



## EFFECTS OF WITHANIA SOMNIFERA (ASHWAGANDHA) AND TERMINALIA ARJUNA (ARJUNA) ON SYSTOLIC AND DIASTOLIC BLOOD PRESSURE

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### Abstract:

Several medicinal plants have been described to be beneficial for cardiac ailments in Ayurveda- the origin of Indian system of medicine like Ashwagandha and Arjuna but there are no scientific clinical studies showing effects of both of these drugs on blood pressure. The present study was there designed and performed to assess the effects of Withania somnifera (Ashwagandha) and Terminalia arjuna (Arjuna) individually and as a combination on systolic and diastolic blood pressure in humans. After 8 weeks of treatment with Withania somnifera, there was no significant change in systolic and diastolic blood pressure while treatment with Terminalia arjuna decreased the systolic blood pressure significantly from  $123.00 \pm 2.87$  to  $117.80 \pm 1.48$  mmHg but there was no significant change in diastolic blood pressure. After administration of both the drugs in combination the systolic blood pressure fell from  $123.40 \pm 3.13$  to  $118.00 \pm 2.49$  ( $P=0.000$ ) but no significant change was observed in diastolic blood pressure.

### Keywords:

Withania somnifera, Terminalia arjuna, systolic and diastolic blood pressure

### Introduction:

Withania somnifera (WS), also known as Ashwagandha, Indian ginseng, or winter cherry, has been an important herb in the Ayurvedic and indigenous medical systems for over 3000 years. The roots of the plant are categorised as Kapha- vata shamaka (pacifier), balya, Rasayana, medhya rasayana, sedative, diuretic, spermopoetic, rejuvenative, anti-inflammatory, aphrodisiac, anabolic and very nutritious tonic for all age groups. Besides it increases libido, corrects impotence and a good uterine tonic (Sharma, 1983).] Withania somnifera





contains alkaloids (withanine, withasomnin) and steroidal lactones and glycosides also called as withanoloids and sitoindosides and the extract of *Withania somnifera* has analgesic, mildly sedative, anti-inflammatory and anabolic activities (Mishra et. al., 2000). It is also useful in stress, strain, fatigue, pain, skin diseases, diabetes, gastrointestinal disease, rheumatoid arthritis, and epilepsy (Prakash et.al. 2002), chronic fatigue syndrome (Singh et. al., 2002) and even during pregnancy without any side effects (Sharma et. al., 1985 ). *Terminalia arjuna* is widely used in both Ayurvedic system of medicine since ancient time ( Vaghbata, 1200 BC) and (Chakardatta, 1700 BC). In recent past it has been claimed to be effective in ischaemic heart diseases (Satyanarayana et. al.,1999).It has been also used in Unani systems of medicine, primarily for heart ailments. Its bark is useful in the treatment of coronary artery disease, heart failure, hypercholesterolemia, anginal pain ( Miller, 1998) and can be considered as a useful drug for coronary artery disease, hypertension and ischemic cardiomyopathy (Bhatiya, 1998; Takahashi et. al., 1997;Jain et. al.,1992).*Terminalia arjuna* has also cardioprotective property, antiviral activity against HSV-2 (Karthikeyan et. al.,2003; Cheng et. al.,2002) and efficiency as potent antioxidant preventing LDL cholesterol oxidation (Pathak et. al.,1990; Khanna, et. al,1996). There are no scientific clinical studies showing effect of herbal drugs on exercise performance after regular administration when given as supplements. This study was conducted to explore the effects of these two plants on systolic and diastolic blood pressure in healthy young adults.

### **Material andMethod:**

The present study was designed to be a randomized controlled, parallel group, single blinded study. Sample Forty healthy individuals of either sex (20 males and 20 females), with a mean age of  $25 \pm 2$  (aged between 20 to 28 years) years and BMI  $21.9 \pm 2.2$  kg/m<sup>2</sup> (ranged between 18 to 25) from the population of village Ashti in Wardha district, Maharashtra, India volunteered for the study.





The sample size was calculated by online 'Java applets for power and sample size' software,[18] keeping power of the study at 95%. The subjects were randomly assigned into four groups using the chit in a box method. Group I (n=10): Arjuna(Terminalia arjuna) group, Group II (n=10): Ashwgandha(Withania somnifera) Group, Group III (n=10):Arjuna(Terminalia arjuna )and( Withania somnifera) combination group, Group IV (n=10): Placebo (control) group. Subjects were unaware of which group they were in and which drug they were to receive. It was thus a single blinded study, where all the subjects were completely unaware of drugs which they were going to consume. Selection of subjects Workingyoung adults with age between 20 and 28 years were screened. To avoid confounding effects, we included only those individuals who were free from any lower limb injury within past 1 year ,those whose BMI was between 18 and 25 and who had not participated in regular exercises and yoga from past 6 months or more. Individuals who were engaged in regular strenuous physical activity, suffering from chronic illness or had undergone major surgery recently, were suffering from any cardiovascular, musculoskeletal or neurological condition and people with history of alcohol abuse or were under medication of other drugs were excluded. Variables for effect The following variables were assessed before and after drug administration under supervision and while ensuring safety of the subjects - Sphygmomanometer was used to measure systolic and diastolic blood pressure. Resting blood pressure was taken in consideration. Procedure The study was done for personal survey. Prior to the start of data collection, participants were explained about the drugs and previous research supporting the effectiveness on physical performance and possible side effects due to overdose. Only then the subjects who volunteered to participate in the study were recruited. A written informed consent was taken from each participant prior to recruitment. Test drugs Withania somnifera was used in the form of a standardized aqueous root extract and Teminalia arjuna was in the form of aqueous bark extracts. The drugs were obtained from Mahatma Gandhi





Ayurved College, Sawangi Meghe, Dist. Wardha. Both the drugs were filled in 500mg gelatin capsules. They were stored in air tight containers and in room temperature below 30°C throughout the experiment. Both drugs were given in the dose of 1 capsule/day orally for 8 weeks. The compliance of the participant to study drug was ensured as the researcher personally administered the drug to the subjects over the period of 8 weeks. BP was measured before administering drug of all groups.

### **Result and Discussion:**

The present study was aimed to assess the effects of *Withania somnifera* and *Terminalia arjuna* singly and in combination *Withania somnifera* and *Terminalia arjuna* on systolic and diastolic blood pressure in healthy young adults after an eight week therapy. Ayurveda is a rich heritage of herbal practices describing medicinal and nutritional uses of more than 600 plants in seventy books. Many plants have ergogenic effects, with no or very less side effects. Ginseng is known as an adaptogen, which means it increases resistance to physical, chemical, and biological stress and builds energy and general vitality. (*Withania somnifera* is considered to be the “Indian” ginseng. In the present study, we found that following 8 weeks of administration of *Withania somnifera* no significant change was seen in blood pressure. *Terminalia arjuna* is a cardio protective drug and is used in ayurveda since centuries for its cardiogenic properties. The present study shows that there is significant improvement in cardiac activity and fall in blood pressure. Bharani et al (2002), observed significant improvement in the duration of treadmill exercise in stable angina patients who received *Terminalia arjuna* when given 500 mg/day for one week. Ghoshal et.al.(1909) reported an increased heart rate and force of contraction in cardiac muscles in isolated rats. Srivastava et .al.(1992) found a dose dependant fall in blood pressure in rats when *Terminalia arjuna* bark was given in aqueous form, intravenously. According to Colabawala (1951), the drug is known to have no significant effect on heart rate, blood pressure and cardiac output in healthy volunteers but causes an





increase in cardiac output and blood pressure and a decrease in heart rate in patients with a failing heart. Contradicting this statement, in our study we found that, there is significant decrease in systolic blood pressure by 4.2% when compared with placebo group [group IV] but no significant improvement was seen in diastolic blood pressure in healthy young adult volunteers following 8 weeks of Terminalia arjuna bark extract consumption. When Withania somnifera and Terminalia arjuna were given in combination in group III showed significant fall in systolic blood pressure but no significant change in diastolic blood pressure when compared with placebo group [group IV]. When results between groups were compared the group which was given both Terminalia arjuna and Withania somnifera (group III) was the most effective in reducing systolic blood pressure (4.37%), which is highest significant reduction in systolic blood pressure between groups followed by group II (4.22%) that consumed only Terminalia arjuna. Terminalia arjuna was found to be effective in reducing resting systolic blood pressure in healthy young adults.

**Table -I** :Effects of Withania somnifera ( Group-I), Terminalia arjuna( Group-II) individually and in combination ( Group III) on systolic blood pressure.).

| Group     | Systolic Blood Pressure(Mean ± SD) |               |          |
|-----------|------------------------------------|---------------|----------|
|           | Pre test                           | Post test     | P- value |
| Group I   | 120.20 ± 3.58                      | 119.80 ± 3.19 | 0.591    |
| Group II  | 123.00 ± 2.87                      | 117.80 ± 1.41 | 0.000    |
| Group III | 123.40 ± 3.13                      | 118.00 ± 2.49 | 0.000    |
| Group IV  | 121.80 ± 3.58                      | 121.60 ± 1.84 | 0.798    |





**Table -II :** Effects of *Withania somnifera* ( Group-I), *Terminalia arjuna*( Group-II) individually and in combination ( Group III) on Diastolic blood pressure.

| Group     | Diastolic Blood Pressure(Mean $\pm$ SD) |                  |          |
|-----------|---|------------------|----------|
|           | Pre test                                | Post test        | P- value |
| Group I   | 78.40 $\pm$ 3.10                        | 78.80 $\pm$ 2.70 | 0.443    |
| Group II  | 78.80 $\pm$ 2.35                        | 78.80 $\pm$ 1.69 | 1.000    |
| Group III | 78.60 $\pm$ 3.53                        | 78.20 $\pm$ 1.48 | 0.619    |
| Group IV  | 79.40 $\pm$ 2.99                        | 79.60 $\pm$ 2.07 | 0.780    |



### Conclusion:

The present study was limited to an 8 week period on healthy young adults. The future research should focus on longer treatment duration, dose finding as well as gender specific effects of the drugs. Further studies are also required to assess whether the drugs can improve other physical parameters and to see the effectiveness in elite sports persons so that in future these drugs can be given as ergogenic elements.

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