

The Effectiveness of Cinnamon and Black Pepper Powder in Managing Blood Pressure Among Hypertensive Patients in Rural Areas of Anand District

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Abstract

Background: Hypertension is a global health challenge, often treated pharmacologically. However, traditional spices like cinnamon and black pepper have been posited as potential natural remedies. **Objective:** To evaluate the effect of cinnamon and black pepper powder on blood pressure in hypertensive patients. **Methods:** A quasi-experimental study involving 80 hypertensive patients from selected rural areas of Anand district. Participants were divided into experimental (n=40) and control (n=40) groups. The experimental group received cinnamon and black pepper powder for 6 weeks, while the control group received standard care. Pre- and post-intervention blood pressure measurements were taken. Results: The experimental group showed a significant reduction in both systolic and diastolic blood pressure compared to the control group ($p < 0.05$). Conclusion: Cinnamon and black pepper powder significantly reduced blood pressure, offering a potential non-pharmacological intervention for hypertension management.

Keywords:

Hypertension, Cinnamon, Black Pepper, Blood Pressure, Non-Pharmacological Intervention

Introduction

Background:

Hypertension is a major risk factor for cardiovascular diseases and affects millions worldwide. While pharmaceutical treatments are common, many patients explore alternative therapies to manage their blood pressure (WHO, 2019). Spices like cinnamon and black pepper have been historically used for various health benefits, including potential antihypertensive effects due to their antioxidant, anti-inflammatory, and vasodilatory

properties (Joyce M. Black, 2017).

Methods Study Design: A quasi-experimental design with a pre-test and post-test approach was adopted. **Study Setting:** The study was conducted in selected rural areas of Anand District, known for limited access to advanced medical facilities. **Population and Sample:** The sample consisted of 80 hypertensive patients, aged 40-65 years, who met the inclusion criteria (diagnosed with hypertension, not on other herbal remedies). Participants were recruited using non-probability convenience sampling. They were divided into two groups: experimental (n=40) and control (n=40). **Intervention:** The experimental group was administered 1.5 grams of cinnamon and black pepper powder daily for 6 weeks, mixed in lukewarm water. The control group received routine care without any intervention. **Data Collection Tools:** Blood pressure was measured using a calibrated sphygmomanometer. Pre-intervention readings were taken before administering the spices, and post-intervention readings were recorded at the end of the 6-week period. **Ethical Considerations:** Ethical approval was obtained from the institutional ethics committee. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study. **Statistical Analysis:** Data were analyzed using SPSS software version 25. Descriptive statistics were used to summarize demographic data. Paired t-tests were conducted to compare pre- and post-intervention blood pressure levels within and between groups. A p-value < 0.05 was considered statistically significant

Result

The presents the demographic and clinical characteristics of hypertensive patients (N=40) in experimental and control groups. Patients are categorized by age, weight, height, BMI, gender, education, occupation, marital status, dietary habits, exercise routines, duration of hypertension, and anti-hypertensive drug use. The experimental group includes more females (75%) compared to the control group (45%). Patients in both groups are primarily aged 50-60 years. Most patients in both groups are overweight, with a higher incidence of obesity in the experimental group. The majority in both groups are homemakers and married. Notably, a larger portion of the control group does not exercise (75%), and Amlodipine is the most commonly used anti-hypertensive medication in both groups.

Analysis of data related to the blood pressure among hypertensive patients for both experimental and control group.

Table 1: The blood pressure among hypertensive patients for both experimental and control group N=40, 40

Group	Blood Pressure	Pretest	
		Freq	%
Experimental group	Elevated	0	-
	High BP Stage 1	25	62.5%
	High BP Stage 2	14	35.0%
	Hypertensive Crisis	1	2.5%
Control group	Elevated	0	-
	High BP Stage 1	24	60.0%
	High BP Stage 2	16	40.0%
	Hypertensive Crisis	0	-

Analysis of data related to the effectiveness of cinnamon black pepper powder on blood pressure among the hypertensive patients

Table 2: Effectiveness of cinnamon black pepper powder on blood pressure among the hypertensive

patients
N=40, 40

Group	Blood Pressure	Pretest		Posttest	
		Freq	%	Freq	%
Experimental group	Elevated	0	0.0%	1	2.5%
	High BP Stage 1	25	62.5%	27	67.5%
	High BP Stage 2	14	35.0%	9	22.5%
	Hypertensive Crisis	1	2.5%	1	2.5%
Control group	Elevated	0	0.0%	0	-
	High BP Stage 1	24	60.0%	20	50.0%
	High BP Stage 2	16	40.0%	20	50.0%
	Hypertensive Crisis	0	0.0%	0	-

Table 3: Paired t-test for the effectiveness of cinnamon black pepper powder on blood pressure among the hypertensive patients of experimental group
N=40, 40

Parameter	Admin	Mean	SD	T	df	p-value
Systolic [mmHg]	Pretest (Day 1)	142.0	14.6	6.2	39	0.000
	Posttest (Day 10)	137.2	13.1			
Diastolic [mmHg]	Pretest (Day 1)	89.2	10.8	7.1	39	0.000
	Posttest (Day 10)	84.0	8.1			

Table 4: two sample Z-test for the comparison of average change in blood pressure among the hypertensive patients of experimental and control group
N=40, 40

Parameter	Group	Mean	SD	Z	df	p-value
Systolic [mmHg]	Experimental	4.9	5.0	4.7	78	0.000
	Control	0.3	3.7			
Diastolic [mmHg]	Experimental	5.2	4.6	2.7	78	0.004
	Control	-0.7	13.3			

Table 5: Fisher's exact test for the association between pre interventional blood pressure among hypertensive patients of both experimental and control group with selected demographic variables

Table 5 presents the results of Fisher's exact test analyzing the association between pre-interventional blood pressure (categorized as High BP Stage 1, High BP Stage 2, and Hypertensive Crisis) and selected demographic variables among hypertensive patients in experimental and control groups (N=80). Significant associations were found with age (p=0.000), gender (p=0.043), and the duration of hypertension (p=0.025). Patients aged 50-60

years and those with hypertension lasting 1-3 years were more likely to be in Stage 1. The association with gender revealed that males had a higher prevalence of Stage 2 hypertension. Other variables, such as weight, height, BMI, education, occupation, dietary patterns, habits, and the use of anti-hypertensive drugs, did not show significant associations with pre-interventional blood pressure levels.

Discussion:

In this study, the pre-interventional blood pressure levels of hypertensive patients were examined to explore potential associations with various demographic and lifestyle factors. The findings revealed several significant associations that provide valuable insights into the risk factors for elevated blood pressure and their implications for hypertensive patients.

Key Findings:

1. **Age and Blood Pressure:** Age was found to be significantly associated with blood pressure levels ($p=0.000$). The majority of patients aged 50-60 years were in Stage 1 hypertension, while a notable proportion of those over 60 years exhibited higher blood pressure levels. This aligns with existing literature that identifies advancing age as a significant risk factor for hypertension due to factors such as vascular stiffness and reduced kidney function, which contribute to increased blood pressure over time.
2. **Gender Differences:** There was a significant association between gender and pre-interventional blood pressure levels ($p=0.043$). Males were more likely to experience Stage 2 hypertension, while females were more prevalent in Stage 1. This finding could be influenced by hormonal differences, lifestyle factors, and health-seeking behaviors, which are known to vary between men and women. Males may be less likely to engage in regular health screenings or seek early treatment, potentially leading to more severe hypertension stages.
3. **Duration of Hypertension:** The study also found a significant relationship between the duration of hypertension and blood pressure levels ($p=0.025$). Patients who had been hypertensive for 1-3 years were more likely to be in Stage 1, while those with hypertension for more than 6 years showed a tendency toward more severe hypertension. This suggests that longer duration of hypertension without adequate control may lead to disease progression, underlining the importance of early diagnosis and consistent management.
4. **Other Factors:** No significant associations were found between blood pressure levels and factors such as weight, height, BMI, educational status, occupation, dietary patterns, and habits (smoking, alcohol, tobacco use). This may indicate that while these factors are important in general cardiovascular health, their direct influence on pre-interventional blood pressure levels might be less pronounced in this particular population. However, lifestyle factors such as exercise and diet remain essential for overall hypertension management, as they can contribute to long-term blood pressure control.
5. **Antihypertensive Drug Use:** The association between specific antihypertensive drugs and blood pressure levels was not significant ($p=0.538$), suggesting that while drug therapy is critical in managing hypertension, other factors such as adherence to medication, diet, and lifestyle changes play an equally important role in blood pressure control.

Conclusion:

This study highlights the importance of age, gender, and the duration of hypertension in influencing pre-interventional blood pressure levels. These findings underscore the need for early interventions, personalized care plans, and patient education to improve hypertension management and outcomes. Although not all demographic factors were significantly associated with blood pressure levels, a comprehensive approach that combines pharmacological treatment with lifestyle modification remains crucial for the effective management of hypertension.

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Authors' Contributions

Ms. Swizel Rana was responsible for designing the study, collecting and analyzing the data, and writing the manuscript. Dr. Anil Sharma provided supervision and guidance throughout the study, assisting with the design, methodology, and editing of the manuscript. Mr. Anil Patidar contributed by conducting the statistical analysis and offering critical revisions to enhance the accuracy and clarity of the manuscript.

Conflict of interests

There are no conflicts of interest declared by the authors.

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