



## Role of naturopathy and yoga treatment in the management of hypertension

S.N. Murthy\*, N.S.N. Rao, Babina Nandkumar, Avinash Kadam

INYS Medical Research Society, Jindal Naturecure Institute, Jindal Nagar, Bangalore 560073, India

### A B S T R A C T

#### Keywords:

Hypertension  
Naturopathy  
Yoga  
Non-pharmacological therapy

**Aim:** The primary aim was to study the effect of naturopathy and yoga interventions in treatment of mild to moderate hypertension.

**Design:** The variables of interest were measured at the beginning and end of the intervention using a pre-post design.

**Setting:** The study was conducted by INYS medical research society in Jindal Nature Cure Institute, Bangalore.  
**Subjects:** A total of 104 subjects, already diagnosed with mild to moderate hypertension and on treatment with antihypertensive medicines were included in study.

**Interventions:** The intervention consisted of various inpatient administration of different naturopathy treatments, yoga therapies, low calorie and low sodium diet for 21 days. Antihypertensive medicines were withdrawn for some patients in one week based upon response to the treatment.

**Outcome measures:** The outcome measures were values of diastolic and systolic blood pressure and body weight. Subjects were followed for a period of one year after every 3 months.

**Results:** After starting nonpharmacological approach of naturopathy and yoga, Systolic blood pressure came down from mean of 139.6 to 129.6 where as it came down from 91.2 to 86.1 for diastolic blood pressure. At the same time favorable effect was also seen in other variables like lipid profile and body weight. At the end of one year out of 57 patients who came for follow-up, 14 cases were found to have blood pressure within normal ranges without any medication over the previous 12 months.

**Conclusion:** Naturopathy and yoga therapy can be considered as a valuable nonpharmacological approach in treatment of hypertension

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### 1. Introduction

Hypertension is a chronic lifestyle disease affecting large numbers of the population worldwide. According to a report nearly one billion adults had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025.<sup>1</sup> It exposes patients to numerous macro/micro vascular complications and subjects with hypertension are known to have a two-fold higher risk of developing coronary artery disease, four times higher risk of congestive heart failure and seven times higher risk of cerebrovascular disease compared to normotensive subjects.<sup>2</sup> Hypertension has become an important public-health challenge worldwide and its prevention, detection, treatment, and control should receive high priority.<sup>1</sup> It is important to maintain blood pressure within the normal range.<sup>3</sup> Several non-pharmacological methods are advocated for controlling normal blood pressure (BP)<sup>4</sup> and one important factor is physical activity.<sup>5–7</sup> Studies have also shown beneficial effects of other relaxation techniques and stress management programs.<sup>8–10</sup> Yoga has shown to have a favorable

metabolic effect on body.<sup>11</sup> These interventions modify certain risk factors responsible for the development of hypertension.

Naturopathy and Yoga advocate a lifestyle as near to Nature as possible. They also counteract mind body dualism. In Nature cure treatments comprehensive healthy life style changes are introduced through Diet therapy and other Nature-cure treatments. One study highlighted the effectiveness of physical exercise, salt intake reduction and yoga in prevention and control of hypertension among young adults.<sup>12</sup> Another study documented that naturopathy treatment has a long term positive effect on overall quality of life.<sup>13</sup>

The present study was conducted to study the efficacy of the combined effects of naturecure and yoga approaches in the management of hypertension the efficacy of combined effect of Nature cure and yoga approach in the Management of Hypertension.

### 2. Material and methods

#### 2.1. Study population

The study was carried out by the INYS Medical Research Society, Bangalore. Ethical approval was obtained from the Institutional

\* Corresponding author. Tel.: +91 80 23717777.

E-mail address: [inysmrs@jindalnaturecure.org](mailto:inysmrs@jindalnaturecure.org) (S.N. Murthy).

Ethics Committee. Patients who were known hypertensive and on treatment to manage their hypertension with antihypertensive drugs were screened after providing information about the study and a signed informed consent was obtained from all patients. Patients diagnosed with mild to moderate hypertension<sup>14</sup> were included in the study. Patients suffering from cardiac or renal problems/lesions, cardio-megaly and disease of the lungs such as emphysema, cystic disease and others which may affect the outcome of the interventions were excluded from the study.

A total of 104 subjects were enrolled in the study between 2006 to 2009. The study intervention consisted of a 21 day inpatient, pre approved protocol of naturopathy and yoga. Patients were assessed at admission and upon discharge. Assessments were also done on follow-up visit after 3 months, 6 months, 9 months and 12 months.

## 2.2. Treatment modalities

During the three week treatment period following the treatment procedures were adopted.

### 2.2.1. Naturopathy

Cold Spinal Bath for 10–15 min, Ice Massage to head and spine – for 20 min, Hot Foot Immersion with ice bag to head and neck, Oxygen Bath, Massage (Reverse Direction), Cold Immersion Bath with friction, Mud Bath, Cold/Neutral Chest Packs 45–60 min.

### 2.2.2. Dietary management

Diet with the following dietary intake was prescribed as per accepted standards.<sup>15,16</sup>

A Low calorie diet containing of about 50 g protein, 40–50 g fats partly as vegetable oil, easily digestible carbohydrates, Low sodium diet (not more than 5 g sodium chloride a day), All fruits and vegetables rich in potassium.

### 2.2.3. Yogic treatment

The principles of Yoga Therapy used in the management of Hypertension were (i) Deep relaxation at both physical and mental levels, (ii) Revitalization of blood vessels and heart, Yogic kriyas and yoga asanas were performed for 30 min. Patients with severe hypertension were made to start with relaxation asana, Savasana and Makarasana. Gradually standing and sitting postures were introduced. As the techniques of relaxation were learnt, more difficult asanas were introduced. Normalization of breath and development of awareness regarding breathing were accomplished by breathing practices and sectional breathing. Revitalization of the organs and toning up of the nervous system were practiced with the use of Pranayama. These interventions were in conformity with approaches adopted in other studies.<sup>6–11,17</sup>

The entire treatment period extended for three weeks. Depending on response to the treatment, the patient's antihypertensive medications were withdrawn for some patients. This was based upon the judgment of the treating physician.

## 2.3. Assessment parameters

A detailed physical examination of each patient was carried out on inclusion in the study. Parameters checked included weight, systolic diastolic blood pressure and lipid profile. Patients were advised to practice yoga and naturopathy treatment after discharge. Anti hypertensive medications were started by the treating physician if hypertension had not been normalised with yoga and naturopathy treatment alone. Commencement of anti-hypertensive medications were also considered as a parameter and followed up on every visit by patient.

## 2.4. Statistical analysis

Statistical significance of mean changes from admission to discharge; in the above parameters were assessed using paired *t*-tests. Repeated measures analysis of variance were conducted in the presence of other confounding factors i.e. diabetes, and these were assessed to examine its influence on the changes. The correlation coefficient was calculated to ascertain any correlation between weight reduction and blood pressure reduction.

## 3. Results

Out of 104 cases with known hypertension who participated in the study, 70 were diagnosed with hypertension while 34 had diabetes mellitus in addition to hypertension.

At the time of admission all the patients were on antihypertensive medication. 40 were recorded to have blood pressure within the normal range with their present medications. The remaining 64 were recorded to have hypertension despite being on antihypertensive medication (Table 1). It is notable that upon discharge following the protocol, the number of subjects with normal blood pressure increased to 97 (93.26%) of which 53 (54.63%) were no longer receiving anti-hypertensive medication (Table 2).

All patients were followed up for a period of one year post-discharge. The number of patients who reported for follow up were 74 (71.1%) at three months, 68 (65.%) at six months, 62 (57%) at nine months and 57 (54%) at one year (Table 2).

## 4. Responses on blood pressure at discharge

Since all the patients were on antihypertensive drugs at admission, their blood pressure values of both systolic and diastolic upon admission were not excessively high. Antihypertensive drugs were withdrawn in 53 subjects as their blood pressure reduced substantially during the treatment protocol. Patients showed a significant reduction in their blood pressure at discharge after naturopathy treatment (Table 1). There was a mean reduction of 10 mm/hg of systolic pressure and 5.1 mm/hg in diastolic pressure in patients overall. The mean blood pressure of the 53 subjects from whom antihypertensive drugs were withdrawn reduced significantly from 140.4 ( $\pm 13.66$ ) to 124.37 ( $\pm 11.42$ ) for systolic and from

**Table 1**  
Blood pressure status at admission and discharge.

Blood Pressure	Follow up period	No. of cases	Mean	Std. deviation	Difference	P Value
Systolic B.P. (mm/hg)	On Admission	104	139.6	16.12	10	0.001
	On Discharge	104	129.6	10.44		
Diastolic B.P. (mm/hg)	On Admission	104	91.2	9.79	5.1	0.001
	On Discharge	104	86.1	5.59		

**Table 2**

Visit wise followup status of subjects.

Follow up status	Admission	Discharge	3 months	6 months	9 months	12 months
Number of subjects whose data was available on follow-up visits	104	104	74	68	62	57
Number of subjects whose data was not available on follow-up visits	NA	NA	30	36	42	47
Number of subjects with blood pressure in normal limits with or without medication	40	97	64	53	50	45
Number of subjects with blood pressure in normal limits without medication	0	53	29	24	19	14

NA, not applicable.

93.2 ( $\pm 9.9$ ) to 82.9 ( $\pm 6.9$ ) for diastolic blood pressure ( $P < 0.001$  in both cases).

### 5. Influence of co-morbidity of diabetes on improvement in blood pressure

On admission, patients who were only hypertensive and those who had co-morbidity of diabetes had mean systolic blood pressures of 139.2 and 140.6 respectively. This difference was not statistically significant. Mean diastolic pressure in the two groups were respectively 93.0 and 87.8. (Table 3)

On discharge, patients who were only hypertensive and those who had co-morbidity of diabetes had mean systolic blood pressures of 128.3 and 132.2 which were not statistically significant. Mean diastolic pressure at discharge in the two groups were respectively 86.3 and 85.8 which were also not statistically significantly (Table 3).

These results indicate that irrespective of the presence of co-morbidity of diabetes naturopathy treatment is beneficial in bringing down the blood pressure.

### 6. Relationship between reduction in blood pressure and body weight of patients

The body weight of patients reduced from a mean of 73.7 kg (S.D. 14.38) to 68.3 (S.D. 12.84) i.e. by 5.3 kg at the time discharge which was statistically significant ( $P < 0.001$ ). Further it was observed that there was a significant positive correlation between reduction in blood pressure and reduction in body weight with a correlation coefficient of  $r = 0.28$  ( $P < 0.01$ ) for Systolic B.P. and  $r = 0.21$  ( $P < 0.03$ ) for diastolic B.P. Regression coefficients were also significant. With every decrease of one kg body weight systolic B.P. decreased by 1.3 mmHg and diastolic B.P. by 0.7 mmHg, within an intervention period of one month.

### 7. Responses on blood pressure levels during follow up periods

There was a significant increase in total number of patients who maintained their blood pressure at normal levels in follow-up period as compared to the baseline status. Though it was observed that varying proportion of patients reverted back to medication

during the follow up period for control of blood pressure, there were quite a large proportion of subjects who did not require any medication for controlling blood pressure up to varying periods. Of the patients who turned up for follow up, number of patients who maintained their blood pressure in normal ranges without anti hypertensive drugs were 29 (39.18%) at three months, 24 (37.5%) at six months, 19 (30.64%) at nine months and 14 (24.56%) at one year (Table 2).

### 8. Response on weight and lipid profile

There was significant reduction in values of cholesterol, Triglycerides and LDL. No significant reduction was seen in HDL. Weight of subjects also reduced significantly because of naturopathy and yoga interventions by a mean of 5.3 kg at the end of 3rd week. (Table 4).

### 9. Discussion

Role of life style modifications in the case of reducing blood pressure has been widely illustrated in many studies.<sup>6–8,12</sup> Increasing aerobic physical activity such as brisk walking, jogging, swimming or cycling has been shown to lower blood pressure.<sup>6,7,18</sup> A meta-analysis of 54 randomized controlled trials showed a net reduction of 3.8 mm Hg in systolic and 2.6 mm Hg in diastolic BP in individuals performing aerobic exercises, compared to controls.<sup>18</sup> Physical activity has been shown to reduce systemic vascular resistance, most likely due to a decrease in the activity of the sympathetic nervous system. This is evidenced by lower plasma nor epinephrine levels in exercising individuals compared to sedentary ones.<sup>19</sup> Also, there is a decrease in plasma rennin activity,<sup>20</sup> which could be a function of reduced sympathetic tone. Reduction of insulin resistance and improvement in endothelial function may also contribute.<sup>21,22</sup> Importantly, this reduction appeared to be independent of the intensity, frequency and type of exercise program. Dietary practices especially adapting to vegetarian diets reduced systolic BP by approximately 5 mmHg but had equivocal effects on diastolic BP. Cereals however have been seen to raise BP levels.<sup>23</sup>

Transcendental meditation was seen in one study to reduce systolic and diastolic blood pressures by 10.7 mmHg and 6.4 mmHg respectively over a period of 3 months.<sup>24</sup> Progressive muscle

**Table 3**

Comparison of blood pressure according to co-morbidity of diabetes.

	Morbidity status	N	Mean	Std. Deviation	t	P
Systolic B.P. on admission (mm/hg)	HTN	69	139.2029	16.3064	0.416	0.67
	DM & HTN	35	140.6000	15.9562		
Systolic B.P. on discharge (mm/hg)	HTN	70	128.3429	10.2715	1.799	0.07
	DM & HTN	35	132.1714	10.3056		
Diastolic B.P. on admission (mm/hg)	HTN	69	93.0145	10.0037	2.656	0.010
	DM & HTN	35	87.7714	8.4404		
Diastolic B.P. on discharge (mm/hg)	HTN	70	86.2571	5.8969	0.370	0.71
	DM & HTN	35	85.8	4.93		

Note: DM: Diabetes, HTN: hypertension.

**Table 4**  
Effect of intervention on values of lipid profile and weight.

Variable	On admission	On discharge	Difference	P value
Cholesterol (mg/dl)	214.15 (46.5)	187.33 (33.6)	26.8	0.00
Triglycerides (mg/dl)	189.2 (76.5)	140.29 (39.8)	49.02	0.00
LDL (mg/dl)	129.5 (45.8)	114.3 (31.7)	15.24	0.00
HDL (mg/dl)	47.32 (9.2)	45.92 (5.3)	1.4	0.08
Weight (kgs) (mg/dl)	75.04 (12.4)	69.75 (11.5)	5.3	0.00

Figures in parenthesis refer to S.D.

relaxation lowered systolic pressure by 4.7 mmHg and diastolic pressure by 3.3 mmHg.<sup>24</sup> Yoga is also widely believed to reduce blood pressures.<sup>25</sup>

In the present study, mean blood pressure came down from 139.6 to 129.6 in the case of Systolic blood pressure while it came down from 91.2 to 86.1 for diastolic blood pressure. The results obtained in the present study are corroborated by other studies which indicate that life style modifications can improve blood pressure levels even in normotensives.<sup>18</sup> From findings of present study it can be concluded that nonpharmacological therapy of naturopathy and yoga is effective in reducing blood pressure in patients with mild to moderate hypertension even without any pharmacological intervention in some cases. Thus yoga and naturopathy can be useful for patients newly diagnosed with hypertension. It can also be used in prehypertensive cases to delay onset of hypertension and avoid cardio vascular complications.

In the present study normal blood pressure levels were maintained even at the end of one year by 13% of the cases treated (24% of follow-up cases), without any other medication.

Co-morbidity of diabetes did not influence the improvement observed with blood pressure values from this we can say that naturopathy and yoga treatment is effective in controlling blood pressure in those suffering from diabetes as effectively as those without diabetes.

Overweight (body mass index  $\geq 25$  kg/m<sup>2</sup>) have been seen in epidemiologic studies to be an important risk factor for higher blood pressure, and there seems to be a linear relation between body weight and blood pressure.<sup>26</sup> In the present study the body weight decreased by a mean of 5.3 kg, which is an associated factor in reducing blood pressure level as illustrated by above quoted studies. Favorable changes were also seen in lipid profile except that in levels of HDL. Thus naturopathy not only reduces blood pressure but also has a positive impact on other risk factors of cardiovascular diseases like Dyslipidemia and obesity.

The limitation of the study was the single arm study design. There exist a difficulty in conducting a randomized controlled trial on some therapeutic procedures like those of naturopathy and yoga as used in present study. The main reason is that people opting for such therapies and coming to naturopathy centre like the one in present study are desirous to undergo naturopathy and yoga therapies and it becomes difficult practically and unethical to allot them to other therapies. Since this study was performed on hypertensive subjects with medication this study highlighted the efficacy of naturopathy and yoga as an add-on therapy in controlling hypertension and reducing the requirement of antihypertensive drugs. A future study could address those individuals deemed to be hypertensive but not yet receiving pharmacotherapy.

This study demonstrated that through the approaches of life style modifications and various therapies practiced in Naturopathy and Yogic exercises, hypertension can be controlled and the improvements attained can be sustained by following the same principles. Naturopathy and yoga therapy can thus be considered as an important nonpharmacological approach in treatment of hypertension.

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