



## Effectiveness of beetroot juice on blood pressure among hypertensive clients

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### Abstract

Blood pressure is the blood pushing against the walls of arteries. In worldwide, 1.13 billion people have hypertension. Hypertension is the major health problem throughout the world. Hypertension has identified and unidentified cause.

**Objectives:** The present study aims to evaluate the effectiveness of beetroot juice on blood pressure level among hypertensive clients.

**Methodology:** Quasi experimental non randomized control design was used. 60 samples were selected by purposive sampling technique with 30 samples in each group. A self-structured questionnaire method was used to collect the data. The data were tabulated and analyzed by descriptive and inferential statistics.

**Results:** The finding of the study reveals that 13.34% (4) has normal level of blood pressure, 43.3% (13) has SBP 120-139mmHg and DSB 80-99mmHg level of blood pressure and 43.3% (13) has SBP above 140 mmHg and DSB above 90mmHg of blood pressure level. It is found to be statistically significant ( $p = 0.001$ ).

**Keywords:** Blood pressure, beetroot juice, hypertension.

### Introduction

Hypertension is the major health problem in the world. According to American Heart Association, High blood pressure is when your blood pressure, the force of your blood pushing against the wall of your blood vessels, is consistently too high [1]. According to WORLD HEALTH ORGANIZATION, "Blood pressure is the force exerted by circulating blood against the wall of the body's arteries, the major blood vessels in the body [2].

In worldwide 1.13 billion people have hypertension? In India 19.4% have hypertension. 14.4% are male and 23.4% are female of above 35 years. The international journal of public health reported in 11 villages, 21.4% with hypertension about 10,500 people [3]. The ICMR – INDIAB study in India has shown the prevalence of hypertension to be 31.5% in urban and 26.2% in rural of Tamilnadu. (Krishnan Swami Nathan, KMCH research foundation, Hospital, Coimbatore, Tamil Nadu, India, 2019) [4]. The prevalence of the hypertension above 35 years is 14.1%. (Neera Gupta, Neeta Kumar, Indian Council of Medical Research, New Delhi, India, 2016) [5].

They classified as primary and secondary hypertension. These causes include renal parenchyma disease, narrowing of the renal arteries, hyperaldosteronism (mineral corticoid hypertension), and pheochromocytoma. They have modified and none modified risk factors in hypertension such as unhealthy diet, obese, and family history, coexisting factor, age. The hypertension medications are classified as Calcium channel blockers, Beta blockers, thiazide, ACE inhibitor, Angiotensin II receptor blockers, alpha blockers and

Vasodilator [6]. The researcher found that daily drink of beetroot juice lowers the blood pressure level of hypertension patients.

The benefits of beetroot juice are lowers blood pressure, improve cognitive function, improve blood flow, improve exercise stamina, prevent from cataract, improve liver function, reduce cholesterol, improve digestion and prevent anemia [7]. In beetroot, greatest effect is nitrate alone, so beetroot is considered as complementary treatment for hypertension because of high content of inorganic nitrate.

The objectives of the present study were

- To assess the pre-test level of blood pressure level among hypertensive clients.
- To evaluate the effectiveness of beetroot juice on blood pressure level among hypertensive clients.
- To determine the association of post-test blood pressure level in hypertensive clients with selected demographic and clinical variable.

### Methodology

**Study Design:** The quantitative approach with quasi experimental non randomized control group design was used in this study. The population of the study included above 35 years of hypertensive clients who residing in Ramanathapuram. 60 samples were selected 30 for experimental and 30 for control group by using a purposive sampling technique. The criteria for sample selection were a) above 35 years with hypertension b) willing to participate c) able to understand Tamil and English are participated in this study. The exclusion criteria were clients with other co-morbidity disease like diabetes mellitus, cardiac disease,

etc., and who are taking hypertensive medications.

**Data Collection:** The data collection period was done with prior permission from the principal, Saveetha College of nursing and village Panchayat head in Ramanathapuram. The purpose of the study was briefly explained to the hypertensive clients and written informed consent obtained from the clients. The demographic data was collected by self-structured questionnaire method was collected from the clients and blood pressure assessed by sphygmomanometer. In experimental group clients, administered 200ml of Beetroot juice in the morning after breakfast for 14days. About 10-15 minutes were spent on each client.

**Statistical Analysis:** Data were analyzed by using descriptive and inferential statistics. The client's characteristics were described using frequency and percentage. Extended McNemar's test is to evaluate the effectiveness of beetroot juice in reducing blood pressure among hypertensive clients. Association between blood

pressure scores with their selected demographic variables among experimental and control group was analyzed using Chi-square test.  $P < 0.05$  was considered as statistically significant.

**Results**

Among 60 samples, based on the demographic variables 56.6% were between 45-55years of age group, 73.33% were female, 100% were married, 40% were secondary school, 46.67% were daily wages, 93.33% number of children were 1- 2 children, 40% were > Rs. 15000, 93.33% were nuclear family, 93.33% were non vegetarian, 80% were family history of hypertension.

Based on the clinical variables, assessment of blood pressure 96.67% had SBP above 140mmHg and DBP above 90mmHg, 50% were moderate worker, 56.66% were BMI of 18-25, 83.33% were no bad habits, 100% sleeps 8 hours per day, 33.33% were full restricted salt and if I like I take of salt diet.

**Table 1:** Pretest and posttest level of blood pressure among experimental group

Level of score	Pre-test		Post-test		Extended McNemar's test
	n	%	n	%	
Normal range – 120/80 mmHg	0	0.00%	4	13.34%	$\chi^2=20.51$ P=0.001*** DF=2(S)
SBP 120-139mmHg and DBP 80-99mmHg	1	3.33%	13	43.33%	
SBP above 140mmHg and DBP above 90mmHg	29	96.67%	13	43.33%	
Total	30	100.00%	30	100.00%	

\*\*\*very high significant at  $p < 0.001$  DF= Degrees of Freedom S= significant

In pre-test, none of the hypertensive clients are having Normal range level of BP score, 3.33% (1) having SBP 120-139mmHg and DBP 80-99mmHg level of BP score and 96.67% (29) are having SBP above 140mmHg and DBP above 90mmHg level of BP score.

In post-test, after beetroot juice, 13.34%(4) of the hypertensive clients are having Normal range level of BP

score, 43.33% (13) having SBP 120-139mmHg and DBP 80-99mmHg level of BP score and 43.33% (13) are having SBP above 140mmHg and DBP above 90mmHg level of BP score.

There is a significant difference between pretest and posttest BP in experimental group.

**Table 2:** Pretest and posttest level of blood pressure among control group.

Level of score	Pre-test		Post-test		Extended McNemar's test
	n	%	n	%	
Normal range – 120/80 mmHg	0	0.00%	0	0.00%	$\chi^2=20.51$ P=0.001*** DF=2(S)
SBP 120-139mmHg and DBP 80-99mmHg	1	3.33%	5	16.67%	
SBP above 140mmHg and DBP above 90mmHg	29	96.67%	25	83.33%	
Total	30	100.00%	30	100.00%	

\*\*\*very high significant at  $p < 0.001$  DF= Degrees of Freedom S= significant

In control group, in pretest, none of the hypertensive clients are having normal range level of BP score, 3.33% (1) having SBP 120-139mmHg and DBP 80-99mmHg level of BP score and 96.67% (29) are having SBP above 140mmHg and DBP above 90mmHg level of BP score. In posttest, none of the hypertensive clients are having Normal range level of BP score, 16.67% (5) are having SBP 120-139mmHg and DBP 80-99mmHg level of BP score and 83.33% (25) are having SBP above 140mmHg and DBP above 90mmHg level of BP score. There is no significant difference between pretest and posttest BP in control group. The association between socio demographic variables was analyzed by Chi square test. The association between demographic variable age ( $\chi^2=4.80$ ,  $p=0.05$ ), sex ( $\chi^2=6.14$ ,  $p=0.01$ ), education status ( $\chi^2=5.86$ ,  $p=0.05$ ) had shown statistically significant in experimental group at  $p < 0.05$  level.

**Discussion**

The present study results revealed that 0% had normal blood pressure level, 3.33% had systolic blood pressure 120-139mmHg and Diastolic blood pressure 80-99mmHg level of Blood pressure and 96.67% had Systolic blood pressure above 140mmHg and Diastolic blood pressure above 90mmHg Blood pressure level. In control group, 0% had normal blood pressure level, 3.33% had systolic blood pressure 120-139mmHg and Diastolic blood pressure 80-99mmHg level of Blood pressure and 96.67% had Systolic blood pressure above 140mmHg and Diastolic blood pressure above 90mmHg Blood pressure level.

The present study results were supported by the following studies: Merisa Restiani Arma, Taadii, Sri Sumarni (2020) [8] conducted a Quasi experimental control group pretest-post-test design to assess the pre-test level of blood pressure among 30 postpartum mother with hypertension in Indonesia. The study results showed that in the beet extract

group the mean pretest systolic BP value was  $152.53 \pm 10.993$  with a minimum value of 140 mmHg with a maximum value of 175 mmHg, and then the pretest diastolic BP value was  $95.80 \pm 8.19$  with a minimum value of 83 mmHg with a maximum value of 115 mmHg. Likewise in the control group, the mean pretest systolic BP was  $149.80 \pm 9.601$  with a minimum value of 140 mmHg with a maximum value of 179 mmHg, then pretest diastolic BP  $97.27 \pm 6.408$  with a minimum value of 85 mmHg with a maximum value of 112 mmHg<sup>[8]</sup>. M Soumya, VL Snehaleeza (2020) conducted a quasi-experimental study to assess the pre-test level of blood pressure among 35 patients of hypertension in Ambalappuzha. The results showed that  $148.13 \pm 5.36$  of systolic blood pressure and  $92.52 \pm 3.05$  of diastolic blood pressure<sup>[9]</sup>.

**Objective 2:** To evaluate the effectiveness of beetroot juice on blood pressure level among hypertensive clients.

Effectiveness of beetroot juice findings shows that in experimental group, 13.33% had Normal range level of BP, 43.33% had SBP 120-139mmHg and DBP 80-99mmHg level of BP and 43.33% had SBP above 140mmHg and DBP above 90mmHg level of BP.

The present study results were supported by the following studies: B. Cynosure Sharma, Mrs. Girija Bhaskaran and Dr.V. Hemavathy (2019)<sup>[10]</sup> performed a quasi-one group pre and post-test experimental study to assess the effectiveness of beetroot juice among 60 hypertensive clients in Sree Balaji Medical College and Hospital, Chennai. The findings of the study shows that before intervention the mean value of systolic blood pressure is 147.3 and after intervention the mean value of systolic blood pressure is 133.7 and before intervention the standard deviation value is 13.2 and after intervention 18.7. Before intervention the mean value of diastolic blood pressure is 92.7 and after intervention 85.3 and before intervention its standard deviation value is 4.9 and after intervention is 8.1. To test the significance 't' test has been applied. The overall paired 't' test value is 9.3 and 9.7<sup>[10]</sup>.

The present study results revealed that the association between demographic variable age ( $\chi^2=4.80$ ,  $p=0.05$ ), sex ( $\chi^2=6.14$ ,  $p=0.01$ ), education status ( $\chi^2=5.86$ ,  $p=0.05$ ) had shown statistically significant in experimental group at  $p < 0.05$  level.

The present study results were supported by the following studies: Liza Mahida, Siddaram Sarate (2020)<sup>[11]</sup> conducted a quasi-experimental study to associate the post-test level of blood pressure among post-menopausal women in Gujarat. The findings shows that unpaired t test was carried out to assess significant change in Blood pressure level in both the groups. The calculated value was obtained t value = 9.445, Table value = 2.0 (P = 0.000). It suggests that there was significant change in Blood pressure level in both groups. The calculated Chi square ( $\chi^2$ ) value = 9.495, Table value = 5.9 (P=0.013) exhibit there was significant association between elevated blood pressure of post menopause women and BMI in control group as well as experimental group.<sup>[11]</sup> Kyle Raubenheimer, Danica Hickey, et, al., (2017)<sup>[12]</sup> performed a randomized, Placebo-Controlled crossover Study design to assess the association of posttest level of blood pressure among older adult in Queensland university. The results showed that the number of blood CD11b-expressing granulocytes decreased 3 h following HI-NI beetroot juice intake ( $p < 0.05$ ), statistically significant<sup>[12]</sup>.

## Conclusion

The findings of the present study concluded that, Beetroot juice is found to be effective in reducing the blood pressure among hypertensive clients in experimental group and it is significantly improved in the post test level of blood pressure.

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