

**Original Article****Effect of Decoction of Camellia Sinensis on Blood Pressure and Heart Rate****1. Naveed Ullah 2. Nazima Rafique 3. Aamir Nazir 4. Sadaf Anwar 5. Nouman Altaf****6. Ghayour Ahmed**

1. Sen. Lecturer of Pharmacology, FMC, Abbottabad 2. Lecturer of Biochemistry, FMC, Abbottabad 3. Lecturer of Physiology, AMC, Abbottabad 4. Lecturer of Pathology, AMC, Abbottabad 5 & 6. PG Students of M.Phil, Pharmacology, University of Malakand.

**ABSTRACT**

**Objective:** Camellia sinensis as a tea (hot decoction) is so widely used throughout the Asia. Therefore to find out, their effects on all the body functions are the need of hour. In the current study the effect of Camellia sinensis on human (females) blood pressure has been evaluated.

**Study Design:** Observational study.

**Place of Study:** This study was conducted at Pharmacy Department, University of Malakand.

**Materials and Methods:** The blood pressure before and after giving the decoction of Camellia sinensis to seventy six individuals was evaluated by using sphygmomanometer and stethoscope.

**Results:** A moderate increase in the blood pressure had been noted. Also a great decrease in the heart rate of individuals has been identified after taking the decoction.

**Conclusion:** From the current study it can be concluded that green tea have an effect of increasing blood pressure in the females, so the heart patients have to take care while using green tea in excess quantity.

**Key words:** Camellia sinensis, Decoction, Blood pressure, Heart rate

**INTRODUCTION**

Nature has been a source of medicinal agents and a large number of drugs are isolated from natural sources. Medicinal plants have a great value in the field of health. From the very past the use of herbal medicine have been very important, and fulfills the primary health care needs of about 80% of the world population<sup>1</sup>.

The leaves of Camellia sinensis is used as green tea, which have undergone minimal oxidation during processing. Green tea originates from China<sup>2</sup> and has become associated with many cultures in Asia. According to a survey released by the United States Department of Agriculture in 2007<sup>3</sup>, the mean content of flavonoids in a cup of green tea is higher than that in the same volume of other food and drink items that are traditionally considered of health contributing nature, including fresh fruits, vegetable juices or wine. Flavonoids are a group of phytochemicals in most plant products that are responsible for such health effects as anti-oxidative and anticarcinogenic functions<sup>3</sup>.

Green tea contains salubrious polyphenols, particularly catechins, the most abundant of which is epigallocatechin gallate, carotenoids, tocopherols, ascorbic acid (vitamin C) minerals such as chromium, manganese, selenium or zinc, and certain phytochemical compounds. It is a more potent antioxidant than black tea<sup>4</sup>. Types of tea are commonly

graded depending on the quality, parts of the plant used and how they are processed<sup>5</sup>. After water, tea is the most widely consumed beverage in the world<sup>6</sup>. In a study of the eating habits of 2,018 women, consumption of mushrooms and green tea was linked to a 90% lower occurrence of breast cancer<sup>7</sup>. The green tea extract may play a role in the control of body composition via sympathetic activation of thermogenesis, fat oxidation, or both<sup>8</sup>. It has also been presented that epigallocatechin-3-gallate (a component of green tea) can be used in prevention or treatment of inflammatory processes<sup>9</sup>. However, pharmacological and toxicological evidence does indicate that green tea polyphenols can in fact cause oxidative stress and liver toxicity<sup>10</sup>. Other evidence presented in the review cautions against the drinking of green tea by pregnant women<sup>11</sup>. It "suggested that the oral intake of L-Theanine (a chemical found in green tea) could cause anti-stress effects via the inhibition of cortical neuron excitation<sup>12</sup>. Daily consumption of tea containing 690 mg catechins for 12 wk reduced body fat, may be useful in obesity<sup>13</sup>. Green tea also has a role in the treatment and prevention of cancer<sup>14</sup> and to treat multiple sclerosis<sup>15</sup>.

As Camellia sinensis is mostly used as a tea in the form of hot decoction, throughout the Asia. Therefore the current study was designed with a view to confirm and explore the effects of green tea on the blood pressure according to gender. Whether it is beneficial for high

blood pressure in females or it may lead to high blood pressure, to stop drinking by volunteers' have routine high blood pressure.

## MATERIALS AND METHODS

### Plant Material

The fresh dried and processed leaves of *Camellia sinensis* plant were purchased from local market Abbottabad, Pakistan. The specimen pack, marked with a number 1320 has been deposited in Pharmacy Museum, University of Malakand Pakistan.

### Preparation of Decoction

Each sachet contained 02 grams of dried plant material were soaked in each cup of 150ml boiling water for three minutes. 10 grams of sugar were added as a sweetening agent to each cup.

### Experimental protocol

The basis for this investigation was blood pressure and heart rate of 3<sup>rd</sup> year students of Frontier medical College Abbottabad Pakistan. Subjects were selected on the basis of four primary criteria. These include age, sex, health and Physical body status. The research specifically targets individuals between 21 and 23 years of age. Seventy six female students, who fulfilled the above criteria, were selected for the study. They were first provided a thorough explanation of the research effort, its benefits and the potential risks to subjects.

Blood pressure and heart rate were noted in all the volunteers by using aneroid sphygmomanometer with stethoscope before and after the drinking of one cup of decoction. I.e. Before, at 0min and after 30 & 60 minutes of taking the decoction. Cumulative results were calculated by using formula;

Cumulative (systolic/ diastolic/ Heart rate) =

$$\frac{\text{Sum of all systolic / diastolic / heart rate}}{\text{total number (76)}}$$

## RESULTS

A total seventy six individual were selected in the current study, and a cumulative result was shown in table 1.

**Table.No.1: cumulative result of eighteen female subjects for B.P & HR**

| Sex    | Timing           | Systolic Blood Pressure | Diastolic Blood Pressure | Heart Rate |
|--------|------------------|-------------------------|--------------------------|------------|
| Female | Initial Reading  | 105 mmHg                | 68 mmHg                  | 75/min     |
|        | After 30 minutes | 107 mmHg                | 69 mmHg                  | 71/min     |
|        | After 60 minutes | 114 mmHg                | 72 mmHg                  | 60/min     |

A decrease in the heart rate was observed as; in the first half hour a little decrease in the heart rate had been noted, while in the next half hour a great decrease in the heart rate had been observed. From this it has been confirmed that *Camellia sinensis* has a strong effect on heart rate, i.e. it decreases the heart rate in normotensive female individuals. It was also noted a little increase in the systolic blood pressure in the first half hour which further increased in the next half hour. As far as the diastolic blood pressure is concerned, the decoction of *Camellia sinensis* was found to have a little increase in the diastolic blood pressure too.

## DISCUSSION

The current study reveals that, drinking of Green tea by the females individuals may have a high risk of increase blood pressure. For each heartbeat, BP varies between systolic and diastolic pressures. Systolic pressure is peak pressure in the arteries, which occurs near the end of the cardiac cycle, when the ventricles are contracting. Diastolic pressure is minimum pressure in the arteries, which occurs near the beginning of the cardiac cycle when the ventricles are filled with blood. An example of normal measured values for a resting, healthy adult human is 120 mmHg systolic and 80 mmHg diastolic.

As Hodgson et al<sup>16</sup> reported that drinking of green tea leads to acute increase in systolic and diastolic blood pressure at 30 min after drinking. Same result was noted in the current study, but no significant increase were noted at 30 minutes but after 60 minutes more significant increase in the systolic blood pressure were recorded. And also a notable increase in the diastolic blood pressure was confirmed, may be dependant on gender.

Seifert et al<sup>17</sup> reported that, Green tea extract in a short-term dosing schedule similar to that commonly used with dietary supplements did not result in alterations in heart rate or blood pressure, while in the current study it was found that each cup of green tea have a significant increase in systolic and minor increase in diastolic blood pressure. Also a great fall in heart rate had been noted i.e. from 75 heart beat to 60 heart beat. So it is recommended for heart patients to take care of drinking green tea.

There is some evidence suggesting that regular green tea drinkers have lower chances of heart disease<sup>18</sup> and of developing certain types of cancer<sup>19</sup>. Although green tea does not raise the metabolic rate enough to produce immediate weight loss, a green tea extract containing polyphenols and caffeine has been shown to induce thermo genesis and stimulate fat oxidation, boosting the metabolic rate 4% without increasing the heart rate<sup>8</sup>. Same was the finding that it couldn't increase heart rate but we can say that it decreases the heart rate.

## CONCLUSION

From the current study it can be concluded that, Green tea have an effect of increasing blood pressure in the females, so the heart patients who have proven to high blood pressure must, have to take care while using green tea in excess quantity.

## REFERENCES

1. World Health Organization. General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine WHO, Geneva, Switzerland, 2001.p. 10.
2. The Tea Guardian. Quality Basics 1: Various Plants, Various Qualities. Retrieved 20 December 2010
3. USDA Database for the Flavonoid Content of Selected Foods, Release 2.1; 2007
4. Cabrera C, Artacho R, Giménez R. Beneficial effects of green tea-a review. *J Am Coll Nutr*, 2006; 25 (2): 79–99.
5. Heiss Mary Lou Heiss, Robert J. The story of tea: a cultural history and drinking guide.2007.p.179–185
6. Alan Macfarlane; Iris Macfarlane. The Empire of Tea. The Overlook Press 2004.p. 32
7. Zhang M, Huang J, Xie X, Holman CD. Dietary intakes of mushrooms and green tea combine to reduce the risk of breast cancer in Chinese women. *Int J of Cancer* 2009;124 (6): 1404–8
8. Dulloo AG, Duret C, Rohrer D. Efficacy of a green tea extracts rich in catechin polyphenols and caffeine in increasing 24-h energy expenditure and fat oxidation in humans. *Am J Clin Nutr* 1999; 70 (6): 1040–5
9. Rodríguez-Caso C, Rodríguez-Agudo D, Sánchez-Jiménez F, Medina MA. Green tea epigallocatechin-3-gallate is an inhibitor of mammalian histidine decarboxylase. *Cell Mol Life Sci* 2003;60(8):1760–3.
10. Lambert JD, Sang S, Yang CS. Possible controversy over dietary polyphenols: benefits vs risks. *Chem Res Toxicol* 2007; 20 (4): 583–5
11. Strick, Strissel PL, Borgers S, Smith SL, Rowley JD. Dietary bioflavonoids induce cleavage in the MLL gene and may contribute to infant leukemia. *Proc Natl Acad Sci USA* 2000; 97 (9): 4790–4795
12. Kimura K, Ozeki M, Juneja LR, Ohira. L-Theanine reduces psychological and physiological stress responses". *Biol Psychol* 2007; 74 (1): 39–45
13. Nagao T, Komine Y, Soga S. Ingestion of a tea rich in catechins leads to a reduction in body fat and malondialdehyde-modified LDL in men. *Am J Clin Nutr* 2005; 81(1): 122–9
14. Sartippour MR, Pietras R, Marquez-Garban DC. The combination of green tea and tamoxifen is effective against breast cancer. *Carcinogenesis* 2006; 27 (12): 2424–33
15. Sueoka N, Suganuma M, Sueoka E. A new function of green tea: prevention of lifestyle-related diseases. *Ann N Y Acad Sci* 2001; 928: 274–80
16. Hodgson JM, Pudsey IB, Burke V, Beilin LJ, Jordan N. Effects on blood pressure of drinking green and black tea. *J Hypertens* 1999; 17(4):457–63.
17. Seifert JG, Nelson A, Devonish J, Burke ER, Stohs SJ. Effect of Acute Administration of an Herbal Preparation on Blood Pressure and Heart Rate in Humans. *Int J Med Sci* 2011; 8:192-197.
18. The Tea Guardian. Tea & Cardiovascular Health. Retrieved 20 December 2010.
19. Green Tea's Cancer-Fighting Allure Becomes More Potent, 2003.

### Address for Corresponding Author:

Dr. Naveed Ullah  
 Tel: 0092-992-511020  
 Cell: 0092-345-5910522  
 E-mail: naveedjia@yahoo.com  
 naveedullahpharmacist@gmail.com