

## Research Article

# A comparative study of pre and post prandial blood pressure recordings on normotensives and hypertensives on treatment

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## ABSTRACT

**Background:** The aim of the study was to study pre and post prandial BP recordings in normotensives and hypertensives on treatment above the age of 18 years.

**Methods:** The study will be conducted on 50 normotensives and 50 hypertensives on treatment admitted to our hospital over a period of 3 months. The patients are randomly selected and the details of duration and antihypertensive are noted. Both systolic and diastolic blood pressure is measured in supine position of the right arm using digital electronic blood pressure monitor. BP recordings are taken 30 min before and 30 min after meals. Then fall in BP is recorded.

**Results:** From this study we found that the mean systolic and diastolic blood pressure is higher in hypertensives than normotensive patients. The study was statistically significant which was found by paired t test. The post prandial fall in BP was significantly higher in hypertensives than normotensive patients. Probably hypertensives had reduced cardiac sympathetic tone which caused postprandial hypotension more than normotensive patients.

**Conclusions:** Apart from pharmacological treatment, poor housing condition and illiteracy of the parents of these patients need to be addressed.

**Keywords:** Postprandial hypotension, Normotensives, Hypertensives, Systolic BP, Diastolic BP

## INTRODUCTION

Post prandial hypotension is fall in the SBP of >20 mmhg or reduction in the postprandial SBP <90 mmhg when pre-prandial BP is >100 mmhg within 2 hours of meal.<sup>1,2</sup> In healthy and elderly individuals meal ingestion is associated with increase in the HR which serves to prevent significant fall in BP.<sup>3</sup> However in patients with postprandial hypotension this response is inadequate to maintain the BP.

After food ingestion, peptides are released in GIT, which cause local vasodilatation. Therefore, after meals,

redistribution of blood occurs because of shifting of large amounts of blood into GIT.<sup>4</sup> In normal individuals, this is well compensated and does not lead to post-prandial hypotension. The mechanism of post-prandial hypotension is well known.<sup>5,6</sup>

Some studies have shown that drugs like ACE inhibitors, Calcium channel blockers, diuretics and nitrates have reported to have postprandial fall in BP<sup>7</sup>. These drugs have also shown to cause postprandial hypotension in patients receiving multiple drugs for cardiovascular diseases.<sup>8</sup>

Postprandial hypotension is associated with syncope, falls, weakness, angina, dizziness, visual disturbance and CVA especially in elderly.<sup>9,10</sup> Post prandial hypotension has received less attention, although it occurs more frequently than orthostatic hypotension and represents substantial cause for morbidity and mortality.<sup>10</sup>

We hypothesized that food intake may result in a transient decrease in parasympathetic activity causing postprandial hypotension.

## METHODS

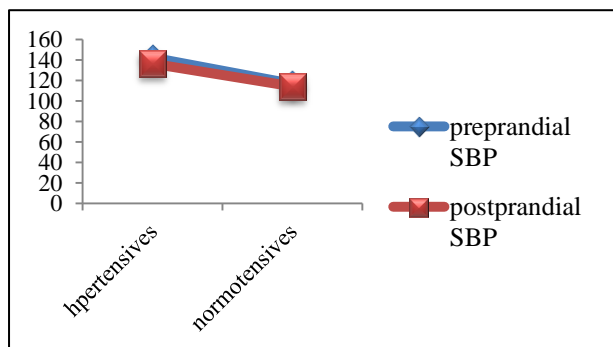
The study was conducted on 50 normotensives and 50 hypertensives patients admitted to Srinivas Institute of Medical Science and Research Center over a period of 3 months. The patients were randomly selected and the details of duration of hypertension and antihypertensive were noted. Both Systolic and Diastolic blood pressure is measured in supine position of the right arm using digital electronic blood pressure monitor. BP recordings are taken 30 min before and 30 min after meals. Then fall in BP is recorded. Informed consent was taken from all the participants.

All normal healthy individuals and those with pre-existing hypertension aged above 18 years were included in our study. Those having diabetes, alcohol abuse and autonomic neuropathy were excluded from the study. Statistical analysis was done using paired t test.

**Table 1: Comparison of pre-prandial and post-prandial systolic blood pressure between hypertensive and normotensive patients.**

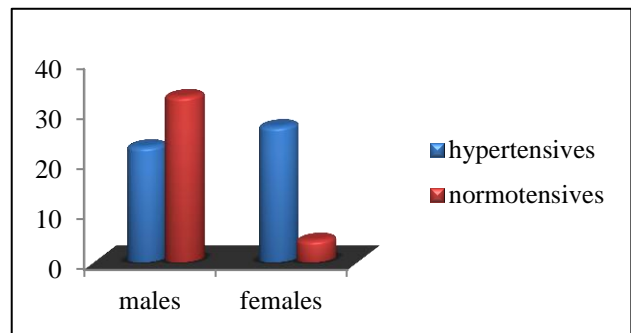
|                                       | Group           | Mean  | Standard deviation | T value | P value |
|---------------------------------------|-----------------|-------|--------------------|---------|---------|
| Systolic pre-prandial blood pressure  | hypertensives   | 142.4 | 12.54              | 9.958   | 0.05    |
|                                       | normotensives   | 116.8 | 13.16              |         |         |
| Systolic post prandial blood pressure | hypertensives   | 136.4 | 13.05              | 8.34    | 0.05    |
|                                       | normotensives   | 114.2 | 13.56              |         |         |
| Paired t value & P value              | T=0.309; P=0.05 |       |                    |         |         |

P value: 0.05



**Figure 2: Comparison of pre-prandial and post-prandial systolic blood pressure between hypertensive and normotensive patients.**

## RESULTS

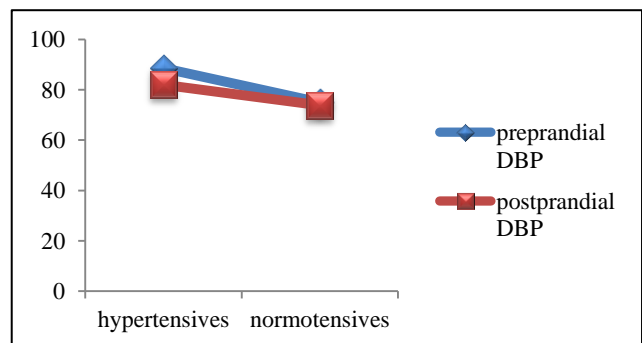


**Figure 1: Sex distribution of hypertensive and normotensive patients.**

As depicted in the above Figure 1 out of 50 normotensives studied 33 were males and 17 were females. Out of 50 hypertensives 23 were males and 27 were females.

As depicted in the above table 2 the mean systolic blood pressure was higher among hypertensives when compared to normotensives.

As depicted in the above table 3 the mean diastolic blood pressure was higher among hypertensives when compared to normotensives.



**Figure 3: Comparison of pre-prandial and post-prandial diastolic blood pressure between hypertensive and normotensive patients.**

From table 3, found that fall in blood pressure was higher among hypertensives than normotensives.

## DISCUSSION

From the above tables and graphs it is evident that the mean systolic and diastolic blood pressure is higher in hypertensive than normotensive patients. The study was statistically significant which was found by paired t test. Thereby the fall in BP was significantly higher in hypertensive than normotensive patients. Studies done by Narender P et al. and Vloet et al. have also shown that postprandial hypotension is more common in hypertensive than normotensive patients.<sup>1,2</sup> These studies also support our study which also shows that postprandial

hypotension was significantly higher among hypertensives when compared to normotensives.

We have hypothesized that there may be a decrease in parasympathetic activity after meals to compensate for the change in blood distribution thereby causing postprandial hypotension. Postprandial hypotension is probably multifactorial, possibly involving an attenuated baroreflex, an attenuated reflex increase in sympathetic activity by activation of stretch receptors in the stomach, sympathetic dysfunction, and patients with an incapability to increase cardiac output due to heart failure or any combination of these factors.<sup>1</sup> Imbalance in cardiac autonomic activity might be a predisposing factor for arrhythmogenesis and subsequently sudden cardiac deaths.<sup>3,11</sup>

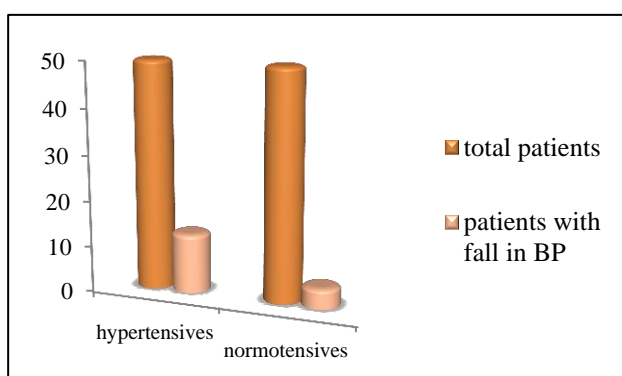
**Table 2: Comparison of pre-prandial and post-prandial diastolic blood pressure between hypertensive and normotensive patients.**

|  | Group           | Mean | Standard deviation | T value | P value |
|--|-----------------|------|--------------------|---------|---------|
| pre-prandial diastolic blood pressure  | hypertensives   | 88.6 | 10.88              | 6.65    | 0.05    |
|  | normotensives   | 75   | 9.52               |         |         |
| post prandial diastolic blood pressure | hypertensives   | 82   | 9.68               | 4.026   | 0.05    |
|  | normotensives   | 73.8 | 10.66              |         |         |
| Paired t value & P value               | T=0.309; P=0.05 |      |                    |         |         |

P value: 0.05

**Table 3: Patients with fall in blood pressure.**

|               | Total patients | No. of patients with fall in BP |
|---------------|----------------|---------------------------------|
| hypertensives | 50             | 13                              |
| normotensives | 50             | 6                               |



**Figure 4: Patients with fall in blood pressure.**

Postprandial hypotension is associated with syncope, falls, weakness, angina, dizziness, visual disturbance and CVA.<sup>3</sup> A strong association between falls and syncope in elderly subjects with postprandial hypotension has been established.<sup>2,3</sup> It has been suggested that orthostatic hypotension commonly caused by autonomic function,

may contribute to effect of posture on postprandial fall in BP.<sup>2</sup> It has also been shown that orthostatic hypotension is additive to postprandial hypotension rather than synergistic.<sup>5</sup> Most of the unexplained syncopes in elderly patients who are hospitalized postprandial hypotension should be excluded.<sup>10</sup> In elderly patients receiving multiple therapies for cardiovascular diseases, orthostatic and postprandial hypotension should be taken care of.

## CONCLUSION

From the above study we conclude that postprandial hypotension was significantly higher in hypertensive than normotensive patients. Post prandial hypotension has received less attention, although it occurs more frequently than orthostatic hypotension and represents substantial cause for morbidity and mortality. However there are very few studies which have shown correlation of postprandial hypotension and antihypertensives. Hence there is need for further studies on drugs used in hypertension causing significant fall in postprandial BP.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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