Introduction
As the population becomes older and more obese, the number of people with hypertension continues to increase. In developing countries worldwide, with the increase in urbanization and adoption of sedentary life style and high fat, high caloric diet, it is estimated that the incidence and prevalence of hypertension is increasing, alarmingly. As a consequence of the increased awareness of the damage caused by hypertension and with the recognition that the progress of hypertension induced cardiovascular diseases, can be slowed down by its treatment, the management of hypertension is now the most common indication for visits to physicians by urban middle aged and elderly individuals.

Hypertension affects approximately 50 million individuals in the United States and approximately one billion individuals worldwide. As the population ages the prevalence of hypertension is likely to increase. Recent data from the Framingham heart study suggests that the individuals who are normotensive at 55 years of age have a 90% life time risk for developing hypertension.

Today’s, fast hitech world has not even spared the eating and drinking habits of the masses. Cola drinks, chocolates, coffee etc have become ready to serve and consume snacks of the day. It’s high time, hence, to dwell into the pharmaco therapeutic aspects and the effect of caffeine consumption on the human biological system. The intake of caffeine containing beverages in many adults and children often reaches levels that can induce pharmacological effects.

Caffeine is an alkaloid, which is a mild central nervous system, cardiac and respiratory system stimulant.
It is abundantly found in coffee, tea, cocoa nuts etc. When present in tea it is known as “thein”. One standard cup of coffee on an average contains 75 mgs of caffeine.

When caffeine or coffee, is taken orally by a non-user or an abstainer, it causes a rise in both systolic and diastolic blood pressures. This effect is more pronounced in those who are already hypertensives. There is a prolonged increase in B.P by a single oral dose of caffeine in mildly hypertensive men (American Journal of Hypertension, Aug 1994).

Although considerable tolerance rapidly develops to the pressor effect of caffeine, the previous response is regained after a few hours (Shi et al, 1993). Those who drank five cups or more of coffee / day, have on an average, a 2.4/1.2 mm Hg higher B.P than those who abstain (Jee et al, 1999). In a 32 year follow-up of 1,017 former medical students, the incidence of hypertension was nearly threefold higher in those who drank 1 – 5 cups of coffee / day as compared to non-coffee drinkers (Mead et al, 1996). In contrast, increased caffeine intake, ascertained by multiple careful dietary results, was associated with lower B.P among the participants in the Multiple Risk Factor Intervention Trial (Stamler et al, 1997).

Stress has been shown to stimulate sympathetic nervous system, which could lead to hypertension. Among healthy employed men, job stress is associated with higher awake ambulatory B.P, an increased risk for developing hypertension, and an increased left ventricular mass index by echocardiography (Pickering, 1997), at least partly mediated by an increased heart rate in response to stress (Vrijkotte et al, 2000).

In a 10 year follow up of 103 young men, Light et al (1999) found the highest rises in B.P over time among those who responded most to
In view of the evidence that, stress related anxiety (Jonas et al, 1997; Markovitz et al, 1995) and job stress (Pickering et al, 1996) may be involved in the development of hypertension, various stress-relieving techniques to lower B.P have been used for many years.

More recently, a variety of cognitive behavioral therapies – including transcendental meditation, yoga, biofeedback and psychotherapy, have been shown to reduce the B.P of hypertensive patients at least transiently (Henderson et al, 1998).

Standardized and reproducible stress procedure :-
1. Stroop colour card test.
2. Mental arithmetic test.

For the study of emotionally induced cardiovascular changes the aim is to use mild but adequate emotional stimuli that could be repeatedly applied and would give quantitatively reproducible effects on the forearm blood flow as well as on systolic and diastolic blood pressure. After many trials, a combination of the stroop procedure and mental arithmetic has proved sufficient.

Stroop in the year 1935 introduced a method to study pain of conflicting stimuli both being inherent aspect of the same symbols. The stroop color – word test has lately been used in various modified forms in many laboratory stress studies. The procedure is as follows : On a card the words red, blue, green and yellow are printed in different colours ; no word is printed in the color it indicates, but an equal number of times in each of the other three colors. Thus, each word presents the name of one color. Hence, a word stimulus' and a color stimulus are presented simultaneously. The color-word test involves
interference between color naming and word reading. The test card contains a hundred words. The patient being examined will have to first read aloud the words and then to name as quickly as possible the colours of the printed words.

After 2 – 3 minutes necessary for the stroop procedure, the subjects have to perform some mental arithmetic for 5 to 6 minutes. The test was given verbally to subjects, it consisted of repeated subtraction of 7 from 1000. The total time of the whole mental stress situation was 8 – 10 minutes. The cardiovascular pattern during such a simple experimental emotional stress situation is in principle the same as the one observed during natural stress of day to day life (e.g. during quiet conversation, examination, hazardous situations, etc.). It is therefore possible to study problems of emotional stress with this model.

The sympathetic nervous system plays a critical role in the maintenance of normal body temperature during exposure to cold environment. Receptors in the skin and CNS respond to a fall in temperature, by activating hypothalamic and brainstem centers that increase sympathetic activity. The reflex responses activated by cold are controlled from the posterior hypothalamus. When cutaneous blood vessels are cooled, they become more sensitive to catecholamines and the arterioles and venules constrict. The sympathetic response involves a complex interaction between lower environmental temperature and α2-adrenergic receptors.

The cold pressor test assesses sympathetic function. The individual immerses one hand in ice water (10 to 40 C) and B.P is measured at 30 seconds and one minute. The systolic and diastolic pressures normally rise by 10 to 20 mm Hg. The afferent pathway is
A study published in Journal of Human hypertension (Carrol D, Davey Smith G, et al Dec 1996) studied blood pressure reactions to the cold pressor test and the prediction of future blood pressure status, suggested that the cold pressor test may be of limited clinical use in older population.

Another study published in Journal of hypertension (Woisetschlager C. et al, April 2000) studied increased blood pressure response to the cold pressor test in pregnant women developing pre-eclampsia. They concluded that an increased vasoconstriction response to a physiological stimulus is present in women with pre-eclampsia as a sign of an increased vascular reactivity, prior to clinical manifestation of the disease. The cold pressor test may be a suitable diagnostic tool to identify women, who will develop pre-eclampsia.

The response of B.P during graded exercise has been found to predict the development of hypertension in normotensives (Matthews et al, 1998; Miyai et al, 2000; Singh et al, 1999) and there subsequently mortality from cardiovascular disease (Mundel et al, 1996; Kjeldsen et al, 2001).

Different upper limits for a normal response to exercise have been used in various series. Matthews et al (1998), considered an exaggerated response to be a rise of more than 60 mm of Hg in systolic BP at 5 minutes, a rise of more than 70 mm Hg at 10 minutes, or a rise of more than 10 mm Hg in diastolic BP at any time. In various series, such an exaggerated response increases the likelihood of the onset of hypertension from two to four fold over the subsequent 5 – 10 years as compared with that seen with non-exaggerated responses.
an exercise test, has been found to predict the onset of hypertension over the next four years (Everson et al, 1996).

Hypertension is taking its toll in today's world. Most of the middle-aged individuals presenting in the OPDs are either hypertensives or harbour a disease that has been borne of hypertension.

Caffeine is one of the ingredients of the common food and drink articles consumed, that significantly affect BP. Stress has become the part and parcel of the life of modern man, because of adoption of sedentary mode of life style. Exercise and physical activity have become stories of the past. To review, the role of autonomic nervous system in BP regulation in hypertensive individuals, I studied its trends by carrying out cold pressor test in my subjects.

So we decided to study the effect of Caffeine, Stress, Cold pressor test, Physical activity on blood pressure in middle aged (30 – 50 years) hypertensive individuals.