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EFFECT OF LIFESTYLE MODIFICATIONS IN PATIENTS WITH ESSENTIAL HYPERTENSION- A RANDOMIZED CONTROLLED STUDY.

Physiology

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ABSTRACT

Introduction-As per availability of research data, there is clear evidence that lifestyle habits may influence blood pressure value. Then, lifestyle changes can provide beneficial effects in hypertensive patients, reducing global cardiovascular risk and all-cause mortality.

Method- This was a intervention, randomised ,pre and post study. 40 essential hypertension (EH) patients in the age group of 20-60years, including both sexes and taking antihypertensive treatment since 5 to 10 years were recruited for the study. By random selection 40 patients with essential hypertension was allocated to the intervention/ study group. This RCT had 2 groups of 20 patients each namely control and study. Patients of both the groups were on their routine antihypertensive medication. The study group of 20 EH patients were subjected to intervention for 3 days with 1 hour duration of work out.

Result- comparision of SBP, DBP and pulse in the two groups at pre and post test shows significant finding. Comparison of DBP in both the groups at pre and post test shows a mean fall of 4 mm of Hg. This finding is significant. Also one way anova & Tukey test finding is also significant.The comparative findings of quality of life in all the 4 domain is statistically significant with $p < 0.05$.

Conclusion- The two lifestyle modification techniques namely yoga and guided visual imagery when combined had a significant effect in the reduction of systolic blood pressure,diastolic blood pressure, pulse and quality of life in patients with essential hypertension.

KEYWORDS

Lifestyle modifications. Blood pressure, Quality of Life, Essential Hypertension.

INTRODUCTION

Hypertension, or high blood pressure, is a very common ailment that usually leads to or complicates many health problems. Blood pressure has direct correlation with the risk of cardiovascular morbidity and mortality. The risks of cerebral stroke, angina, myocardial infarction, congestive cardiac failure, kidney failure or death from a cardiovascular cause are directly correlated with hypertension.

Approximately, 20% of the adult population worldwide has hypertension.(1) The prevalence of hypertension-related events is increasing, with the majority occurring among pre-hypertensives (120–139 mmHg systolic; 80–89 mmHg diastolic) and stage-1 hypertensives (140–159 mmHg systolic; 90–99 mmHg diastolic).(2)

The 2017 Hypertension Guideline features a few key changes. New blood pressure targets and treatment recommendations: For years, hypertension was classified as a blood pressure (BP) reading of 140/90 mm Hg or higher, but the updated guideline classifies hypertension as a BP reading of 130/80 mm Hg or higher. Pharmacologic recommendations: The updated guideline recommends BP-lowering medication for those with stage 1 hypertension with clinical CVD or a 10-year risk of ASCVD 10% or greater, as well as for those with stage 2 hypertension. For stage 2, the recommendation is 2 BP-lowering medications in addition to healthy lifestyle changes, which is a more aggressive treatment standard—previous guidelines recommended starting patients on only 1 BPlowering medication.

Treatment recommendations: The updated guideline presents new treatment recommendations, which include lifestyle changes as well as BP-lowering medications. These lifestyle changes can reduce systolic BP by approximately 4 to 11 mm Hg for patients with hypertension.(3) Moreover, the more recent guidelines for the management of arterial hypertension (4)recommend to institute lifestyle measures, whenever appropriate, in all hypertensive patients, including those who require drug treatment. The non-adoption of appropriate lifestyle in hypertensive subjects can thwart therapeutic effect of drugs and prevent achievement of target values.

Hypertension is a major modifiable risk factor for cardiovascular diseases and stroke. Proper treatment of hypertension can reduce the risk of stroke up to 42% and the risk of coronary heart disease by about 14%(5). Lifestyle is a vital issue in managing hypertension since optimal therapy of the disease involves consideration of the patient's age, sex, race, diet, exercise, tobacco use, comorbid conditions, use of antihypertensive drug treatment, compliance, and achievement of blood pressure control(6).

Lifestyle modification also known as nonpharmacological therapy is the cornerstone of helping out hypertensive patients to attain lifestyle behaviors that are healthy (7). It is recommended that a healthier lifestyle is essential in order to minimize hypertension risk with a combination of antihypertensive drugs (8]). Lifestyle change is an effective way of managing high blood pressure . It is also said that lifestyle change may delay hypertension and even prevent it (9).

Some studies have shown that simple exercise are equally effective as yoga in the control of essential hypertension.(10).

A study was done to evaluate the effectiveness of Guided imagery technique on BP, stress & QOL of hypertensive patients. It concluded that Guided imagery (GI) is an effective adjunctive therapy in reducing blood pressure, stress and in improving QOL in essential hypertensive patients. These results suggest that more attention needs to be paid to the mental health situation of hypertensive patients in order to reduce their stress and to improve their quality of life.(11)

Guided visual Imagery has powerful physiological consequences. The body tends to respond to mental imagery exactly as it would to a genuine external experience. Numerous studies have shown that imagery can affect almost all major physiologic control systems in the body, including respiration, heart rate, blood pressure, metabolic rates in cells, gastrointestinal motility and secretion, sexual function, cortisol levels, blood lipids, and even immune responsiveness. (12)

The purpose of this study was to evaluate the combined effect of yoga and guided imagery as lifestyle modifications in the management of essential hypertension among patients who were prescribed hypertension medication at AVBRH.

Our hypothesis is that these lifestyle interventions namely yoga and guided visual imagery combined can have a role to play in slowing down the progress of essential hypertension.

Objectives Of The Study Were--

1. To find out the difference in systolic blood pressure , diastolic blood pressure , pulse & QOL at post intervention, in study group.

2. To compare study finding with control group.

METHODOLOGY

Study Design And subjects-

This was a intervention, randomised, pre and post study. 40 essential hypertension (EH) patients in the age group of 20-60 years, including both sexes and taking antihypertensive treatment since 5 to 10 years were recruited for the study.

Inclusion Criterion was -

1. Age between 20 to 60 years of both sexes.
2. Duration of hypertension between 5-10 years.
4. No prior record of following life style modifications.
5. Patients with EH consenting to the study.

Exclusion Criteria-

1. Age less than 20 years and more than 60 years.
2.Hypertensive patients with major co- morbidities like cardiovascular disease, diabetes mellitus or nephropathy.
3. Hypertensive patients having cancer.
4. Patients with EH not consenting to the study.

Study setting- Department of Physiology, Jawaharlal Nehru Medical College, Wardha.

Period of Study – 1 ½ years.

Intervention-

The study started after obtaining prior approval from Institutional Ethical committee.

By random selection 40 patients with essential hypertension was allocated to the intervention/ study group. This RCT had 2 groups of 20 patients each namely control and study.

Patients of both the groups were on their routine antihypertensive medication. The study group of 20 EH patients were subjected to intervention for 3 days with 1 hour duration of work out. The workout was done in 3 steps.

Step 1-One week prior to the intervention all pretest namely systolic blood pressure , diastolic blood pressure , pulse and quality of life(WHOQOL) was done.

Step 2- intervention given.

Step 3- 3 months later (after intervention was given), the posttest namely systolic blood pressure , diastolic blood pressure , pulse and quality of life(WHOQOL) was taken

The schedule of intervention was as follows-

1st day- orientation to the disease through video programme and lectures.
2nd day- performance of asanas & pranayam.
3rd day – performance of guided imagery techniques .

The programme started on Tuesday and ended on Thursday of the same week.

Duration of intervention was 3 months Control group was 20 patients age & sex matched. They were on their routine anti hypertensive treatment only.

At the outset, basic characteristics including sex, age, , education, marital status, , systolic blood pressure , diastolic blood pressure , pulse and quality of life(WHOQOL)details, comorbidities (diabetes, dyslipidemia, cardiovascular disease, and stroke), family medical history, and other prescribed medication was documented.
The study group perfomed asanas and pranayam.

The following asanas were performed- Tadasan, Ardhakatichakraasan, Pawanmukthasan, Shravasan, Bakrasan & Bhujangasan.

Pranayam practised was Anulom –Vilom & Bhramri.

The study group practised guided visual imagery on the 3rd day.Pre packaged DVD & audio compact disc (CD) guided imagery relaxation were used for the relaxation. In this, the patient was first asked to relax in a chair . Then the patient was made to imagine healing rays of yellow light , falling on all the blood vessels in his body, with a soft affirmation that his blood pressure was coming back to normal.

Measurements-

Primary outcome of this study was difference in blood pressure and pulse between pre & post test in all the groups. Secondary outcome was difference in change in QOL measurements in both the groups**.**

Mercury sphygmomanometer shall be used of the diamond make was used with standard cuff having a bladder that is 12 cm X 35 cm. The bladder encircled and covered two-thirds of the length of the arm. Proper maintenance and calibration of the sphygmomanometer was done before the tests. For measurement, inflate the bladder was inflated quickly to a pressure of 20 mm Hg higher than the point of disappearance of the radial pulse. Then the bladder was deflated slowly by 2 mm Hg every second. The first appearance of the sound (Phase I Korotkoff) was the systolic BP. The disappearance of the sound (Phase V Korotkoff) w as the diastolic BP. The method of blood pressure recording was followed as Indian Blood pressure guidelines 2.

In our study normal blood pressure(BP) was defned as less than 140 mm Hg systolic and 90 mm Hg diastolic . BP was recorded in the sitting posture with the sphygmomanometer kept at heart level. An average of 3 consecutive reading with an interval of 30 minutes was taken as the accepted BP level.

Pulse was taken using a computerized physiograph.
Quality of life assessment was done using the WHOQOL-Bref. The WHOQOL- Bref is a quality of life assessment first developed by the WHOQOL Group with fifteen international field centres, simultaneously, in an attempt to develop a quality of life assessment that would be applicable cross-culturally. The WHOQOL-BREF instrument comprises 26 items, which measure the following broad domains: physical health, psychological health, social relationships, and environment.(13).

Sample size-40

Method of Randomization- Simple Randomization.

Method used to generate the random allocation sequence-

Three interventions-
A1 to 3 B4 to 6 C7 to 9 ignore(0).

Random digits: 7 2 4 0 2 3 6 3 1 8 ... Treatment assigned: (5A, 2B, 2C) C A B - A A B A A C ... Number assigned to each group: 5A, 2B, 2C

Mechanism used to implement the random allocation sequence-

Neither the subject nor the investigator knew the intervention assignment before the subject's decision to enter the study. This was done using sequentially numbered, opaque, sealed envelopes (SNOSE) containing group numbers prepared by facilitators of the study.

Randomization Concealment-

the sequence of intervention assigned was concealed from the investigator and subjects before allocation. So, neither participant nor investigator knew about the investigation group of a participant until a participant was randomly allocated to a group.

Allocation Randomization-

Facilitators generated the allocation sequence. Hypertensive patients visiting AVBRH hospital were enrolled as participants for the study by the attending physicians. A attendant of Pharmacology department was assigned participants to their groups-

Implementation Blinding-

the outcome evaluators were blinded to the study.

Periods of Recruitment- It was 3 months.

Efforts To Maintain Compliance Of Patients-

This was done using log books of asanas and exercise charts.

Handling Of Lost To Follow Up Patients-
This was addressed by recruiting extra 1% i.e 6 elligible patients for the study.

Compliance was ensured by logbook maintained by patients.

Statistical Analysis-
Baseline characteristics of subjects and change in namely systolic blood pressure , diastolic blood pressure , pulse and quality of life(WHOQOL) to the conclusion at 12 weeks was analyzed. Statistical analysis was done by using descriptive and inferential statistics using student's paired t test, one way ANOVA and Multiple Comparison Tukey Test and software used in the analysis were SPSS 24.0 version and $p<0.05$ is considered as level of significance.

Observation

Table 1: Age Wise Distribution Of Patients In Three Groups

Age Group(yrs)	Study	Control
31-40 yrs	6(30%)	6(30%)
41-50 yrs	8(40%)	8(40%)
51-60 yrs	6(30%)	6(30%)
Total	20(100%)	20(100%)
Mean±SD	45.75±8.63	45.75±8.63
Range	32-60 yrs	32-60 yrs

Table 2a: Comparison Of SBP In Three Groups At Pre And Post Test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	155.40±14.14	150.45±11.78	4.95±2.85	7.75 p=0.0001,S
Control	156.30±11.09	156.30±11.09	0±0	-

Table 2b: Comparison Of Mean Difference In SBP In Three Groups Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	150.45	11.78	2.63	144.93	155.96	120.00	167.00
Control	20	156.30	11.09	2.48	151.10	161.49	142.00	172.00

One Way ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	p-value
Between Groups	343.63	2	171.81	1.149	0.324,NS
Within Groups	8521.35	57	149.49		
Total	8864.98	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-5.85	3.86	0.292,NS	-15.15	3.45

Table 3a: Comparison Of DBP In Three Groups At Pre And Post Test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	93.90±6.40	90.25±4.96	3.65±3.71	4.39 p=0.001,S
Control	95.50±5.42	95.50±5.42	0±0	-

Table 3b: Comparison Of Mean Difference In DBP In Three Groups Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	90.25	4.96	1.10	87.92	92.57	78.00	98.00
Control	20	95.50	5.42	1.21	92.96	98.03	80.00	106.00

One Way ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	p-value
Between Groups	277.033	2	138.517	4.77	0.012,S
Within Groups	1653.950	57	29.017		
Total	1930.983	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-5.25	1.70	0.009,S	-9.34	-1.15

Table 4a: Comparison Of Pulse In Three Groups At Pre And Post Test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	77±4.07	74.90±3.14	2.10±2.10	4.47 p=0.001,S
Control	77±4.07	77±4.07	0±0	-

Table 4b: Comparison Of Mean Difference In Pulse In Three Groups Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	74.90	3.14	0.70	73.42	76.37	70.00	82.00
Control	20	77.00	4.07	0.91	75.09	78.90	70.00	86.00

One Way ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	p-value
Between Groups	44.40	2	22.20	1.74	0.18,NS
Within Groups	723.60	57	12.69		
Total	768	59			

Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
	Control	-2.10000	1.12	0.159,NS	-4.81	0.61

WHO-QOL Domains

Table 5. Comparison Of WHO-QOL Domains In Study Group At Pre And Post Test

WHO QOL Domains		Mean	N	Std. Deviation	Std. Error Mean	Difference	z-value	p-value
Domain 1	Pre Test	53.50	20	12.23	1.54	16.68±12.14	10.90	0.000 S,p<0.05
	Post Test	70.19	20	10.85	1.36			
Domain 2	Pre Test	42.79	20	14.82	1.86	25.12±16.67	11.96	0.000 S,p<0.05
	Post Test	67.92	20	15.05	1.89			
Domain 3	Pre Test	57.95	20	19.36	2.43	12.34±19.54	5.01	0.000 S,p<0.05
	Post Test	70.30	20	11.05	1.39			
Domain 4	Pre Test	35.87	20	12.12	1.52	24.76±14.82	13.24	0.000 S,p<0.05
	Post Test	60.61	20	12.86	1.62			

Table 6. Comparison Of Mean Difference In WHO-QOL Domain In Two Groups

WHO-QOL domains	Group	Mean Difference	SD	z-value	p-value
Domain 1	Study Group	16.68	12.14	9.22	0.000S, p<0.05
	Control Group	1.00	5.60		
Domain 2	Study Group	25.12	16.67	10.87	0.000S, p<0.05
	Control Group	0.33	6.70		
Domain 3	Study Group	12.34	19.54	5.23	0.000S, p<0.05
	Control Group	1.43	7.07		
Domain 4	Study Group	24.74	14.82	11.05	0.000S, p<0.05
	Control Group	1.10	7.89		

RESULT

Table 1-shows age distribution between the 2 groups which are matching.

Table 2a compares of SBP in the two groups at pre and post test and the finding is significant. The descriptive finding is not significant (table 2b).

Table 3a shows comparison of DBP in the two groups at pre and post test with a mean fall of 4 mm of Hg. This finding is significant. Also as seen from table 3b the one way anova & Tukey test finding is also significant.

Table 4a compares pulse in study and control group at pre and post test. The finding is significant. However descriptive finding is not significant (table 4b).

Table 5 shows the comparison of World Health Organization- Quality of Life (WHO-QOL) domains in study group. Domain 1 showed a pre-test mean value of 53.50 and post test mean value of 70.19. The z-value for this comparison was 10 which corresponded to a statistically significant p finding ($p < 0.05$). In Domain 2 the pretest mean value was 42.79 and post test mean value was 67.92. The z-value was 11.96 and this comparative finding is statistically significant ($p < 0.05$). Domain 3 showed a pretest mean value of 57.95 and post test mean value of 70.30. The z- value was 5.01 and this finding is statistically significant with $p < 0.05$. In Domain 4, the pretest mean value was 35.87 and post term mean value was 60.61 with z- value at 13.24. This is a significant statistical finding ($p < 0.05$).

The comparative findings in all the 4 domain is statistically significant with $p < 0.05$ as seen from Table 6.

DISCUSSION

The finding in this study is in line with the Systematic Review and Meta-Analysis of Marshall Hagins, et al. 17 studies included in the review had unclear or high risk of bias. Yoga had a modest but significant effect on systolic blood pressure (SBP) (−4.17 [−6.35, −1.99], $P = 0.0002$) and diastolic blood pressure (DBP) (−3.62 [−4.92, −1.60], $P = 0.0001$). Subgroup analyses demonstrated significant reductions in blood pressure for (1) interventions incorporating 3 basic elements of yoga practice (postures, meditation, and breathing) (SBP: −8.17mmHg [−12.45, −3.89]; DBP: −6.14mmHg [−9.39, −2.89]) but not for more limited yoga interventions; (2) yoga compared to no treatment (SBP: −7.96mmHg [−10.65, −5.27]) but not for exercise. *They concluded that* Yoga can be preliminarily recommended as an effective intervention for reducing blood pressure and that additional rigorous controlled trials are warranted to further investigate the potential benefits of yoga.(14)

Previous studies have shown that yoga reduces BP [15–18, 19–23]. However, the yoga intervention design varied among these studies and the length of the intervention ranged from 3 to 20 weeks, making it difficult to compare the interventions in terms of effectiveness.

According to a Swedish literature review, the mean reduction of BP from an antihypertensive drug is 10/5 mmHg, when used alone [24]. The effect of an additional drug is mostly lower. In view of this fact, the mean reduction of DBP of 4.4 mmHg, shows that the effect of the short yoga program could be of clinical relevance and interest when used as a supplement to other treatment.(25)

Stress Stress management has been considered to be a coadjutant therapy with pharmacological treatment and other lifestyle modifications in the management of hypertension [26]. Possible biological plausibility may reside in the effect of cortisol on hypertension [27].

Recent reviews [28,29] have concluded that psychosocial stress is a major independent risk factor for hypertension, coronary artery disease, and cardiovascular mortality. Studies have shown that individuals who exhibit exaggerated cardiovascular responses to mental stress tasks are at increased risk for developing hypertension in subsequent years [30].

The limitations are balanced by several notable strengths. First, the methodology is simple yet efficient and can be practiced at home once understood. When mind-body techniques to evoke the RR are integrated into an individual's lifestyle in a manner similar to that suggested by Ghiadoni, there is the potential for a cumulative health benefit.[31]

Pangtey, Ruchira et al in their study of a total of 269 hypertensive who had mean age and duration of hypertension as 58.25 ± 10.35 and 7.65 ± 8.00 years respectively found that the age, duration of illness, number of symptoms, systolic blood pressure and number of drugs prescribed showed statistically significant ($P < 0.05$) negative correlation. While number of symptoms, systolic blood pressure and duration of illness showed statistically significant positive correlation ($P < 0.01$). Women had significantly poorer QOL compared to men. This is descriptive cross sectional study. This study was conducted in an urban area of Delhi. They concluded that most of the participants had an average to poor quality of life. Age, female, duration, number of symptoms, systolic blood pressure and number of medications may be important predictors to improve QOL in hypertensive patient (32)

Guided imagery is a Stress reduction program which works by relaxation response(RR). Cornelissen VA et al has suggested that therapies such as relaxation, meditation, or biofeedback may help patients to reduce the effects of stress by reducing physiologic arousal and restoring autonomic balance, thereby reducing blood pressure [33]. Linden W et al and Chesney MA studied relaxation therapies aiming to enable patients to achieve physical and mental relaxation. Relaxation therapies included progressive muscle relaxation, using exercises to tense and release muscle groups [34] and autogenic training, which involved concentrating on somatic sensations and using autosuggestion [35]. These therapies were combined with use of mental imagery or breathing exercises. They found that these were beneficial in the management of hypertension.

The mechanism by which relaxation techniques lower blood pressure is unclear. One theory suggests that they may help lower the stress and physiologic arousal produced by the autonomic nervous system, thereby reducing blood pressure. (36).

Meng Xiao et al conducted a cross-sectional survey in Chongqing, China. Of 600 randomly selected patients, 586 patients agreed to participate and 567 patients completed the survey. This study aimed to investigate the factors impacting on Health-Related Quality of Life (HRQoL) among hypertensive patients in Chongqing, China, and to provide evidence-based strategies to improve their HRQoL. A SF-36 (Medical Outcomes Study (MOS) Short Form Health Survey questionnaire) that included eight domains: physical functioning, role limitations due to physical problems, body pain, general health, vitality, social function, role limitations due to emotional problems, and mental health was used to measure HRQoL. Linear regressions were used; each domain of HRQoL was measured in the stratification of sex. *They found that* perceived economic burden caused by hypertension was the most common factor impacting on patients' HRQoL. Female patients were more susceptible when compared to male patients.(37).

Moa Wolff et al had also similar findings as in our study. They investigated the effects of two yoga interventions on blood pressure and quality of life in patients in primary health care diagnosed with hypertension. Adult patients (age 20–80 years) with diagnosed

hypertension were identified by an electronic chart search at a primary health care center in southern Sweden. In total, 83 subjects with blood pressure values of 120–179/≤109 mmHg at baseline were enrolled. At baseline, the patients underwent standardized blood pressure measurement at the health care center and they completed a questionnaire on self-rated quality of life (WHOQOL-BREF). They found that The yoga class group showed no improvement in blood pressure or self-rated quality of life, while in the yoga at home group there was a decline in diastolic blood pressure of 4.4 mmHg ($p<0.05$) compared to the control group. Moreover, the yoga at home group showed significant improvement in self-rated quality of life compared to the control group ($p<0.05$). Finally they concluded that that simple yoga exercises may be useful as a supplementary blood pressure therapy in addition to medical treatment when prescribed by primary care physicians.(38)

J Vasantha et al in their study titled:"**.** Impact of Yoga on Blood Pressure and Quality of Life in Patients with Hypertension" found that a short yoga program for the patient to practice at hospital seems to have an antihypertensive effect, as well as a positive effect on self-rated quality of life compared to controls. The investigator evaluated the effects of yoga intervention on blood pressure and quality of life in patients diagnosed with hypertension. Adult patients (age 20–80 years) with diagnosed hypertension were identified at OPD of Meenakshi Medical College and Hospital. The yoga class group showed improvement in blood pressure or selfrated quality of life, while in the yoga at home group there was a decline in diastolic blood pressure of 4.4 mmHg ($p<0.05$) compared to the control group. Moreover, the yoga at home group showed significant improvement in self-rated quality of life compared to the control group ($p < 0.05$).(39).

The YHIP-study (The Impact of Yoga on Blood Pressure and Quality of Life in Patients With Hypertension), that investigated yoga as additional treatment for hypertension on primary care patients, showed that a short yoga program practiced daily at home had a blood pressure lowering effect as well as a positive effect on self-rated quality of life compared to control. This study concluded that if the yoga intervention shows to be effective, then yoga exercises may be useful as a supplementary BP therapy in addition to medical treatment when prescribed by primary care physicians. (40)

Senthil Kavitha et al examined the effect of guided imagery visualization on Quality of Life (QOL) in hypertensive patients. A randomized control trial, pre and post test group design was selected for this study. Subjects of mini health centers were randomly assigned through simple lottery method thirty samples in each group: the study group received the intervention of guided imagery and the other group control received a usual treatment care. The two groups were pre tested then followed up till 3 months to see if there are any differences between them in outcome. Simple lottery method was used from primary health centers for randomization. Subjects underwent guided imagery visualizations preliminary training program of 1 week through DVD followed by GI audio relaxation. They concluded that findings after 3 months showed that. The guided imagery program significantly improved quality of life of hypertensive patients. (41) . This finding is in line with our study.

In another study , similar to our findings Kaur Gurvinder et al did a Quasi experimental study to assess and evaluate the effectiveness of guided imagery technique on blood pressure and stress level of elderly people in selected old age homes at Haryana. The purposive sampling technique was used to gather data by using Glazer stress life style questionnaire and blood pressure record sheet for 60 elderly people (30 in experimental and 30 in comparison group) . The study concluded that guided imagery technique had significant effect on blood pressure and stress level among elderly people. (42).

CONCLUSION

Lifestyle interventions namely yoga and guided visual imagery combined, had a significant effect in the reduction of systolic blood pressure, diastolic blood pressure, pulse and quality of life in patients with essential hypertension. Hence these lifestyle modifications should be prescribed along with routine anti hypertensive drugs in essential hypertensive patients. This will reduce the economic impact and the side effects of the pharmacological treatment finally slowing down the progress of the disease.

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