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## **A study to assess the effect of cucumber on blood pressure among pre-hypertensive adults in a selected rural area, Bangalore**

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### **Abstract**

Hypertension is the commonest cardiovascular disorder affecting about 20% adult population worldwide. There are various remedial measures to control blood pressure. Cucumber consumption is one such remedial measure which is a very good source of potassium and magnesium, an important intra-cellular electrolyte which helps in controlling blood pressure and heart rate by countering effects of sodium. Hence this study was conducted to assess the effect of cucumber on blood pressure among adults with pre-hypertension BP reading. The result of the study showed, the pre-intervention Systolic BP of subjects was in the range of 120 – 138mmHg and Diastolic BP in the range of 80 – 88mmHg. The mean pre-intervention Systolic BP was 130.65 (SD 5.98) and the mean pre-intervention Diastolic BP was 83.49 (SD 2.94). The post-intervention Systolic BP was in the range of 118 – 138mmHg and Diastolic BP was in the range of 78 – 90mmHg. The mean post-intervention Systolic BP was 128.73 (5.65) and the mean post-intervention Diastolic BP was 82.95 (SD 2.64). The mean Systolic BP reduced by 1.92mmHg and the mean Diastolic BP reduced by 0.54mmHg in the post-intervention. There was a statistically significant reduction in Systolic BP in the study subjects and there was decrease in the Diastolic BP reading but not statistically proved. The Paired 't' test shows the reduction of Systolic BP statistically significant (p value <0.001).

**Keywords:** Effect, cucumber, blood pressure, pre-hypertensive adults

### **Introduction**

The prevalence of hypertension in the developing countries seems to be similar to that in European or other developed societies ranging from 10 per cent among adults. The prevalence of hypertension in India is reported ranging from 59.9 and 69.9 per 1000 males and females in urban population and 35.5 and 35.9 per 1000 males and females in the rural population. Hypertension has many implications in the wellbeing of individuals. Promotion of comfort and wellbeing is an important consideration for the health care providers. Therefore measures must be taken to reduce the ill effects of the hypertension. Cucumbers having mild diuretic property due to its water content, is helpful in weight loss and high blood pressure.

### **Objectives**

1. To assess blood pressure before and after administration of cucumber among pre-hypertensive adults
2. To compare the effectiveness of cucumber on blood pressure among pre-hypertensive adults
3. To determine the association between the blood pressure and baseline variables before administration of cucumber.

### **Materials and Methods**

Quantitative survey approach was considered as an appropriate research approach for this study. Quasi-Experimental Research Design (One group pretest post-test design) was selected. Formal permission obtained from the District Health Officer and from the Ethical Review Board of SJMCH. Formal permission obtained from the village leader of Kuguru village. The study was conducted in Kuguru village,

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which is under Sarjapura PHC, Anekkal Taluk, Bangalore. The direction for sampling was obtained by pen-rolling technique *i.e.* by standing in the center of the village and rolling down the pen and thereby started from the direction the pen was pointing. The individual subjects were selected using purposive sampling technique based on inclusion and exclusion criteria. Door to door survey was done and BP was checked for the adults between 35 to 65yrs. The subjects with Systolic BP of 120 to 139 or Diastolic BP of 80 to 89 in three consecutive readings both male and female between 35 and 65yrs in Kuguru village were selected for the study. BP was measured by radial palpation method followed by auscultatory method with the help of mercury sphygmomanometer. The individual subjects were selected by taking three consecutive readings with pre-hypertension and also based on inclusion and exclusion criteria. In this study the sample size is 55, which is calculated from the previous review, Lu.et.al (reference) as to detect a reduction in blood pressure for 63% of the subjects marked improvement with 13% precision and 95% confidence interval a sample size of 55 subjects is required. Informed

consent was obtained from the selected subjects. The instruments used in the study are Baseline variables (Semi-structured interview) and Outcome variables (Callibrated Mercury Sphygmomanometer). Reliability of the BP apparatus was tested by Inter-rater method. The established reliability is 0.8 (80%). All selected subjects were given 1 cup (approx 100grams) of cucumber with skin peeled, cut in slices, weighed and packed for 30 consecutive days by the investigator. The subjects were made to consume 100grams of weighed and packed cucumber in the presence of the investigator in all the 30 days of intervention. BP was checked using calibrated mercury sphygmomanometer on the 15<sup>th</sup> and 30<sup>th</sup> day of intervention.

### Result

The analysis and interpretation of data was based on the objectives of the study.

**Section 1:** Description of baseline variables of pre-hypertensive adults.

**Table 1:** Frequency and percentage distribution of subjects according to baseline variables. N = 55

Sl No.	Baseline variables	Frequency	Percentage (%)
<b>1.</b>	<b>Age (in years)</b>		
a.	35 – 45	25	45.50
b.	46 – 55	14	25.50
c.	56 – 65	16	29.00
<b>2.</b>	<b>Gender</b>		
a.	Male	25	45.50
b.	Female	30	54.50
<b>3.</b>	<b>Educational status</b>		
a.	Illiterate	25	45.50
b.	Primary and middle school	11	20.00
c.	High school and above	19	34.50
<b>4.</b>	<b>Type of occupation</b>		
a.	Clerical, shop-owner, farmer	26	47.30
b.	Skilled / Semi-skilled worker	19	34.50
c.	Unskilled worker	10	18.20
<b>5.</b>	<b>Monthly per capita income (in Rs.)</b>		
a.	1547 - 2577	14	25.50
b.	773 - 1546	28	50.90
c.	Below 773	13	23.60
<b>6.</b>	<b>Pattern of cucumber consumption</b>		
a.	Weekly	22	40.00
b.	Monthly	33	60.00
<b>7.</b>	<b>Habits</b>		
a.	Smoking	10	18.20
b.	Pan chewing	29	52.70
c.	Smoking and Alcohol	06	10.90
d.	None	10	18.20
<b>8.</b>	<b>Walking</b>		
a.	Yes	04	7.30
b.	No	51	92.70
<b>9.</b>	<b>Food pattern</b>		
a.	Vegetarian	10	18.20
b.	Non-vegetarian	45	81.80

### Interpretation of Table 1

Among the 55 study subjects 45.5% of them belonged to the age group of 35 - 45years. 54.5% of them were females and 45.5% of them were males. The educational status of the study subjects revealed that 45.5% of them were illiterates. 47.3% of them were farmers and shop-owners. Based on the 2013 Modified B G Prasad's classification of socio-

economic scale, the monthly income of the study subjects revealed that 50.9% of their income was between Rs. 773 – 1546. The pattern of cucumber consumption of the study subjects revealed that 60% of them consumed cucumber once in a month. 52.7% of the study subjects had the habit of chewing pan. 92.7 of the subjects do not go for walking and 81.80% of the study subjects were non-vegetarians.

**Section 2:** Description of blood pressure before and after administration of cucumber.

**Hypothesis: H1:** There will be significant variation in blood pressure before and after administration of cucumber at 0.05 level of significance.

**Objective 1:** To assess blood pressure before and after administration of cucumber among pre-hypertensive adults.

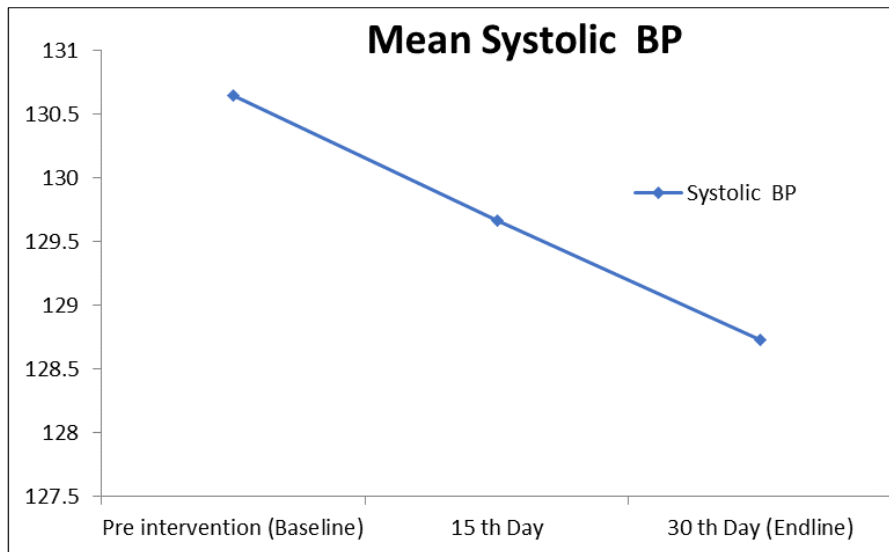


Figure 1 Depicts the Mean systolic BP in the Baseline, 15<sup>th</sup> and 30<sup>th</sup> day (Endline) as 130.65, 129.67 and 128.73 respectively showing reduction in the Mean Systolic BP and statistically significant.

**Fig 1a:** Line diagram showing pre and post-intervention Systolic BP readings of the selected pre-hypertensive subjects. N = 55

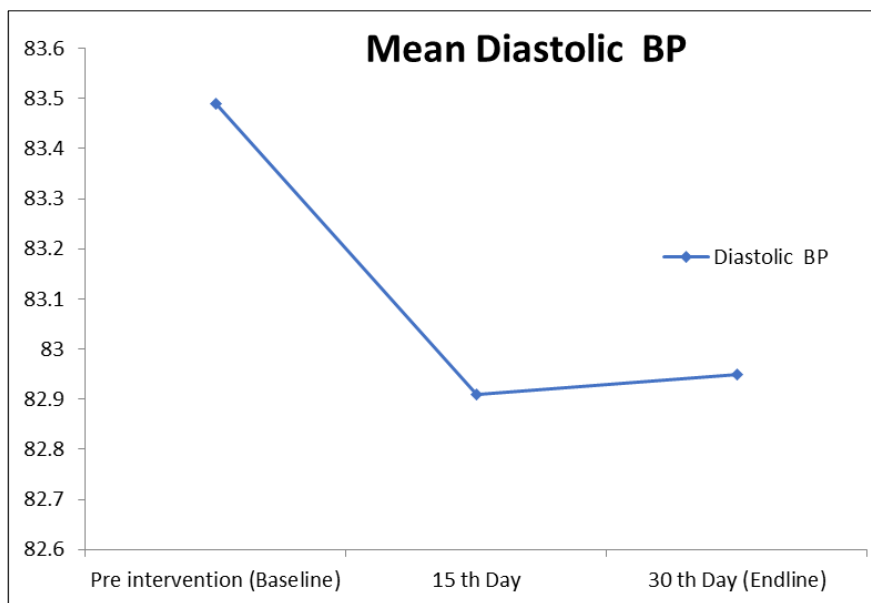


Figure 1b depicts the Mean Diastolic BP of the Baseline, 15<sup>th</sup> and 30<sup>th</sup> day (Endline) as 83.49, 82.91 and 82.95 respectively showing clinically reduction in the Mean Diastolic BP but not statistically significant

**Fig 1b:** Line diagram showing pre and post-intervention Diastolic BP readings of the selected pre-hypertensive subjects. N = 55

**Section 3:** Comparing the effectiveness of cucumber on blood pressure.

**Objective 2:** To compare the effectiveness of cucumber on blood pressure among pre-hypertensive adults.

**Table 2:** Range, Mean, standard deviation of the pre and post-intervention BP readings of pre-hypertensive subjects to assess the effect by paired 't' test. N = 55

SI No.	Bp Parameter	Pre-intervention value			Post-intervention value			Test of significance	P value
		Range	Mean	SD	Range	Mean	SD		
1.	Systolic BP*	120-138	130.65	5.98	118-138	128.73	5.65	5.25	<0.001 (S)
2.	Diastolic BP*	80-88	83.49	2.94	78-90	82.95	2.64	1.48	0.145 (NS)

\* Paired t test; (S) Significant; (NS) Not significant

Table 2 depicts that mean systolic BP of the study subjects in the pre-intervention was 130.65 and the mean systolic BP reduced to 128.73 which is highly significant in the post-intervention. And the mean diastolic BP in the pre-intervention was 83.49 which reduced to 82.95 in the post-intervention.

The computed Paired 't' test value was 5.254 for Systolic BP, which is statistically significant (p value <0.001). Thus the research hypothesis is tested and proven true.

**Section 4:** Association of pre-intervention Systolic and Diastolic BP with baseline variables.

**Objective 3:** To determine the association between the blood pressure and baseline variables before administration of cucumber.

**Hypothesis H2:** There will be significant association between blood pressure and their baseline variables before administration of cucumber at 0.05 level of significance.

**Table 3a:** To determine the association of pre-intervention Systolic BP with baseline variables N= 55

Sl.no	Baseline variables	Pre-intervention SBP Mean Sd	Test of significance	P value
<b>1.</b>	<b>Age (in yrs)#</b>			
a.	35 – 45	129.76 5.95	2.520	0.090 NS
b.	46 – 55	129.14 6.21		
c.	56 – 65	133.38 5.20		
<b>2.</b>	<b>Gender*</b>			
a.	Male	131.92 5.73	1.448	0.153 NS
b.	Female	129.60 6.07		
<b>3.</b>	<b>Educational status#</b>			
a.	Illiterate	130.64 6.08	0.105	0.901 NS
b.	Primary and middle school	130.00 6.39		
c.	High school and above	131.05 5.90		
<b>4.</b>	<b>Type of occupation#</b>			
a.	Clerical, shop-owner, farmer	130.92 6.05	1.540	0.224 NS
b.	Skilled / Semi-skilled worker	131.79 6.29		
c.	Unskilled worker	127.80 4.66		
<b>5.</b>	<b>Monthly per capita income#</b>			
a.	1547 – 2577	130.86 6.50	1.047	0.358 NS
b.	773 – 1546	131.50 5.62		
c.	Below 773	128.62 6.13		
<b>6.</b>	<b>Pattern of cucumber consumption*</b>			
a.	Weekly	128.36 6.25	2.424	0.019 S
b.	Monthly	132.18 5.35		
<b>7.</b>	<b>Habits#</b>			
a.	Smoking	132.60 5.82	0.446	0.721 NS
b.	Pan chewing	130.28 5.90		
c.	Smoking and Alcohol	130.67 5.61		
d.	None	129.80 7.02		
<b>8.</b>	<b>Food pattern*</b>			
a.	Vegetarian	129.00 7.32	0.967	0.338 NS
b.	Non-vegetarian	131.02 5.67		

# ANOVA; \* Independent t test NS = Not Significant ; S = Significant

Table 3a depicts that there is no significant association found between the age, gender, education, occupation, monthly per capita income, habits, food pattern of the study subjects with the pre-Systolic BP. But there is significant

association found between the pattern of cucumber consumption and the pre-Systolic BP at 0.019 level of significance.

**Table 3b:** To determine the association of pre-intervention Diastolic BP with baseline variables. N = 55

Sl.no	Baseline variables	Pre-intervention DBP mean Sd	Test of significance (t test / ANOVA)	p value
<b>1.</b>	<b>Age (in yrs)#</b>			
a.	35 – 45	83.68 3.25	0.145	0.865 NS
b.	46 – 55	83.14 2.80		
c.	56 – 65	83.50 2.68		
<b>2.</b>	<b>Gender*</b>			
a.	Male	83.12 2.65	0.853	0.398 NS
b.	Female	83.80 3.17		
<b>3.</b>	<b>Educational status#</b>			
a.	Illiterate	84.08 3.03	1.136	0.329 NS
b.	Primary and middle school	83.45 3.11		
c.	High school and above	82.74 2.68		
<b>4.</b>	<b>Type of occupation#</b>			
a.	Clerical, shop-owner, farmer	83.38 2.98	0.159	0.853 NS
b.	Skilled / Semi-skilled worker	83.79 3.05		

c.	Unskilled worker	83.20 2.86		
<b>5.</b>	<b>Monthly per capita income#</b>			
a.	1547 – 2577	83.14 2.90	0.133	0.876 NS
b.	773 – 1546	83.64 3.03		
c.	Below 773	83.54 2.96		
<b>6.</b>	<b>Pattern of cucumber consumption*</b>			
a.	Weekly	82.55 2.63	2.003	0.050 NS
b.	Monthly	84.12 2.99		
<b>7.</b>	<b>Habits#</b>			
a.	Smoking	83.60 2.95	1.442	0.241 NS
b.	Pan chewing	84.00 3.02		
c.	Smoking and Alcohol	83.67 2.66		
d.	None	81.80 2.57		
<b>8.</b>	<b>Food pattern*</b>			
a.	Vegetarian	85.00 3.16	1.835	0.072 NS
b.	Non-vegetarian	83.16 2.81		

# ANOVA; \* Independent t Test ; NS = Not Significant

Table 3b depicts that there is no significant association found between the age, gender, education, occupation, monthly per capita income, pattern of cucumber consumption, habits, and food pattern of study subjects with the pre-intervention Diastolic BP.

#### Discussion

The discussion is done under following headings

1. Findings related to effect of cucumber on blood pressure.
2. Findings related to association of baseline variables with changes in blood pressure.

#### Findings related to effect of cucumber on blood pressure

In the present study, the pre-intervention Systolic BP of subjects was in the range of 120 – 138mmHg and Diastolic BP in the range of 80 – 88mmHg. The mean pre-intervention Systolic BP was 130.65 (SD 5.98) and the mean pre-intervention Diastolic BP was 83.49 (SD 2.94). The post-intervention Systolic BP was in the range of 118 – 138mmHg and Diastolic BP was in the range of 78 – 90mmHg. The mean post-intervention Systolic BP was 128.73 (5.65) and the mean post-intervention Diastolic BP was 82.95 (SD 2.64).

In the study, approx 100 grams of cucumber was given to the study subjects for 30 days. The studies done by the DASH (The Dietary Approaches to Stop Hypertension) group consisted of subjects consuming foods rich in magnesium, potassium and fiber. The study subjects BP lowered to normal levels. Cucumber is found as one of the component in DASH study which is administered approx 100grams per day. Cucumbers are a very good source of potassium and magnesium, an important intra-cellular electrolyte which helps in controlling blood pressure and heart rate by countering the effects of sodium. Cucumbers also have mild diuretic property due to their high water content, which is helpful in weight loss and high blood pressure. This would be the reason for reduction in blood pressure.

#### Findings related to association of baseline variables with changes in blood pressure

In the present study, the investigator made an attempt to find out whether the baseline variables affect the findings of the study. Selected baseline variables such as age, gender, educational status, occupation, monthly per capita income, pattern of cucumber consumption, habits and food pattern

were associated with changes in blood pressure before intervention of study participants.

With regard to the association of pre-intervention Systolic BP with baseline variables, the study reveals that there is statistically significant difference between the subjects who consumed cucumber weekly (Mean SBP 128.36; SD 6.25) and monthly (Mean SBP 132.18; SD 5.35) with p value <0.05 = 0.019.

With regard to the association of pre-intervention Diastolic BP with baseline variables, the study reveals that there is no significant association between the pre-Diastolic BP and the baseline variables.

#### Conclusion

Results of the present study show that cucumber can be used as one of the home remedial preventive measure to control blood pressure. The implications of this study are vital to nursing practice, nursing administration, nursing research and nursing education.

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#### References

1. Park K. Textbook of preventive and social medicine. 21<sup>st</sup> edition. India: M/S Banarsidas bhanot publishers. 2011;346:279-280.
2. Davidson's. Principles and practice of Medicine. 20<sup>th</sup> edition. Elsevier publishers,611 -613.
3. Ebrahim A, Balbisi, BS Pharm. An overview of JNC 7: Available from URL, 2004. <http://pharmacytimes.co.management> of hypertension. Accessed on 12 July 2013.
4. Victoria B. What to Add to Green Smoothie to Help with High Blood Pressure. Available from URL, 2011.

- <http://greensmoothiesblog.com/high-blood-pressure>.  
Accessed on 10 June 2013.
5. Whelton PK, Muntner P. Prevalance, awareness, treatment and control of hypertension. *Journal of Human Hypertension*. 2004;18(8):545-551.
  6. Chobanian AV, Bakris GL, HR, Black.et.al. Seventh report of the Joint National committee on prevention, detection, evaluation and treatment of high blood pressure, 2003, 1206-1252.
  7. Williams B, Poulter, Brown, Davis.et.al. Guidelines for management of Hypertension. *Journal of Human Hypertension*. 2004;18(3):139-185.
  8. Lewis S L. *Medical Surgical Nursing*. 7<sup>th</sup> edition. New Delhi: Elsevier publishers. 2007, 761.
  9. Libert MA, Prevalence of hypertension. Inc publishers. (Internet). Available from URL, 2012.  
<http://online.liebertpub.com/dia>. Accessed on 4 August 2012.
  10. *Indian J Med RES* 128. Available from URL  
<http://icmr.nic.in/ijmr/2008/december/1207-pdf>.  
Accessed on 5 August 2012.