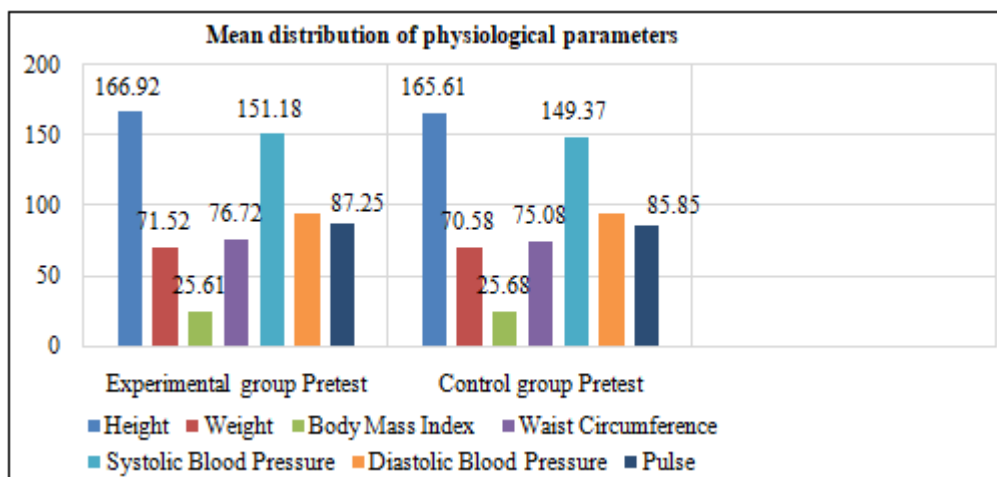

Figure 2: Mean distribution of physiological parameters in pretest of hypertensive patients in the experimental group and control group

In the experimental group, the pretest mean value for height, weight, Body Mass Index, waist circumference, systolic blood pressure, diastolic blood pressure and pulse were 166.92, 71.52, 25.61, 76.72, 151.18, 95.11 and 87.25. Whereas in the control group the mean pretest value for height weight, Body Mass Index, waist circumference, systolic blood pressure, diastolic blood pressure and pulse were165.61, 70.58, 25.68, 75.08, 149.37, 94.65 and 85.8.

Objective 2: To find out the effectiveness of intervention strategies on life style modifications and physiological parameters among hypertensive patients.

The mean lifestyle modifications of experimental group at post test (60 days) was54.66 ± 9.93 where as pretest mean lifestyle was 32.6 ± 4.8 with a paired 't' test value of23.81 which is very highly significant at p<0.001.

The One way ANOVA repeated measures test revealed there is a significant improvement in life style modifications level for experimental group hypertensive patients.

In the experimental group, significant changes were noted, in comparison of pretest vs Posttest I, Post test I vs post test II and post test II vs post test III at P<0.001. The non – significant p - value of the one way ANOVA test reveals that three mean values are not statistically different for control group.

The post test mean life style modification of experimental group at 60 days was54.66 whereas for control group the mean post test was 33.82 which is very highly significant (t=15.928, p<0.001). Two way ANOVA revealed that while making the comparison between experimental group and control group, the intervention has significant influence on the life style modifications of the hypertensive patients (F =210.18, P<0.001). The repeated contrast test revealed that in all the three groups, there is an improvement in the life style modifications (P<0.001).

Body Mass Index (BMI)

With regard to Body Mass Index, the mean post test (60days) of experimental group was 24.26 where as pretest mean was 25.62 with a paired 't' test value of 35.43 at p<0.001.

The One way ANOVA repeated test and Two way ANOVA repeated measures test results infer that 'F' value is not significant (F=3.63, P<0.001). The mean post test II at 60th day (24.26) Body Mass Index is significantly lower than the mean pretest (25.62) of the experimental group than the control group. Therefore the intervention is having significant influence on the Body Mass Index of the hypertensive patients.

Weight

With regard to weight, the mean post test (60days) of experimental group was 67.7where as pretest mean was 71.53 with a paired 't' test value of 39.68 which is very highly significant at P<001. The significant p - value infers that the four mean values are statistically different for experimental group. Further "Repeated Contrast test" result of the comparisons infers that there is a significant decrease in the weight level has been observed at each assessment.

The One way ANOVA repeated measures and Two way ANOVA repeated measures test results infer that 'F' value is not significant (F=0.012, P<0.001). The post test mean

weight at 60 days of experimental group was 67.7 where as for control group the mean post test was 70.38 with an independent 't' test value of 2.162 which is significant.

Pulse

The post test mean of pulse at 60 days of experimental group was 77.93 whereas pretest mean was 87.25 with a paired 't' test value of 41.61 which is very highly significant atp<.001.

One way ANOVA repeated measure test result clearly indicates that the intervention is highly effective in decreasing the pulse rate of the experimental group among hypertensive patients. Further, "Repeated contrast test" reveals that the comparisons infer that there is significantly different at P<.0.001. The post test mean pulse of experimental group at 60 days was 77.93 whereas for control group the mean posttest was 84.63 with an independent 't' test value of 8.211which is very highly significant at p<0.001.

The significant P - value of the "Between Subjects" infers that in general the mean pulse rate of the experimental and control group hypertensive patients are not similar. (F=11.39, P<0.001). The results of the repeated contrast test show that in all the groups there is a reduction in the pulse rate. To conclude, the intervention has significant influence in the pulse rate of the hypertensive patients.

Waist Circumference

The post test mean waist circumference at 60 days of experimental group was 73.7where as pretest mean lifestyle was 76.74 with a paired 't' test value of 22.17 which isvery highly significant at P & lt; 0.001.

The one - way ANOVA repeated measures test findings indicate that intervention is effective in decreasing the waist circumference among experimental group hypertensive patients (P<0.001). Further "Repeated Contrast test" result of the comparisons infers that there is no significant decrease in the waist circumference. Two - way ANOVA repeated measures test results infer that 'F' value is not significant.

The mean post test III at 60th day (73.7) waist circumference is significantly lower than the mean pretest (76.74) of the experimental group than the control group. Therefore, the intervention is effective in reducing waist circumference of hypertensive patients.

Systolic Blood Pressure

The mean systolic blood pressure at post test (60days) of experimental group was139.55 whereas pretest mean was 151.18 with a paired 't' test value of 51.25 which is very highly significant at p<0.001.

Table 1: 2X4 ANOVA test with last variable as repeated measure for the Systolic Blood Pressure of hypertensive patients and its Repeated Contrast test result. (n=240)

Source	F – value	P - value	Repeated Contrast test result		
			Comparison	F - value	P - value
Between Subjects					
Group	15.939	.000			
Within Subjects					
Assessment	1450.588	.000			
Assessment Group*	928.068	.000	Pre test vs Post test I	188.556	.000
			Post test I vs Post test II	286.609	.000
			Post test II vs Post test III	2293.761	.000

P<.001***Very highly significant

The ANOVA repeated measure test result of experimental group infers that the mean decreases in the systolic blood pressure. The "Repeated Contrast test" for the experimental group result also confirms that at each assessment there is a decrease in the mean Systolic Blood Pressure level. The post test mean systolic blood pressure of experimental group at 60 days was 139.55where as for control group the mean post test was 148.05 with an independent 't' test value of 10.679 which is very highly significant at p<0.001.

The significant p - value of the "Between Subjects" infers that in general the mean systolic blood pressure of the experimental and control group hypertensive patients are not similar (F=15.939, P<0.001).

The significant p - value of the "Within subjects - Assessment" comparison infers that irrespective of the experimental group and control group, the mean systolic blood pressure is statistically different between the pre and post assessments (F=1450.588, P<0.001).

Diastolic Blood pressure

With regard to diastolic blood pressure, the mean post test (60 days) of experimental group was 83.32 where as pretest mean was 95.12 with a paired 't' test value of 53.33 which is very highly significant at p<0.001.

Table 2: 2X4 ANOVA test with last variable as repeated measure for the Diastolic Blood Pressure of hypertensive patients and its Repeated Contrast test result. (n=240)

Source	F - value	P – value	Repeated Contrast test result		
			Comparison	F - value	P - value
Between Subjects					
Group	185.960	.000			
Within Subjects					
Assessment	1472.826	.000			
Assessment Group*	962.158	.000	Pre test vs Post test I	181.694	.000
			Post test I vs Post test II	247.066	.000
			Post test II vs Post test III	2437.249	.000

P<.001***Very highly significant

The ANOVA repeated measure test result infers that there is a significant decrease in the mean Diastolic Blood Pressure level after the intervention for the experimental group. The "Repeated Contrast test" result also confirms that at each assessment there is a decrease in the mean Diastolic Blood Pressure level.

The significant p - value of the "Between Subjects" infers that in general the mean diastolic blood pressure of the experimental and control group hypertensive patients are not similar (F=185.960, P<0.001).

The significant p - value of the "Within subjects - Assessment" comparison infers that irrespective of the experimental group and control group, the mean diastolic blood pressure is statistically different between the pre - and post - assessments (F=1472.826, P<0.001). The result of the repeated contrast test showed that in all the groups there is a reduction in the diastolic blood pressure. To conclude, the intervention has significant influence on the diastolic blood pressure of the hypertensive patients.

Objective 3: To find out the relationship between life style modifications and selected physiological parameters of hypertensive patients.

There was a significant negative correlation between lifestyle modifications and Systolic, Diastolic Blood Pressure and Pulse at posttest III (60 days) of the experimental group. It reveals when lifestyle modifications improve, the physiological parameters like Systolic and Diastolic Blood Pressure and Pulse decreases.

Objective 4: To find out the association between life style, selected physiological parameters and selected demographic variables of hypertensive patients.

There was a significant association between sex, family monthly income, duration of hypertension, history of smoking and alcoholism and waist circumference of hypertensive patients in the experimental and control group.

There was a significant association between sex, family monthly income, history of smoking and alcoholism and weight of hypertensive patients in the experimental and control group.

3. Limitations of the study

The problems encountered by the investigator were;

1) Regular follow up of the study subjects had to be carried over phone by giving frequent reminders.
2) Long term follow up is not possible because of limited availability of time.
3) Convenient sampling technique was used to select the sample for the study.

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