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Original Research Article

Efficacy of Panchakarma therapy and lifestyle modification in essential hypertensive patients to reduce anti-hypertensive dependency

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ABSTRACT

Background: Anti-hypertensive drugs are associated with a plethora of adverse reactions which can lead to poor treatment adherence, increased morbidity and mortality rates, and significant economic burden. The blood pressure management program (BPMP) is an Ayurvedic treatment strategy that combines Panchakarma with diet management. Thus, the current study sought to assess the efficacy of the BPMP in essential hypertensive patients to reduce anti-hypertension dependency.
Methods: A retrospective, observational, single-centre study was conducted between December 2018 and September 2023 in Maharashtra, India. Patients aged 30-75 years diagnosed with primary/essential hypertension regardless of gender participated in the BPMP and were included in the study. Follow-up was conducted after 90 days. Day 1 and day 90 data were compared.
Results: A total of 59 patients were assessed. Daytime ambulatory blood pressure monitoring (ABPM) systolic blood pressure decreased (day 1: 123.71±11.83 mmHg and day 90: 123.12±12.36 mmHg), night-time ABPM systolic blood pressure decreased (day 1: 114.76±13.41 mmHg and day 90: 114.31±14.40 mmHg), daytime ABPM diastolic blood pressure decreased (day 1: 77.03±8.28 mmHg and day 90: 76.31±9.45 mmHg, and night-time ABPM diastolic blood pressure decreased (day 1: 69.53±8.32 mmHg and day 90: 68.42±8.85 mmHg). Nocturnal dipping decreased (day 1: 7.08±8.19 and day 90: 6.08±8.99). Dependency on allopathic medication also decreased.
Conclusions: The Ayurveda-based BPMP effectively reduces blood pressure and dependency of allopathic medication. It also improves quality of life of patients diagnosed with primary/essential hypertension.

Keywords: Ambulatory blood pressure monitoring, Ayurveda, Diastolic blood pressure, Hypertension, Systolic blood pressure

INTRODUCTION

Hypertension is the foremost cardiovascular risk factor worldwide accountable for 13% mortality and significant loss of disability-adjusted life years.[1] Therefore, decreasing hypertension rates can lead to a reduction in cardiovascular morbidity and mortality. Effective hypertension management begins with accurate diagnosis.

Ambulatory blood pressure monitoring (ABPM) has been demonstrated to be preferable over clinical blood pressure measurements due to its ability to provide mean blood pressure levels, diurnal variation in blood pressure, and short-term blood pressure variability.[2] Accordingly, the American College of Cardiology (ACC)/American Heart Association (AHA) and European Society of Cardiology (ESC)/European Society of Hypertension (ESH) recommend use of ABPM for standard clinical practice.[3,4] Moreover, the India ABPM study of 27,472 patients revealed as many as 31.3% patients would have been wrongly diagnosed if only conventional office blood pressure measurement was considered as in current Indian primary care practice.[5]

Medicines such as angiotensin receptor blockers, angiotensin converting enzyme inhibitor beta-blockers, calcium channel blockers, and diuretics are among the medications prescribed to hypertensive patients. However, these medications often have side effects such hypotension, worsening of asthma, heart block, dizziness, headache, hallucinations and others in addition to high costs.[6] These factors bring about reduced patient adherence to medication spurring the search for alternative therapeutic options. Ayurveda is an ancient medicinal practice that employs herbal preparations for the treatment of disease. The blood pressure management program (BPMP) is an Ayurvedic treatment strategy that combines Panchakarma with diet management. Thus, the current study sought to assess the efficacy of the BPMP in essential hypertensive patients to reduce anti-hypertension dependency.

METHODS

Study design and patient population

A retrospective, observational, single-centre study was conducted between December 2018 and September 2023 in Maharashtra, India. Patients aged 30-75 years diagnosed with primary/essential hypertension regardless of gender participated in the BPMP and were included in the study. Patients with (i) secondary hypertension, (ii) resistant hypertension (iii) severe hepatic insufficiency, (iv) renal insufficiency (v) pregnancy and ongoing lactation and (vi) age <30 and >75 years were excluded from the study. All patients provided signed informed consent for data collection and its analysis for research purposes.

Blood pressure management program

The BPMP encompassed a total of 12 sessions (4 within the first month, 4 in the second month, and 4 in the third month) along with conventional allopathic treatment if the patient was prescribed medication. It comprises 3 steps and each session lasts for approximately 65-75 minutes. This procedure was performed on hypertensive patients after a light breakfast. The first procedure, Snehana was the process of external oleation with R Abhyanga oil massaged on the hands, legs, shoulders, thorax, abdomen and the back in a centripetal manner with strokes directed towards the heart. The duration of this massage was approximately 30 minutes. This process improves circulation and acts as an anxiolytic. The second procedure, Swedana was thermal vasodilation also known as passive heat treatment with Dashmoola (group of 10 herbs) decoction at temperature not exceeding 40°C for a duration of 10-15 minutes. The patient was asked to lie in a supine position in a wooden box. The patient's neck was allowed to protrude outside the box. This helps produce sweat eliminating salt and water from the body. After the treatment, the patients were asked to relax for 3-4 minutes. The total duration of this procedure was 15-20 mins. Shirodhara, was the third procedure. Luke warm Nardostachys Jatamansi decoction was continuously dripped at a constant speed from a fixed height on the middle of the forehead and eyebrows as a steam and in an oscillating manner. Care was taken to ensure the decoction does not enter the eyes and ears. The procedure lasted 20 minutes. This helps reduce level of stress hormones such as adrenaline and noradrenaline and thus relaxes the mind and helps in reducing BP and HR.

Data collection

Data for patient demographics, anthropometrics, and medications were collected and analysed from the patients' medical records. On day 1 of the BPMP, the patients had undergone blood pressure measurement as per Eighth Joint National Committee guidelines.[7] 3 readings were recorded a few minutes apart and the average of these 3 readings was calculated and considered as the baseline reading. Blood pressure readings were also recorded before and after Panchakarma sessions during each visit. Readings were also recorded on day 90 of the BPMP to calculate the change from the baseline reading. Details of concomitant allopathic medication were also recorded. Data of day 1 was compared with data of day 90. Data of only those patients who had completed a total of 12 sessions was collected and analysed.

Statistical analysis

Categorical data are expressed as number (percentage) and continuous data are expressed as mean±standard deviation. Paired t-test was used to determine the difference between baseline and follow-up at 90 days. P value ≤0.05 was considered as statistically significant. R version 3.4.1 software was used to analyse the data.

RESULTS

Patient demographic and anthropometric characteristics

The mean age of the study patients was 54.02±9.06 years. Males comprised 39 (66.1%) patients. Systolic blood pressure (SBP) decreased (day 1:139.00±15.44 mmHg and day 90: 121.69±11.80, p=0.00) and diastolic blood pressure (day 1: 87.39±8.18 mmHg and day 90: 79.88±6.40 mmHg, p=0.00) at the 90-day follow-up. Daytime ambulatory blood pressure monitoring (ABPM) systolic blood pressure decreased (day 1: 123.71±11.83 mmHg and day 90: 123.12±12.36 mmHg), night-time ABPM systolic blood pressure decreased (day 1: 114.76±13.41 mmHg and day 90: 114.31±14.40 mmHg), daytime ABPM diastolic blood pressure decreased (day 1: 77.03±8.28 mmHg and day 90: 76.31±9.45 mmHg, and night-time ABPM diastolic blood pressure decreased (day 1: 69.53±8.32 mmHg and day 90: 68.42±8.85 mmHg). Nocturnal dipping decreased (day 1: 7.08±8.19 and day 90: 6.08±8.99). The demographic and anthropometric details are elaborated further in Table 1.

Table 1: Study treatment: blood pressure management program (HTN Kit).

Steps involved	Product	Mechanism of action	Duration (minutes/sitting)	Probable adverse effects
Snehana/ centripetal oleation	*R. abhyanga* oil/rose *Rosa antefolia* perfumed oil	Reduces peripheral vascular resistance Reduces endothelial dysfunction Improves venous return Reduces sympathetic overactivity Rose oil is anti-anxiety in nature	30	Not observed
Swedana/ thermal vasodilatation	Dashmool decoction Group of 10 herbs	It causes vasodilatation Reduces fluid overload due to excretion of water and electrolytes	15-20	Dehydration
Shirodhara/ herbal decoction dripping over forehead	Jatamansi/*Nardostachys Jatamansi* decoction	Shirodhara relives anxiety by reducing catecholamine surge and helps to induce sleep *Nardostachys jatamansi* has anti-oxidative properties	20	Cold

Table 2: Patient demographic and anthropometric characteristics.

Variables	Day 1	Day 90	P value
Age (years)	54.02±9.06		
Males, N (%)	39 (66.1)		
Weight (kg)	80.79±14.52	74.10±12.39	0.00
Body mass index	30.70±5.07	28.12±4.44	0.00
Abdominal girth, cm	102.33±11.11	95.24±8.43	0.00
Systolic blood pressure, mmHg	139.00±15.44	121.69±11.80	0.00
Diastolic blood pressure, mmHg	87.39±8.18	79.88±6.40	0.00
Ambulatory blood pressure monitoring and systolic blood pressure day, mmHg	123.71±11.83	123.12±12.36	0.73
Ambulatory blood pressure monitoring and systolic blood pressure night	114.76±13.41	114.31±14.40	0.78
Ambulatory blood pressure monitoring and diastolic blood pressure day	77.03±8.28	76.31±9.45	0.57
Ambulatory blood pressure monitoring and diastolic blood pressure night	69.53±8.32	68.42±8.85	0.40
Nocturnal dipping	7.08±8.19	6.08±8.99	0.46

All data are expressed as number (percentage) or mean±standard deviation.

Table 3: Weight, body mass index, and abdominal girth according nocturnal dipping classification.

Nocturnal dipping classification	Weight			Body mass index			Abdominal girth		
	Day 1	Day 90	% change	Day 1	Day 90	% change	Day 1	Day 90	% change
Risers	76.30 ±11.90	70.50 ±10.58	-7.58	31.50 ±5.44	29.30 ±5.52	-7.00	102.30 ±9.75	94.20 ±6.82	-7.92
Extreme dippers	93.77 ±5.21	80.63 ±2.16	-14.01	33.28 ±2.39	28.61 ±1.24	-14.03	111.33 ±2.49	99.33 ±2.05	-10.78
Dippers	78.38 ±12.20	74.10 ±11.86	-5.46	29.13 ±4.17	27.42 ±3.85	-5.87	99.37 ±7.73	94.05 ±7.01	-5.35
Non-dippers	82.70 ±16.32	74.70 ±13.59	-9.68	31.22 ±5.42	28.13 ±4.52	-9.90	103.43 ±13.25	96.00 ±9.96	-7.18

Table 4: Systolic and diastolic blood pressure according nocturnal dipping classification.

Nocturnal dipping classification	Systolic blood pressure			Diastolic blood pressure		
	Day 1	Day 90	% change	Day 1	Day 90	% change
Risers	140.00±16.95	119.00±10.44	-15.00	83.60±4.54	78.00±4.00	-6.70
Extreme dippers	143.33±12.47	113.33±4.71	-20.93	80.00±0.00	80.00±0.00	0.00
Dippers	134.21±9.90	119.47±11.80	-10.98	86.11±7.35	77.11±8.78	-10.45
Non-dippers	141.52±17.42	125.19±11.72	-11.54	90.52±8.84	80.33±4.95	-11.25

Table 5: Daytime ambulatory blood pressure monitoring systolic and diastolic blood pressure according nocturnal dipping classification.

Nocturnal dipping classification	Daytime ABPM SBP			Daytime ABPM DBP		
	Day 1	Day 90	% change	Day 1	Day 90	% change
Risers	122.60±14.08	122.20±17.27	-0.33	73.40±6.42	72.40±11.03	-1.23
Extreme dippers	144.33±3.86	121.00±6.68	-16.17	88.67±4.11	72.67±2.49	-18.05
Dippers	119.89±9.55	123.63±6.93	3.12	74.63±6.97	77.32±7.94	3.60
Non-dippers	124.52±10.39	123.33±13.56	-0.95	78.78±8.46	77.41±9.80	-1.74

All data are expressed as number(percentage) or mean±standard deviation. ABPM SBP- ambulatory blood pressure monitoring systolic blood pressure, ABPM DBP- ambulatory blood pressure monitoring diastolic blood pressure

Table 6: Night ambulatory blood pressure monitoring systolic and diastolic blood pressure and nocturnal dipping according nocturnal dipping classification.

Nocturnal dipping classification	Night-time ABPM SBP			Night-time ABPM DBP			Nocturnal dipping		
	Day 1	Day 90	% change	Day 1	Day 90	% change	Before	After	% change
Risers	129.10 ±13.18	120.00 ±18.96	-7.05	75.10 ±6.14	66.10 ±9.41	-11.98	-5.47 ±3.52	3.79 ±8.72	-169.34
Extreme dippers	108.00 ±8.60	105.00 ±6.53	-2.78	65.00 ±4.97	61.00 ±5.10	-6.15	25.28 ±4.06	13.25 ±1.19	-47.58
Dippers	103.58 ±8.75	111.16 ±8.27	7.32	62.21 ±6.07	67.89 ±6.35	9.14	13.61 ±2.53	7.66 ±9.16	-43.71
Non-dippers	118.07 ±9.30	115.44 ±15.39	-2.23	73.11 ±6.67	70.48 ±9.72	-3.60	5.11 ±2.56	5.01 ±8.87	-1.93

All data are expressed as number(percentage) or mean±standard deviation. ABPM SBP- ambulatory blood pressure monitoring systolic blood pressure, ABPM DBP- ambulatory blood pressure monitoring diastolic blood pressure

Weight, body mass index, abdominal girth, SBP, DBP, daytime ABPM SBP, daytime ABPM DBP, night-time ABPM SBP, Night-time ABPM DBP, and nocturnal dipping are detailed in Tables 3, 4, 5, and 6.

Adherence to medication

At baseline, 32 patients adhered to angiotensin receptor blockers, however this dropped to 17 at the 90-day follow-up. Calcium channel blockers were adhered to by 18 patients at baseline, decreasing to 4, while beta blockers were used by 17 patients and also dropped to 4 by the 90-day follow-up. Details of adherence to medication is outlined in Table 7. The details of diet kits are given in Figure 1.

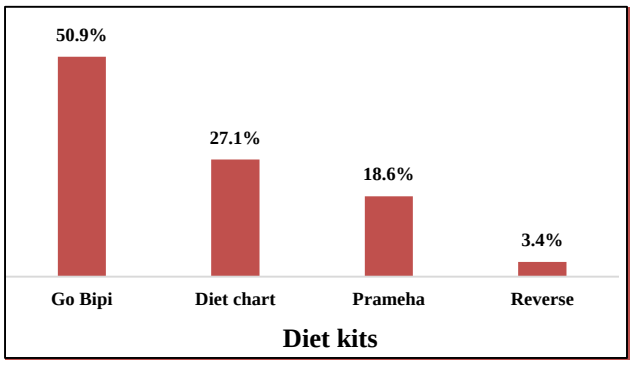

Figure 1: Diet kit details.

Table 7: Adherence to medication.

Medication	Day 1	Day 90	Percent change
Angiotensin receptor blockers	32	17	-46.88
Calcium channel blocker	18	4	-77.78
Beta blocker	17	4	-76.78
Diuretics	11	1	-90.91
Angiotensin converting enzyme inhibitor	2	0	-100
Alpha blocker	1	1	0
Alpha and beta blocker	1	1	0

DISCUSSION

Healthcare accessibility remains a significant challenge, especially in rural India, leading to under diagnosis and contributing to the country's disease burden, especially in conditions like hypertension. This condition often results in income loss and disability. Despite existing guidelines, hypertension's prevalence continues to rise. Ayurvedic medicines and interventions offer a promising alternative to allopathic medicines. The BPMP combines Panchakarma and diet management to treat hypertension, effectively lowering blood pressure by reducing sympathetic over activity and excess sodium.

Additionally, rose fragrance has been shown to decrease sympathetic activity, likely through relaxation induced by pleasant smells and increased binding of essential oil components to gamma-aminobutyric acid inhibitory receptors in brain.[8] *Nardostachys Jatamasi* reduces of stress and has antioxidant and cardio protective effects.[9]

Studies support the effectiveness of Panchakarma in managing hypertension. A study of 29 elderly male hypertensive patients documented decrease in SBP (day 1: 150.67±12.97 and day 90: 126±13.01) and DBP (day 1: 87.7917±7.72 an day 90: 76.917±7.59).[10] Similarly, another study of 28 overweight/obese male hypertensive patients reported decrease in SBP (day 1: 153.5±9.6 mmHg and day 90: 127.80±10.23 mmHg) and DBP (day 1: 91.60±9.13 mmHg and day 90: 78.64±6.92 mmHg).[11]

Nocturnal blood pressure dipping is defined as the physiological decrease in nocturnal blood pressure relative to daytime blood pressure- a decrease of 10-20% is considered normal. According to the American Heart Association Council on High Blood Pressure Research, the European Society of Hypertension and the Japanese Society of Hypertension, >120/70 mmHg nocturnal blood pressure is considered normal blood pressure whereas >125/75 mmHg is deemed abnormal.[12-14] A large systematic review of more than 23,856 hypertensive patients from Asia, Europe, and South America revealed that nocturnal blood pressure is a significant risk factor for cardiovascular mortality in hypertensive and non-hypertensive patients even when adjustments were made for daytime blood pressure.[15] The current study focussed on use of ABPM measurements after Panchakarma therapy. In the current study, daytime ABPM SBP decreased (day 1: 123.71±11.83 mmHg and day 90: 123.12±12.36 mmHg) night-time ABPM SBP decreased (day 1: 114.76±13.41 mmHg and day 90: 114.31±14.40 mmHg), daytime ABPM DBP reduced (day 1: 77.03±8.28 mmHg and day 90: 76.31±9.45 mmHg), night-time ABPM DBP decreased (day 1: day 1: 69.53±8.32 mmHg and day 90: 68.42±8.85 mmHg and nocturnal dipping (day 1: 7.08±8.19 mmHg and day 90: 6.08±8.99 mmHg).

There are a few limitations of the current study that deserve mention. The first is the small sample size. The second was the retrospective, single-arm study design due to which the study findings may not be generalised. Thirdly, the short follow-up duration limits insights regarding long-term outcomes. A prospective, comparative study of larger sample size and longer follow-up duration may provide further insights towards the long-term outcomes of the BPMP program in the management of hypertension.

CONCLUSION

The Ayurveda-based BPMP effectively reduces blood pressure and dependency of allopathic medication. It also improves quality of life of patients diagnosed with primary/essential hypertension.

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