

NUTRACEUTICAL EFFECT OF ALLIUM SATIVUM ON BLOOD PRESSURE IN PATIENT WITH HYPERTENSION

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Abstract

Hypertension (HT), high blood pressure or arterial HT, is a chronic medical condition in which the pressure or tension exerted by the blood on the arteries and the venous blood vessels is called blood pressure. Dietary and lifestyle changes can improve blood pressure and decrease the risk of health complications. Although treatment with medication is still often necessary in people for whom lifestyle changes are not enough or not effective. Generally, the herbs and spices cause lesser side effects and even perhaps increase longevity. Garlic is one such miracle herb that has been held in high esteem for over 6000 years. Garlic contains small amounts of selenium and germanium. Selenium is believed to prevent abnormal blood clotting, to normalize

blood pressure, and to prevent infections. There have been numerous clinical trials and research based studies to establish the effect of garlic in the treatment of hypertension.

Objectives:

To study the efficacy of garlic in the management of Hypertension.

Methodology: Total 30 patients with hypertension were selected using randomized purposive sampling and divided as control group (15) with only medication and experimental group (15) with both medication and supplementation of garlic pods in the dosage of 2 pods per day in the morning on empty stomach for a period of 2 months. Both the groups are assessed with the specific Objective parameters before and

after study period and at a regular interval of 30 days were reviewed.

Results:

Significantly there was a greater decrease in systolic blood pressure ($P=0.072$) and Diastolic Blood Pressure ($P= 0.164$) among the experimental group; similarly the lipid profile was positively correlated with TC, TGL, LDL, HDL and VLDL parameters. Noticeably there was significant decrease in all the parameters among the control group; however a less significant effect was observed in comparison to experimental group. Findings illustrate the definite marked effect of garlic in controlling the blood pressure.

Key Words: Garlic, Selenium, Blood pressure, HDL

Introduction

Hypertension (HT), high blood pressure or arterial HT, is a chronic medical condition in which the pressure or tension exerted by the blood on the arteries and the venous blood vessels is called blood

pressure. High blood pressure occurs when the blood is pumped by the heart through the system that is abnormally fast and powerful. This sustained greater than normal force and pressure can cause damage to the arteries.^{1,2} The prevalence of hypertension in the urban population was estimated to be 40.8% and that of hypertension in the rural population was 17.9%. It is evident that the prevalence of hypertension is significantly higher in the urban population of India compared to the rural.³

The risk of high blood pressure increases as age, family history, lack of physical activity risk increases being overweight or obese, high alcohol consumption, smoking or chewing tobacco high sodium and low potassium in the diet, stress certain chronic conditions etc. Hypertension is rarely accompanied by any symptoms, and its identification is usually through screening, or when seeking healthcare for an unrelated problem. Fatigue or confusion, vision problems, chest pain, difficulty breathing,

irregular heartbeat, blood in the urine, headaches (particularly at the back of the head and in the morning), light headedness, vertigo, tinnitus (buzzing or hissing in the ears), altered vision, fainting episodes, anxiety, pounding in your chest, neck, or ears etc., are some of the signs and symptoms.⁴

Dietary and lifestyle changes can improve blood pressure control and decrease the risk of health complications, although treatment with medication is still often necessary in people for whom lifestyle changes are not enough or not effective.⁵ However, despite this one can still take recourse to natural wonders or miracle herbs and spices for the cure of illnesses. Generally, these herbs and spices cause lesser side effects and even perhaps increase your longevity. Garlic is one such miracle herb that has been held in high esteem for over 6000 years.⁶

Garlic (*Allium sativum*) is a bulbous plant. It is a perennial bulb made up of 7-35 divided cloves or bulblets that are covered in papery, transparently white glistening skin.

The medicinal part of the plant is the bulb. The peculiar strong scent of garlic is due to its sulfur containing compound or volatile oil known as Allicin. Garlic contains small amounts of selenium and germanium. Selenium is believed to prevent abnormal blood clotting, to normalize blood pressure, and to prevent infections. Garlic is used for many conditions related to the heart and blood system. These conditions include high blood pressure, high cholesterol, coronary disease, heart, and “hardening of the arteries” (atherosclerosis).^{7,8,9,10}

There have been numerous clinical trials and research based studies to establish the effect of garlic in the treatment of hypertension. These studies have not only studied the effect of garlic on blood pressure relative to placebo and other antihypertensive agents, but also garlic by itself in blood pressure management.^{11,12} As a common consensus, garlic has been shown to cause a significant reduction in systolic blood pressure (SBP) with a slightly lesser reduction in diastolic blood pressure (DBP), as comparable

to patients given a placebo, in mild or moderate hypertension. This report is validated when there are other lifestyle changes such as weight loss, reduced salt intake, stress reduction etc; together with taking garlic as a supplement.^{13,14}

The ability of garlic to significantly reduce the risk of suffering from hypertension can be attributed to the presence of an active substance known as garlic sulphides and allicin. Allicin is a substance which is said to work in relaxing blood vessels while also reducing any pressure and damage affecting blood. It also interferes with the effects of angiotensin I enzyme in elevating blood pressure and smoothly contracting muscles. Garlic has the ability to stimulate hydrogen sulphide and nitric oxide synthase production. Garlic also helps in lowering cholesterol levels. Its ability to break down fibrinolytic activity in a person's blood is also a huge help in reducing the level of cholesterol and platelet aggregation.^{15, 16,17}

Consuming garlic in the natural or raw

form every day is needed to get the therapeutic benefit for the treatment of hypertension as Allicin can be destroyed by cooking and even by cutting in seconds. It has no complications and side effects and an alternative therapy that helps to reduce hypertension.¹⁸⁻²¹

Objective:

In accordance to focus on alternative, safe, natural and cost effective approach towards management of hypertension; the present study was taken to evaluate the potential efficacy of garlic in lowering the blood pressure and also the lipid profile in the hypertensive patients

Methodology:

This experimental clinical study was undertaken on 38 hypertensive patients aged 35 to 60 years visiting to the hospital for treatment. The subjects were divided into two groups of 19 each using purposive sampling method. Control group with only medication and experimental group with medication and supplementing 2-3 garlic cloves (4gms) on empty stomach daily in the morning for a period of three

months with obtaining informed consent from the patient. Objective parameters like blood pressure and lipid profile like LDL, HDL, and VLDL were observed using medical records before and after study period at a regular interval of 30 days. Data established were analyzed and interpreted with percentage, mean scores and P value using statistical software XL STAT

Results and Discussion:

Forty hypertensive subject saged between 35-60 years were included as study participants. About 66% were between age 35 to 45 and 33% were between 46 to 60, with 93% were females and 7% were males. Out of 40 subjects studied, 20 subjects were under control group with only BP medications and 20 subjects were under experimental group who were on medication and also with intervention of 2-3 garlic cloves (4gms) on empty stomach in the morning every day for a period of three months. Both the groups were subjected to objective parameters like blood pressure and lipid profile at an interval of 30 days.

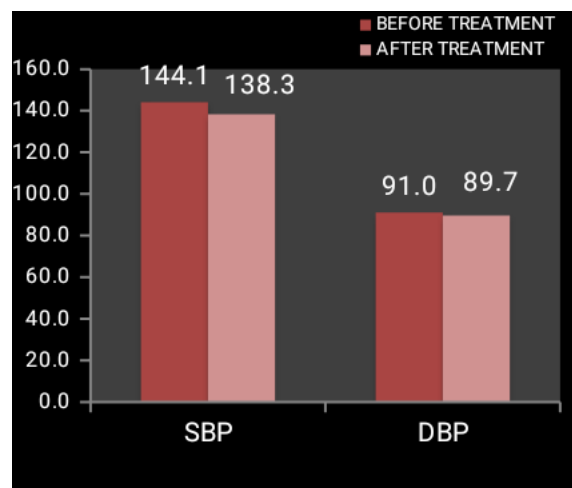
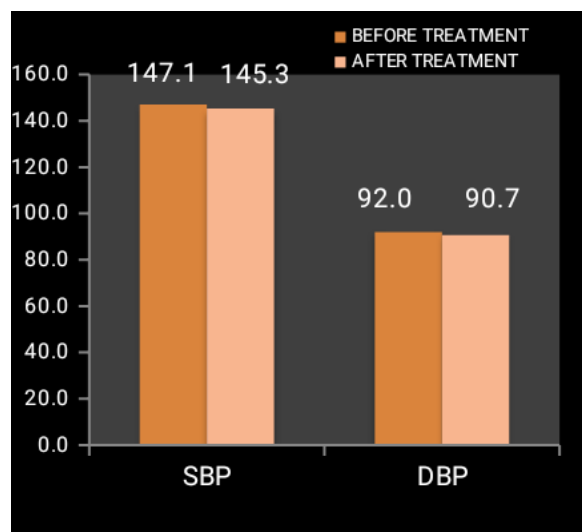


Fig. 01: Mean score distribution of hypertensive patients based on SBP and DBP

The results showed changes in mean SBP or DBP of garlic and control groups before and after intervention (figure. 01). In case of the control group a fairly significant reduction in the SBP from 147.1 to 145.3 mmHg and DBP from 92.0 to 90.7 with P values 0.004, however the

experimental group showed a reduction in SBP from 144.1 to 138.3 and DBP from 91.0 to 89.7 that were marked significant (0.001). There was an average reduction in SBP of 5.8 mmHg in the experimental group, when compared to that of the control group by 1.8mmHg indicating the significant effect with administration of garlic supplement in reducing SBP than DBP. Interestingly similar results with garlic supplementation was demonstrated by other researchers.¹⁵

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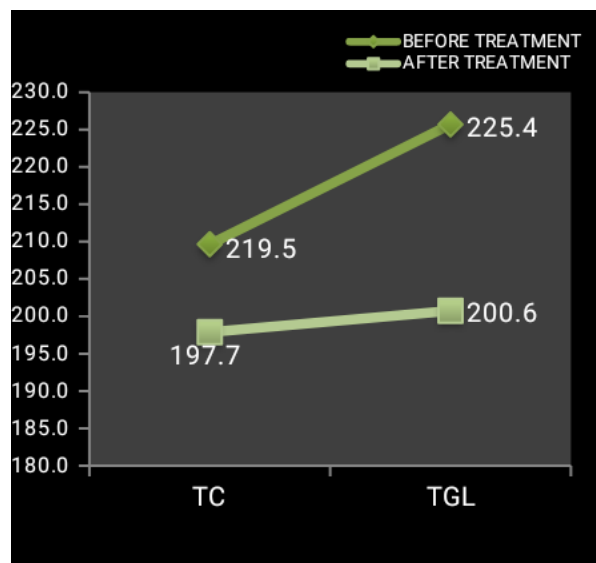
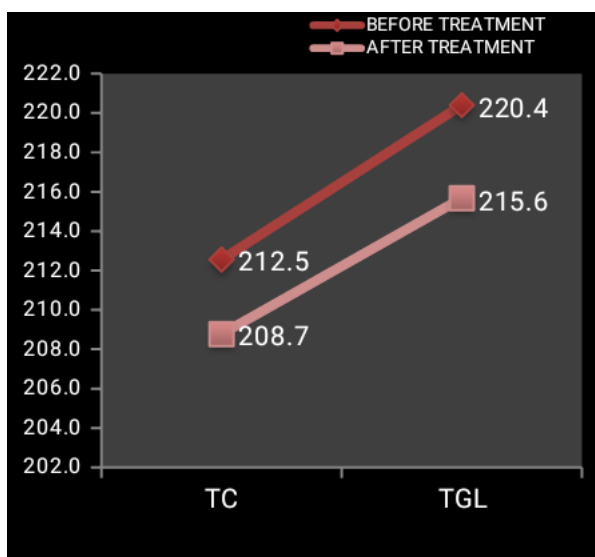


Fig. 02: Mean score distribution of hypertensive patients based on TC and TGL

Mean score distribution of total cholesterol and triglyceride was measured before and after intervention period for three months. Findings from figure 02- showed a significant reduction in both the parameters in both control and experimental group. However, experimental group showed extremely significant reduction with p value 0.0002 compared to the control group with p= 0.003. This shows that garlic has a definite effect on lipid profile also. Similar results were observed by Karin Reid et al.

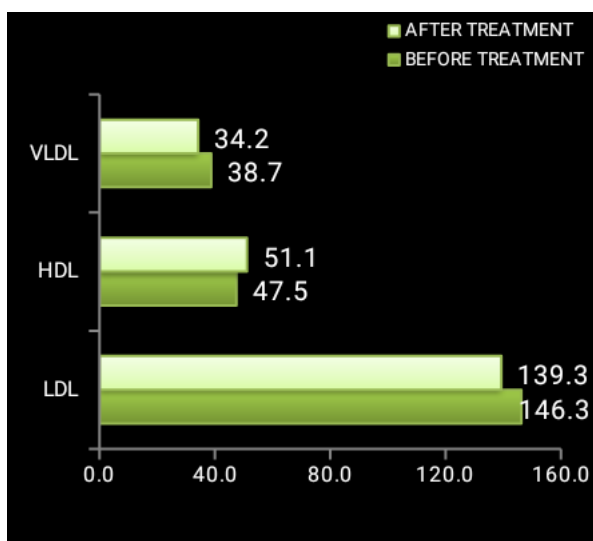
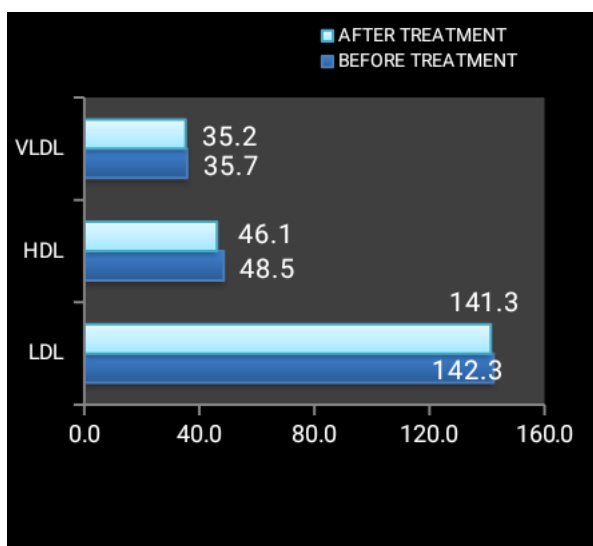


Fig. 03: Mean score distribution of hypertensive patients based on VLDL, HDL and LDL

Results on other lipid parameters were recorded (fig. 03). There was a significant decrease observed in the other parameters of lipid profile with LDL, VLDL and a small increase in HDL in both the control and experimental groups respectively. Garlic therapy is found to be effective in monitoring the blood pressure

level and also maintained the lipid profile towards normalcy among the patients with hypertension.

Conclusion:

Importantly blood pressure and lipid profile indicated to be a key markers in monitoring stress, hypertension and cardiac risks. From the investigation a significant reduction in SBP, DBP, and lipid profile was observed with the intervention of garlic to hypertensive patients along with drug therapy. Thus nutraceutical effects of garlic could be a complementary therapy in treating hypertension and elevated lipid profile.

References:

1. James, PA.; Oparil, S.; Carter, BL.; Cushman, WC.; Dennison-Himmelfarb, C.; Handler, J.; Lackland, DT.; Lefevre, ML. et al. Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)". *JAMA* 311 (5): 2013; 507-20.

2. Carretero OA, Oparil S; Oparil (2000)."Essential hypertension. Part I: definition and etiology". *Circulation* 101 (3): 329–35.
3. Suetsuna K. Isolation and characterization of angiotensin I-converting enzyme inhibitor dipeptides derived from *Allium sativum* L. (garlic). *J NutrBiochem*. 1998;9:415–419.
4. Lewington, S; Clarke, R; Qizilbash, N; Peto, R; Collins, R; Prospective Studies, Collaboration. "Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies.". *Lancet* 360 (9349): 2002; 1903–13.
5. Briganti EM, Shaw JE, Chadban SJ, Zimmet PZ, Welborn TA, McNeil JJ, et al. Untreated hypertension among Australian adults: the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study. *Med J Aust*. 2003; 179:135–139.
6. Ried K, Frank OR, Stocks NP, Fakler P, Sullivan T. Effect of garlic on blood pressure: a systematic review and meta-analysis. *BMC CardiovascDisord*. 2008; 8:13.
7. Rivlin RS. Historical perspective on the use of garlic. *J Nutr*.2001; 131:951S-4S. 15.
8. Petrovska BB, Cekovska S. Extracts from the history and medical properties of garlic. *Pharmacogn Rev* 2010; 4:106-10. 16. Moyers SB. *Garlic in Health, History, and World Cuisine*. St Petersburg: Suncoast Press; 1996; 17.
9. Lawson L. Garlic: A review of its medicinal effects and indicated active compounds. In: Lawson L, Bauer R, editors. *Phytomedicines of Europe: Chemistry and Biological Activity*. Washington, D. C: American Chemical Society; 1998; p. 177 209.
10. Lawson LD, Gardner CD. Composition, stability, and bioavailability of garlic products used in a clinical trial. *J Agric Food Chem*. 2005; 53:6254–6261.
11. Reinhart KM, Coleman CI, Teevan C, Vachhani P, White CM. Effects of garlic on blood pressure in patients with and without systolic hypertension: a meta-analysis. *Ann Pharmacother*. 2008; 42:1766–1771.
12. Ried K, Frank OR, Stocks NP. Aged garlic extract lowers

- blood pressure in patients with treated but uncontrolled hypertension: a randomised controlled trial. *Maturitas*.2010;67:144–150.
- 13.J. S. ThaslimaNandhini, S. Preetha, R. Gayatri Devi. Effect of garlic on blood pressure in hypertensive patients. *Drug Invention Today* | 2018; Vol 10 • Issue 11 •
- 14.Harauma A, Moriguchi T. Aged garlic extract improves blood pressure in spontaneously hypertensive rats more safely than raw garlic. *J Nutr*. 2006; 136:769S–773SS.
- 15.Feyh A, Bracero L, Lakhani HV, Santhanam P, Shapiro JI, Khitan Z, et al. Role of dietary components in modulating hypertension. *J ClinExpCardiol*. 2016; 7:1-15.
- 16.Karin Ried and Peter Fakler, Dovepress, Potential of garlic (*Allium sativum*) in lowering high blood pressure: mechanisms of action and clinical relevance, *Integrated Blood Press Control*. 2014; 7: 71–82.
- 17.Karin Ried, Oliver R Frank, Nigel P Stocks, Peter Fakler, and Thomas Sullivan. Effect of garlic on blood pressure: A systematic review and meta-analysis, *BMC Cardiovasc Disorders*, 2008; 8: 13.
- 18.Silagy Christopher A.; W. Neil, H. Andrew A meta-analysis of the effect of garlic on blood pressure, *Journal of Hypertension*: 1994; p 463-468
- 19.Ried K, Frank OR, Stocks NP. Dark chocolate or tomato extract for prehypertension: a randomised controlled trial. *BMC Complement Altern Med*. 2009; 9:22.
- 20.Rizwan Ashraf et al., Effects of *Allium sativum* (Garlic) on systolic and diastolic blood pressure in patients with essential hypertension, *Pakistan journal of pharmaceutical sciences*: 2013; 26(5):859-63.

