

EVALUATION OF DIET & LIFE STYLE MODIFICATION IN THE MANAGEMENT OF HYPERTENSION

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ABSTRACT

A scientific and technological revolution has occurred over the last three decades. Due to the rapid modernization, people are leading more stressful lives. As a resultant, the hypertension is one of the widespread disorders which came across in practice which is called as silent killer and is leading cause of mortality and morbidity. It affects the all the major organs of the body in due course of time if not managed properly. It is estimated that 600 million people are affected worldwide with hypertension. By the year 2025, approximately 1 in 3 adults aged over 20 years, totally 1.56 billion people worldwide, will have hypertension. In the present study entitled “Evaluation of diet & life style modification in the management of hypertension” we had planned to find out the exact causative factors of the disease in the present scenario and simultaneously the management modalities as per the *Ayurvedic* concepts. In the study there are two groups one of them were newly diagnosed case of hypertension and second were already on antihypertensive drugs. Dietary and lifestyle regimes provided in this present study were found significant in the maintaining *Vata dosha* by its *Vatanulomak*, *Amapachak*, *Srotosodhak* and *Pittakaphaghna* properties. It also helps in reduction of cardiac output, reduces total peripheral resistance and also relaxes the mind, thus helps in maintaining Hypertension.

Keywords: Hypertension, lifestyle disease, dietary and lifestyle regimes

INTRODUCTION

Hypertension is called a silent killer because it rarely provides symptoms before it damages the heart, brain or kidney¹. It is estimated that 600 million people are affected worldwide with hypertension. By the year 2025, approximately 1 in 3 adults aged over 20 years, totally 1.56 billion people worldwide, will have hypertension².

The faulty dietary and lifestyle like excessive consumption of junk foods, lack of exercise, disturbed sleeping patterns, excessive use of electronic gazettes and stressful work culture leading to Anxiety and Depression which plays a significant role in causation of the disease. In spite of the newer advancement in the field of antihypertensive drugs the disease was not managed up to target level, this is mainly because of

the above factors. So it is the need of time to find out an alternative method of management of the disease. The holistic approach of Ayurveda which is based on *Ahara* (Diet) and *Vihara* (Lifestyle) and also on the avoidance of causative factor that is *Nidanaparivarjana* can play a better role in the management of the disease. So in this present study we had planned to find out the exact causative factors of the disease in the present scenario and simultaneously the management modalities as per the *Ayurvedic* basic concept of the treatment.

AIM AND OBJECTIVES

1. To evaluate the effect of diet in the management of Hypertension
2. To evaluate the effect of lifestyle modification in the management of Hypertension

MATERIAL & METHODS

TYPE OF STUDY-Observational clinical study

SELECTION OF PATIENTS

For clinical trial total 40 patients of essential hypertension (stage 1 and stage 2 hypertension) fulfilling the criteria of inclusion and willing to participate in clinical trial were selected from OPD & IPD of Rog nidan department of Rishikul Campus of UAU, Haridwar.

DIAGNOSTIC CRITERIA

Three consecutive readings of blood pressure were taken in supine posture and their average was utilized for diagnosis. A patient with persistent blood pressure above 140/90 mm of Hg was designated as Hypertensive.

TABLE 1:

INCLUSION CRITERIA	EXCLUSION CRITERIA
Age group of 20 -65 years	Below 20 years and above 65 years of age
Systolic blood pressure above 140mm of hg and below 180mm of hg	Systolic blood pressure below 140 mm of hg and above 180 mm of hg
Diastolic blood pressure above 90mm of hg and below 110 mm of hg	Diastolic blood pressure below 90mm of hg and above 110 mm of hg
	Major illness like diabetes mellitus, renal disorders, pulmonary tuberculosis, HIV, major endocrinal disorders, congestive cardiac failure, pregnancy, and epilepsy etc.

FOR CLINICAL STUDY

The patients were divided into two groups

Group 1 – In this group newly diagnosed patients who were not taking any antihypertensive medication were registered.

Group 2 –In this group the patients who were already on antihypertensive medication but still their blood pressure are not in optimal control were registered.

DURATION OF STUDY- 30 days

INVESTIGATIONS

- Routine hematological investigations
- Lipid profile
- BS, Blood urea, Serum creatinine
- Routine and microscopic examination of urine

TABLE 2: DIET AND LIFE STYLE MODIFICATION PLAN FOR HYPERTENSIVE PATIENTS

EARLY MORNING 5 am	Luke warm water + lemon or Herbal /green tea etc Garlic	1 glass (150ml) ½ cup (50ml) 2-3 pieces
BREAKFAST 9 am	Bread – Vegetable or Poha/Daliya/Cornflakes	1-2 (50gm each) + 1 bowl (150gm) 1 bowl (60gm)

	or Sprouts	1 bowl (50gm)
MIDMORNING 11 am	Fruits Juices	1 bowl(150gm) 1 glass(150ml)
LUNCH 2 pm	Bread Rice Vegetable Cereals Salad	1-2 (50 gm each) 1 bowl (100gm) 1 bowl (150gm) 1 bowl (100gm) 1 bowl (150gm)
EVENING /SNACKS 5 pm	Roasted chana or Herbal /green tea etc or Idli or poha etc/eg upma V	1 bowl (50-60 gm) ½ cup (50ml) 1-2 Pieces 1 bowl
DINNER 9 pm	Soup Bread Vegetable Cereals Salad	1 bowl (100ml) 1-2 (50 gm each) 1 bowl (150 gm) 1 bowl (100 gm) 1 bowl (150 gm)
BEDTIME 10 pm	Milk without cream	1 glass (200ml)

- **Bread-** Use fibre-rich cereals like bread mixed with flour like wheat, maize, oats, gram flour.
- **Vegetables-** Onions, Cabbage, Tomatoes, Spinach, Karela, lady finger, Parwal, Lauki, Torai etc.
- **Dal-** Moong, Arhar, Soyabean, Chana.
- **Fruits-** Apple, Strawberry, Raw Guava, Orange, Fresh Melon, Melon, Papaya. Amla, banana, grape etc.
- **Salad-** Onion, cucumber, tomato.
- **Juice-** Coconut water, bottle gourd, carrots, vegetables and fruits.

TABLE NO – 03

<p>Pathya / Do's Walk 1/2-1 hour daily and exercise for 30 minutes. Do Pranayama (<i>Bhramari, Anulom-Vilom, Sheetkary</i>) and <i>Asanas (Sawasan, Vajrasan, Bhujangasan)</i> regularly every day. Eat simple, nutritious, and digestible foods. Oil- Mustard, olives, coconuts. Spices: Use turmeric cinnamon, fenugreek, cumin, black pepper, etc. to make vegetables. Use buttermilk or whey with cumin seeds. Use pomegranates, grapes, coconut, etc. in regular diet. Take dinner on time at least 2 hours before bedtime. Sleep early at night and get up early in the morning. Get 7-8 hours of sleep regularly.</p>	<p>Apathya / Don't Do not eat too much food. Don't sleep during the day. Do not take more fried and oily food. Do not use butter, ghee, paneer, curd. Do not use too much salt. Does not use outside fast food such as burgers, pizzas, potato finger chips, bakery products, cold drinks, ice cream. Don't eat meat (RED MEAT), fish and heavy meal. Avoid smoking, tea, alcohol, and alcoholic beverages. Do not use tools like mobile, TV, laptop etc. for long. Don't sit for too long.</p>
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CRITERIA FOR ASSESSMENT

- Reduction in systolic and /or diastolic blood pressure
- Relief in subjective parameters like headache, giddiness, palpitation, disturbed sleep, easy fatigability.

Assessment of total effect of the therapy-

Complete remission- 100% improvement
 Markedly improved – improvement between 75%-99%
 Moderately improved – improvement between 50%-74%
 Mild Improvement- improvement between 25 - 50%
 No improvement - improvement below 25%

STATISTICAL ANALYSIS

The results found were analyzed statistically. Wilcoxon signed rank method was used to check the statistical improvement in subjective parameters and Paired “t” test for objective parameters.

- Insignificant - > 0.05

- Significant - ≤ 0.05
- Highly significant - ≤ 0.001

OBSERVATION

In the present study total 40 patients were registered, from which 37 patients were completed the treatment. Whereas, 3 patients (2 patients from Group 1 and 1 patients from Group 2) discontinued the treatment. It was observed that maximum number of patients i.e. 30% belonged to age group of 40-49 years, followed by 25% patients to 30-39 years, 22.5% patients belonged to 20-29 years of age group. Sex wise, the maximum i.e. 57.5% patients were male while rest of the patients i.e. 42.5 % were female. Religion wise maximum i.e. 85% patients were Hindus followed by 15% of Muslims. Occupation wise, it was found that maximum i.e. 35% was housewives and 22.5% were students. And 32.5% & 2.5% were doing their Service & business respectively and 7.5% were Labors.

TABLE 4: SYMPTOMS WISE DISTRIBUTION OF 40 PATIENTS

Symptoms	Group 1	Group 2	Total	Percentage (%)
Shirahshoola(headache)	16	14	30	75
Hrid-dravata(palpitation)	09	13	22	55
Klama (fatigue)	10	11	21	52.5
Bhrama (vertigo)	04	09	13	32.5
Akshiraga(redness of eye)	-	03	03	7.5
Krodhaprachoorata (irritability)	12	08	20	50
Alpanidra(disturb sleep)	06	14	20	50

The present study revealed that maximum 75% patients were having Shirahshoola following 52.5% patients were having *Klama*. 39% patients were having

Akshiraga and *Bhrama* while 55% patients were having Hrid-dravata. 50% patients were reported of Alpanidra, and Krodhaprachoorata.

TABLE 5: SYSTOLIC (SITTING) BLOOD PRESSURE WISE DISTRIBUTION OF 40 PATIENTS

B.P. (mm of Hg)	Group 1	Group 2	Total	Percentage (%)
Stage I (140-159)	18	12	30	75
Stage II (160-179)	02	08	10	25

The above table revealed that maximum 75% of patients were recorded stage I systolic blood pressure, followed by 25% patients suffering from stage II systolic blood pressure.

TABLE 6: DIASTOLIC (SITTING) BLOOD PRESSURE WISE DISTRIBUTION OF 40 PATIENTS

B.P. (mm of Hg)	Group 1	Group 2	Total	Percentage (%)
Stage I (90-99)	16	10	26	65

Stage II (100-109)	04	10	14	35
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The above table showed that 60 % patients were suffering from stage I diastolic blood pressure and 35 % patients were reported of stage II diastolic blood pressure.

EFFECT OF THERAPY

TABLE 7: SUBJECTIVE CRITERIA

Subjective	Group	N	Mean Score		d	Relief %	W	P	Significance
			BT	AT					
Shirahashoola	Gr. 1	16	2.66	1.46	1.20	45.1	-91	<0.001	HS
	Gr. 2	14	1.78	0.68	1.10	61.79	-105	<0.001	HS
Hrid-dravata	Gr. 1	09	2.50	1.12	1.37	54.8	-36	<0.008	S
	Gr. 2	13	2.00	1.07	0.92	46	-66	<0.001	HS
Klama	Gr. 1	10	2.75	1.21	1.50	54.54	-36	<0.001	HS
	Gr. 2	11	2.35	0.92	1.42	60.42	-105	<0.001	HS
Bhrama	Gr. 1	04	2.00	0.66	66.5	66.5	-6	<0.250	NS
	Gr. 2	09	2.16	1.16	1.00	46.29	-66	<0.001	HS
Akshiraga	Gr. 1	-	-	-	-	-	-	-	-
	Gr. 2	03	2.00	1.33	0.66	33	-3	=0.50	NS
Krodhaprachurata	Gr. 1	12	2.58	1.16	1.41	54.65	-78	<0.001	HS
	Gr. 2	08	2.42	0.85	1.57	64.87	-28	<0.016	S
Alpanidra	Gr. 1	06	2.33	0.85	1.57	64.87	-21	<0.031	S
	Gr. 2	14	2.15	1.15	1.00	46.51	-78	<0.001	HS

TABLE 8: OBJECTIVE CRITERIA

Objective	Group	N	Mean score		D	% relief	S.D	S.E	T	P
			BT	AT						
Systolic blood pressure	Gr. 1	18	157.15	138.42	18.63	11.86	5.89	1.35	13.78	<0.001
	Gr. 2	19	150	130	20	13.33	3.56	0.84	23.80	<0.001
Diastolic blood pressure	Gr. 1	18	95.11	86.55	8.55	8.99	2.72	0.64	13.30	<0.001
	Gr. 2	19	98.63	89.89	8.73	9.30	3.54	0.81	10.75	<0.001

TABLE 9: OVERALL EFFECT OF THERAPY

Assessment	Group 1		Group 2	
	No. of patients	%	No. of patients	%
Complete remission (100%)	-	-	-	-
Markedly improved (>75 - <100%)	-	-	-	-
Moderate improved (>51 - <74%)	03	16.67	04	21.05
Mild improved (>25 - <50%)	13	72.22	14	73.68
Unchanged (0 - <25%)	02	11.11	01	5.26

DISCUSSION

The percentage of relief in group 1 was 13.33% and in group 2 it was 11.86% and the effect of therapy was highly significant in both groups on **Systolic blood pressure** and percentage of relief in group 1 was

8.99% and in group 2 it was 9.30% and the effect of therapy was highly significant in both groups on

Diastolic blood pressure.

Blood pressure = cardiac output x Total peripheral resistant.

Systolic blood pressure mainly depends upon Cardiac output.

Diastolic blood pressure mainly depends upon Total peripheral resistance.

The diet used in the study was rich in potassium (as in spinach, salad, coconut water etc.) which prevents water retention, helps to relax the blood vessels. Less water retention is responsible for low cardiac output. Blood pressure depends upon cardiac output and total Peripheral resistant so this diet helps to control the blood pressure. The main gradient of spinach is Lutein which prevents thickening of wall of arteries. Reduced thickness decreases peripheral resistance and helps to control the BP mainly. The adenosine present in garlic and onion act as smooth muscle relaxant which also decrease TPR and help to maintain BP. Salad generally have less sodium, more potassium and rich fiber which helps to decrease in both cardiac output and TPR, leads to decrement in BP. Routine walking, aerobic exercises, *Praṇayama* (*Anuloma*, *Viloma*) and *Asana* (*Savasana*, *vajrasana* and *bhujangasana* etc.) provides oxygenation at cellular level and relaxes the mind. Due to proper circulation obstruction tends to clear and channel purifies. These events lead to lower TPR and ultimately help to maintain the BP.

The percentage of relief in group 1 was 45.1% and in group 2 it was 61.79% and the effect of diet and life-style modification is highly significant in both groups on *Shirahshoola*. *Shirahshoola* is *Pitta* and *Rakta* dominated disease (ch.su.17/11³, As.H.su.27/3-4⁴). The therapy used in this study has *Pittasamak prabhava* and alleviates both *Pitta* and *Rakta*.

The percentage of relief in group 1 was 54.8% and in group 2 it was 46% and the effect of therapy was significant in group 1 and highly significant in group 2 on symptom *Hrid-dravata* (Palpitation). It was because of hot water, lemon water and green tea softens blood vessels and decrease peripheral resistance which directly effects the palpitations. The therapy given to the patients having *Yogasana* such as *Savasana*, *Vajrasana* and *Bhujangasana* with *Pathya-Apathya*, helps all micro and gross channels to en-

hance smooth and free flow of blood and help to reduce *Hrid-dravata* (Palpitation).

The percentage of relief in group 1 was 66.5% and in group 2 it was 46.29% and the effect of therapy was not significant in group 1 while highly significant in group 2. *Bhrama* occurs due to the *Vata* (*Ch.Chi.28/61*⁵), *Pittavrita Prana* (*Ch.chi.28/221*⁶), *Pittavrita udana* (*Su.ni.1/35*⁷) and *Pittaja Hṛidroga* (*Ch.su.17/33*⁸). *Bhrama* is a common symptom. So it seems that *Bhrama* manifests due to the *Avaraṇa* of *Pitta*. This therapy helps to remove the *pittavarāṇa* and *margavarodha* and causes significant effect. In group 1, only 4 newly diagnosed patients were suffering from *bhrama* that may be due to other disease.

The percentage of relief in group 1 was 54.54 % and in group 2 it was 60.42% and the effect of therapy was highly significant in both groups on symptom *Klama*. It may be due to *Laghu Ahara* such as *Mudga*, *Yava*, *Salad* and decrement in *Adhyasana* and *Viśamasana* habits. These above factors cause *Strotosodhana* and *Agnivardhana* and pacify the *Pitta Avaraṇa*. In *Pitta Avaraṇa* (*ch.chi.28/222*⁹, *su.ni.1/35*), *Pittavrita Vyana* (*ch.chi.28/227-228*¹⁰, *su.ni.1/38*¹¹) and in *Pittaj Hṛidroga* (*ch.su.17/33*¹²) *Klama* is a common symptom. This symptom is also present in hypertension so we can say that patient of *klama* with hypertension had *Pitta* dominancy to obstruct *Vyana* or *Udana Vayu*. The therapy given in this study pacifies the *Pitta Avaraṇa* and is highly significant for *Klama*.

In group 1 no patient were registered of symptom *Akshiraga*. In group 2 the percentage of relief was 33% and the effect of therapy was not significant symptom. *Akshiraga* is a *raktapradoṣaja vyadhi* (*ch.su.24/11*¹³). Increase in blood volume may be a definable cause behind *Akshiraga*. Diet and lifestyle modification given in this study causes decrease in circulatory volume. It may be the cause of relief on *Akshiraga*.

The percentage of relief in group 1 was 54.65% and in group 2 it was 64.87% and the effect of therapy was highly significant in group 1 and significant in group 2 on symptom *Krodhaprachurata*. *Krodhaprachurata* is *Pitta* dominated and *Raktapradoṣaja vikara*. The vi-

tiation of Uṣhna and Teekshṇa Guṇa in *Sadhak Pitta* lead to *Krodhaprachurata*. The diet and lifestyle modification used in this present study alleviate all these effects in unison to calm the patient. The effect of therapy in newly diagnosed patients (group 1) shows better result than that of chronic patients of group 2. The symptom of *Krodhaprachurata* may be a behavioral disorder in group 2 patient.

The percentage of relief in group 1 was 64.87% and in group 2 it was 46.51% and the effect of therapy was significant in group 1 and highly significant in group 2 on symptom *Alpanidra* (Disturbed sleep). Both group showed almost same result on *Alpanidra*. *Alpanidra* occurs due to *Pitta Doṣa Vridhi* (*su.su 15/18¹⁴*). The therapy used in study was *Pittahara* and does not enhance *Vata* (B.p.pur.kha.28-29). So it alleviates *pitta* which plays important role in sound sleep. Light exercise and *Yogasana* also relaxes the mind and have beneficial effect on sleep.

This study shows that overall effect of therapy, 72.22% of patients were mild improved, 16.67% were moderately improved and 11.11% of patients were unchanged in **group 1** and 73.68 % of patients were improved, 21.05% were moderately improved and 5.56% of patients were unchanged in **group 2**.

CONCLUSION

In the present study it was found that there is statistically significant improvement were found in both group but in group II i.e. hypertensive patients taking antihypertensive drugs along with dietary and lifestyle regimes i.e. *Ahara* and *Vihara* which was recommended in the present study, was found clinically more significant in comparison to group I which was only on dietary and lifestyle regimes. So it can be concluded that dietary and lifestyle modification provided in initial stage can control the progression of disease and maintains quality of life and in chronic stage can be provided as supportive therapy with anti-hypertensive drug to provide better benefits to patients.

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