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Effect of *Ashwagandha* (*Withania somnifera*) Root Powder Supplementation in Treatment of Hypertension

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ABSTRACT *Ashwagandha* (*Withania somnifera*) is widely used in Ayurvedic medicine, and it is one of the ingredients in many formulations to increase energy, improve overall health and longevity, and prevent disease. The main objective of the study was to analyze the efficacy of *Ashwagandha* root powder with water and with milk in treatment of hypertension. The experiment was conducted on 51 stress-oriented hypertensive subjects in the age group of 40 to 70 years, selected by purposive sampling. Subjects were divided into group I and group II. Supplementation of 2gm of *Ashwagandha* root powder was given to group I and group II with milk and water respectively in morning. Blood pressure was also recorded over a period of three months. Overall decrease in systolic blood pressure was found though it was non- significant. Further, decrease in systolic blood pressure was significant in group I, whereas decrease in diastolic blood pressure was significant in both the groups. Hence, supplementation of *Ashwagandha* with milk is recommended in treatment of stress- oriented hypertension.

INTRODUCTION

The plant Withania somnifera (L.) Dunal, commonly known as *"Ashwagandha"* is well known for its therapeutic use in the ayurvedic system of traditional medicine. It has been used as an antibacterial, antioxidant, adaptogen, aphrodisiac, liver tonic, anti-inflammatory agent (Mehrotra et al. 2011). It is a reputed health food and herbal tonic and used for cardiovascular diseases in ethnomedicine. It is available for human use either as a single herb or an ingredient of polyherbal or herbomineral formulations. The human doses of *Ashwagandha* are generally in the range of 4-6 g/day and expected to be safe and non-toxic. Withania contains active ingredients like steroidal alkaloids and lactones known as "withanolides". Withaferin A and withanolide D are the two main withanolides that contribute to most of the biological actions of withania (Matsuda et al. 2001; Sharma V et al. 2011). Stress, as a major cardiovascular risk factor leads activation of sympathoadrenal and hypothalamic pituitary adrenal (HPA) axis and causes oxidative stress. Withania possesses a potent anti-stressor effect and is reported to alleviate stress induced changes and provides cardio protection in ischemic rats similar to the properties ascribed to adaptogens like Panax ginseng. It also increases heart weight and glycogen in myocardium and liver indicating intensification of the anabolic process and enhances the duration of contractility as well as coagulation time (Dhuley 1998, 2000). So, this study was planned to assess the effect of *Ashwagandha* on hypertensive subjects.

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MATERIALS AND METHODS

The present study was conducted in Department of Nutrition, Isabella Thoburn College, Lucknow during July 2007 to December 2007. This study was based on the action of *Ashwagandha* root powder in stress- oriented hypertension.

The roots of *Ashwagandha* were collected from an authorized Ayurvedic shop and sorted out, washed and dried in oven at 60ºC for 4 to 6 hours till all the moisture is lost and is then ground to a fine powder in a flour mill. The powders are then filled in small bottles. 2g of powder was administered to subjects of group I and group II with milk and water respectively. Supplementation study was conducted among hypertensive subjects residing in Indira Nagar, Lucknow. A purposive random sampling method was adopted in selecting the subjects. The criteria used for the selection of subjects were-

1. They should be on dietary restriction and minimal dosage of antihypertensive drugs.
2. They should not have any other complications and they should be willing to cooperate for the entire period of supplementation.
3. They should be available at specific time periods for obtaining the supplements and measuring blood pressure.

The supplementation was conducted from September 1st 2007 to November 31st 2007. A total number of 51 subjects were selected, 26 of the subjects formed group I and were given *Ashwagandha* root powder with milk and other 25 subjects were given *Ashwagandha* root powder with water in morning for 91 days. Blood pressure were monitored before supplementation, mid of supplementation and after supplementation with Sphygmomanometer (Maclead and Davidsons 1984) by the physician. The main tools for data collection were interview schedule, and anthropometric measurements. Weight and height (Jellife 1966) were recorded and BMI was calculated. The demographic profile of the respondents was gathered by the interview schedule, and anthropometric assessment was used to find out the height, weight and body mass index.

The data obtained were subjected to descriptive analysis. Body mass index was computed using the height and weight values. Blood pressure was also assessed. The risk factors were also computed. Statistical tests included- arithmetic mean, standard deviation and students' t-test.

RESULTS AND DISCUSSION

When comparing the change in mean body weight (Table 1) of hypertensive subjects, it was found to be 80.66 ± 5.23 to 81.75 ± 2.65 of group I and for group II, 77.35 ± 7.45 to 78.49 ± 6.25 before supplementation and after supplementation. No significant change was observed in height. When comparing the change in mean body mass index (Table 2) of hypertensive subjects, it was observed to be 30.32 ± 2.23 to 30.56 ± 2.69 for group I and group II 28.43 ± 2.56 to 28.92 ±2.34 before supplementation and after supplementation. Non- significant change was observed in weight and body mass index of subjects.

Mehra et al. (2009) reported that *Ashwagandha* is advocated as a protective drug against atherosclerosis, hypertension and coronary heart diseases. It reduces the sensitivity of the heart to adrenergic stimulation and thereby protects the heart against sympathetic outbursts. The blood pressure of group I and group II (systolic and diastolic) were compared before supplementation and after supplementation.

Table 1: Comparison of mean body weight of hypertensive subjects

Group	*Before supplementation*	*After supplementation*	*'t' Value*	*Level of significance*
Group I	80.66 ± 5.23	81.75 ± 2.65	0.51	NS*
Group II	77.35 ± 7.45	78.49 ± 6.25	0.41	NS*

Table 2: Comparison of mean body mass index of hypertensive subjects

Group	*Before supplementation*	*After supplementation*	*'t' Value*	*Level of significance*
Group I	30.32 ± 2.23	30.56 ± 2.69	0.88	NS*
Group II	28.43 ± 2.56	28.92 ±2.34	0.41	NS*

*Not Significant

Mean systolic blood pressure (Fig. 1) of group I and group II before supplementation was found to be 164 mmHg and 157 mmHg respectively whereas after supplementation mean systolic blood pressure decreases to 158 mmHg for group I and 154 mmHg for group II. Decrease in systolic blood pressure was not significant.

Mean diastolic blood pressure (Fig. 2) of group I and group II before supplementation was found to be 100.50 mmHg and 101.2mmHg respectively whereas after supplementation mean diastolic blood pressure decreased to 85 mmHg for group I and 92 mmHg for group II. Decrease in diastolic pressure was significant. Since differences were greater for subjects in group I than for subjects in group II. This indicates that *Ashwagandha* with milk is more effective in decreasing blood pressure in hypertensive subjects than *Ashwagandha* with water.

Fluctuations in Blood Pressure among Groups

Moharana (2008) reported that the roots and leaves of *Ashwagandha* are used traditionally in the form of powder, decoction, oil etc. These have been used in folk medicine against general disability, hypertension, inflammations and wounds.

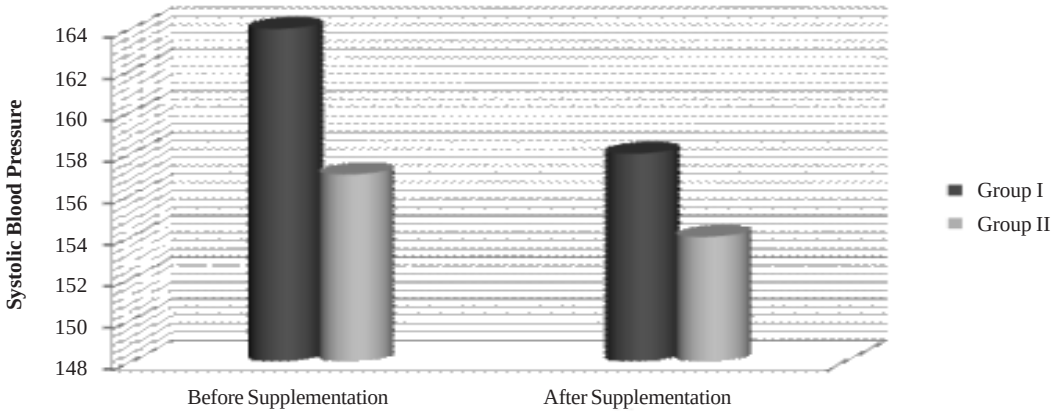


Fig. 1. Change in systolic blood pressure before and after supplementation of *Ashwagandha*

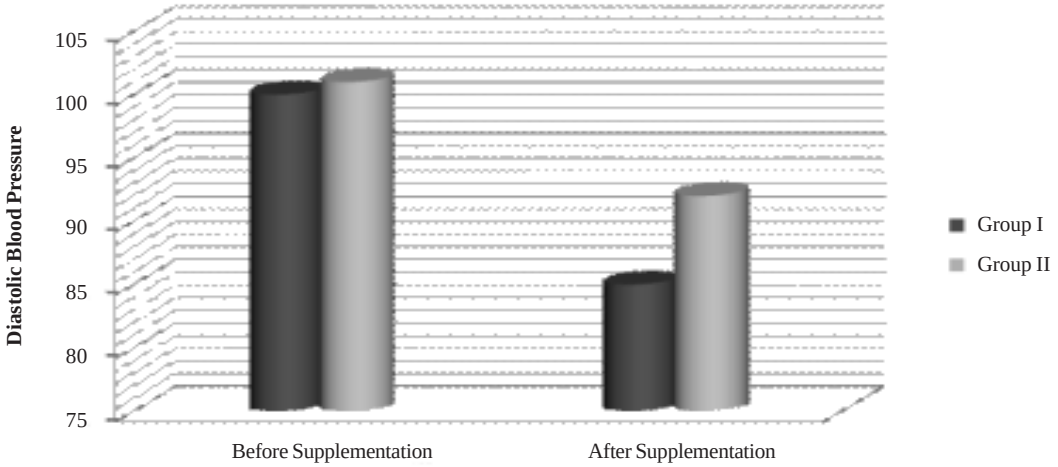
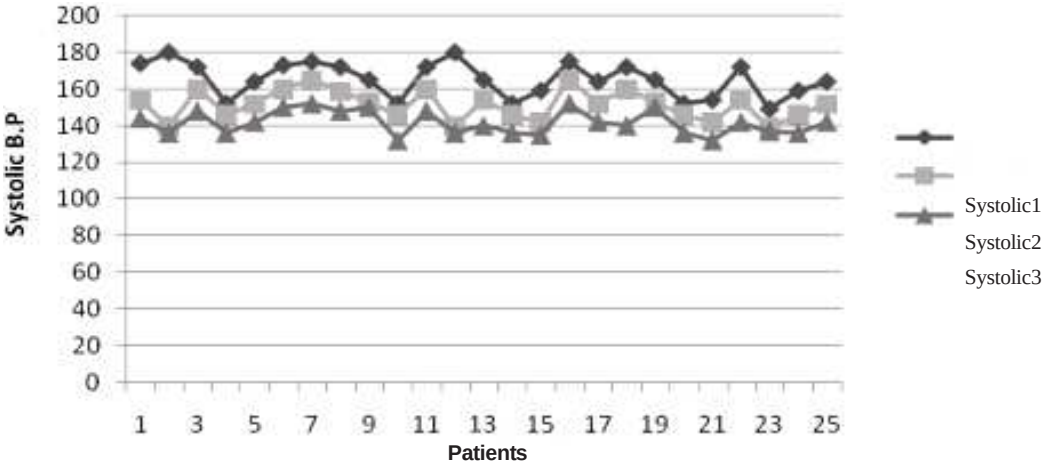


Fig. 2. Change in diastolic blood pressure before and after supplementation of *Ashwagandha*

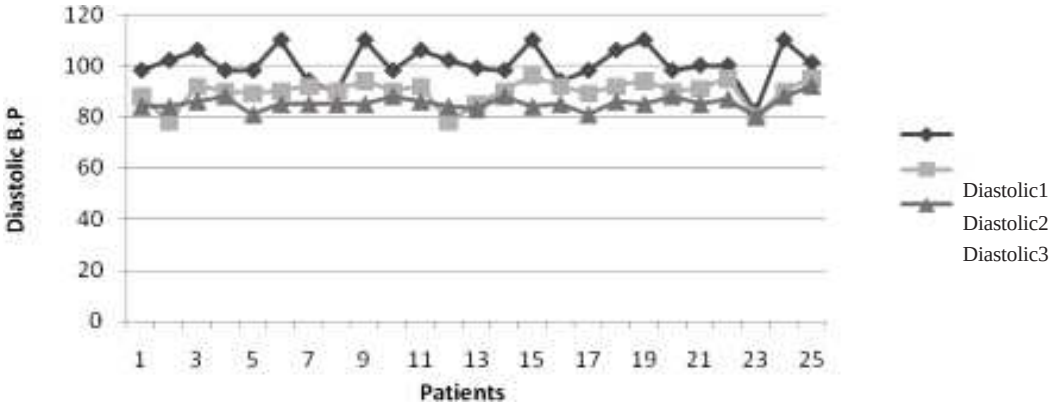
1: Blood pressure in September
2: Blood pressure in October
3: Blood pressure in November

Fluctuation in blood pressure of subjects receiving *Ashwagandha* with milk (Fig.3) indicated that there has been a decrease in systolic blood pressure for the hypertensive subjects taking *Ashwagandha* with milk. On the other hand, diastolic blood pressure showed a decrease in second month of treatment but increased slightly in the third month. Thirunavukkarasu et al. (2006) found *Ashwagandha* having energy boosting properties and recommended its use as a dietary supplement for cardio protection. The effect of *Ashwagandha* root was evaluated for lipid peroxidation in stress. The herb was found to have a very good antioxidant activity, which may in part explain the anti-stress, congestion facilitating, anti-inflammatory and anti-ageing effects of this herb (Moharana 2008).

Fluctuation in blood pressure of subjects receiving *Ashwagandha* without milk (Fig.4) indicates that there has been decrease in systolic blood pressure for the hypertensive subjects taking *Ashwagandha* with water. On the other hand, diastolic blood pressure showed a greater decrease in second month of treatment as compared to in slight decrease in the third month. Stress, as a major cardiovascular risk factor leads activation of sympathoadrenal and hypothalamic pituitary adrenal (HPA) axis and causes oxidative stress. Withania possesses a potent anti-stressor effect and alleviates stress induced changes and provides cardioprotection (Ojha and Arya 2009).



Fluctuations in Systolic B.P for ashwangandha with milk treatment



Fluctuations in Diastolic B.P for ashwangandha with milk treatment

Fig. 3. Change in blood pressure of group I subjects

The important risk factors that affect hypertensive subjects were found to be economic status, smoking, alcohol, diet, work stress and family stress.

CONCLUSION

Ashwagandha possesses many qualities, including anti-inflammatory, anti-tumor, and immunomodulatory properties, as well as exerting an influence on the endocrine, nervous, and cardiopulmonary systems. On the basis of analysis, it was concluded that supplementation of *Ashwagandha* with milk is more effective in treatment of hypertension whereas it does not have any effect on body mass index and weight. Thus, *Withania somnifera* offers a natural alternative or as an adjunct with conventional agents with lesser side- effects. However, for concrete evidence and its application as a drug in as per the stricter norms of drug development, more studies are warranted in clinical settings.

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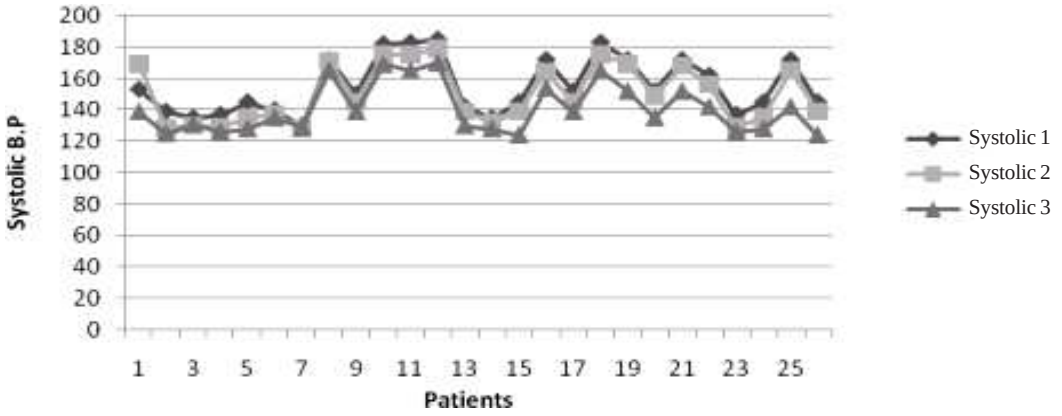
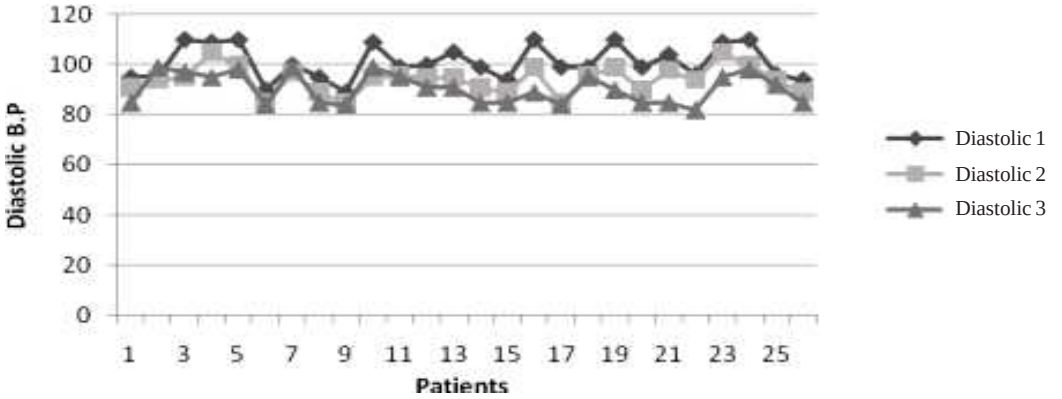


Fluctuations in Systolic B.P for ashwagandha with water



Fluctuations in Diastolic B.P for ashwagandha with water

Fig. 4. Change in blood pressure of group II subjects

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