

# Effect of Soya-Based Diet on Hypertension in Middle-Aged Women: A Prospective Study in Jhunjhunu, Rajasthan

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**Abstract:** Hypertension is a growing health concern among middle-aged women, particularly in India, where lifestyle and dietary patterns play a significant role in disease prevalence. This study evaluates the impact of a soya-based diet on blood pressure regulation among hypertensive women in Jhunjhunu, Rajasthan. A six-month prospective study was conducted with 100 participants aged 40–60 years. Participants were divided into two groups: one following a soya-based dietary intervention and another continuing with their regular diet. The intervention group was provided with a daily intake of soya-based foods such as tofu, soya milk, and soya flour-based chapatis, ensuring a minimum of 25 grams of soya protein per day.

Baseline and post-intervention blood pressure readings were recorded, along with additional data on BMI, lipid profile, and dietary intake. The results indicate a significant reduction in both systolic and diastolic blood pressure among women consuming a soya-based diet. The intervention group showed a mean reduction of 10–12 mmHg in systolic blood pressure and 5–7 mmHg in diastolic blood pressure. Additionally, improvements in lipid profiles, including increased HDL levels and reduced LDL and triglycerides, were observed.

The findings suggest that dietary modifications, particularly the inclusion of soya-based foods, can serve as a non-pharmacological intervention for hypertension management. The study highlights the potential role of plant-based diets in cardiovascular health and encourages further large-scale research to validate these results. Adopting a soya-based diet could be a cost-effective and sustainable strategy for reducing hypertension and associated cardiovascular risks among middle-aged women in India.

Keywords: Hypertension, Soya-Based Diet, Middle-Aged Women, Blood Pressure, Jhunjhunu, Rajasthan

## 1. Introduction

Hypertension, commonly known as high blood pressure, is a major public health concern globally and is particularly prevalent among middle-aged women. It is a significant risk factor for cardiovascular diseases, including heart attacks and strokes, and is influenced by lifestyle factors such as diet, physical activity, and stress levels. In India, the prevalence of hypertension has been rising due to changing dietary habits, increased consumption of processed foods, and sedentary lifestyles.

Dietary interventions have been widely explored for their role in managing hypertension, and plant-based diets have gained attention for their potential benefits. Among these, soya-based foods have been recognized for their ability to regulate blood pressure due to their high content of bioactive compounds such as isoflavones and proteins. Isoflavones, which are plant-based phytoestrogens, have been shown to enhance endothelial function, promote vasodilation, and reduce arterial stiffness, all of which contribute to lower blood pressure levels.

Jhunjhunu, a city in Rajasthan, was chosen as the study location due to its diverse population and increasing prevalence of hypertension among middle-aged women. Traditional diets in this region are gradually shifting toward processed and high-sodium foods, necessitating research on alternative dietary strategies for hypertension management.

This study aims to assess the impact of a soya-based diet on hypertensive middle-aged women in Jhunjhunu, Rajasthan. By analyzing changes in blood pressure, lipid profiles, and overall health markers, this research seeks to provide evidence supporting dietary interventions as a natural and cost-effective approach to managing hypertension. The study also aims to create awareness regarding the importance of including plant-based foods in the daily diet to promote long-term cardiovascular health.

## 2. Methodology

### 2.1 Study Design

A prospective, randomized controlled trial was conducted over a period of six months. The study involved 100 hypertensive women aged 40–60 years, recruited through local health

centers in Jhunjhunu. Participants were randomly assigned into two groups: the intervention group, which followed a soya-based diet, and the control group, which maintained their regular diet. All participants provided informed consent before the study commenced.

## 2.2 Dietary Intervention

The intervention group was provided with a structured dietary plan incorporating soya-based foods such as tofu, soya milk, soya flour-based chapatis, and other traditional dishes modified to include soya protein. Each participant in this group consumed at least 25 grams of soya protein per day. The control group continued with their regular diet without any soya-based modifications. Dietary adherence was monitored through weekly follow-ups, where participants were asked to maintain food diaries and report their daily intake.

## 2.3 Data Collection

Baseline measurements were taken before the intervention, including blood pressure, BMI, lipid profile, and dietary intake patterns. Blood pressure readings were recorded using a standardized sphygmomanometer in a seated position, with three measurements taken at different times to ensure accuracy. Follow-up assessments were conducted at the third and sixth months to track changes.

Additional data such as physical activity levels, smoking habits, and family history of hypertension were also collected through structured questionnaires to control for confounding variables. Blood samples were taken to analyze lipid profile changes, including HDL, LDL, and triglyceride levels.

## 2.4 Statistical Analysis

Data were analyzed using SPSS software. Descriptive statistics were used to summarize baseline characteristics. Paired t-tests and ANOVA were employed to evaluate the impact of the soya-based dietary intervention on systolic and diastolic blood pressure levels. A p-value of less than 0.05 was considered statistically significant.

## 3. Results

The study demonstrated a significant reduction in blood pressure among the intervention group compared to the control group. The key findings are as follows:

- **Systolic Blood Pressure (SBP):** The intervention group showed a mean reduction of 10–12 mmHg, whereas the control group exhibited no significant change.
- **Diastolic Blood Pressure (DBP):** A reduction of 5–7 mmHg was observed in the intervention group, with minimal changes in the control group.
- **Lipid Profile:** Participants in the soya-based diet group exhibited an increase in HDL levels by 5–8%, while

LDL and triglyceride levels decreased by 8–12% and 10–15%, respectively.

- **Body Mass Index (BMI):** A slight reduction in BMI was recorded among intervention participants, indicating potential weight management benefits.
- **Overall Health Improvements:** Participants reported increased energy levels, improved digestion, and enhanced general well-being.

## 4. Discussion

The findings of this study strongly support the role of soya-based diets in hypertension management. The significant reduction in both systolic and diastolic blood pressure highlights the potential of plant-based interventions in reducing cardiovascular risks. Isoflavones present in soya are known to enhance nitric oxide production, promoting vasodilation and reducing arterial stiffness, which may explain the observed improvements in blood pressure.

Moreover, the favorable changes in lipid profiles, including increased HDL and reduced LDL levels, suggest that soya protein can contribute to overall cardiovascular health. These findings align with previous research indicating that plant-based proteins can positively influence cholesterol metabolism and reduce inflammation associated with hypertension.

## 5. Conclusion

The results of this study suggest that incorporating soya-based foods into the diet can be an effective, natural, and sustainable approach to managing hypertension in middle-aged women. The observed improvements in blood pressure, lipid profile, and overall health indicators highlight the potential benefits of soya protein and isoflavones in cardiovascular health. Encouraging dietary modifications as a non-pharmacological intervention can help reduce dependence on medication, lower healthcare costs, and improve the quality of life for individuals with hypertension. Future large-scale and long-term studies are necessary to confirm these findings and explore additional health benefits of soya-based dietary interventions.

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