Introduction
INTRODUCTION

Hypertension is a disease that makes for a lot of drawing room conversation and is probably the bane of modern living. A report on prevention of hypertension in the Archives of Internal Medicine says that 15 percent of the age group 35 to 44 suffer from high blood pressure or hypertension, with incidence rising to 33 percent in the age group 45 to 54 and 48 percent in the age group 55 to 64.

While a certain amount of blood pressure— the pressure exerted by the blood on the walls of the blood vessels— is needed to keep the circulation going, when it exceeds a particular limit it is called hypertension. Blood pressure is expressed in two ways: systolic pressure which is the pressure exerted or generated when the heart contracts and diastolic pressure, when the heart relaxes.

According to the American Heart Association, systolic pressure above 140 mm Hg and diastolic above 90 mmHg can be considered hypertension. But here again if a person is not a smoker, not a diabetic, does not have high cholesterol and is of ideal weight for his age then a blood pressure reading of up to 140/90 can be considered normal but if a person has any of the above risk factors a pressure of 120/80 or 130/80 is better.

Dr. N. Sivarajan, chief of Cardiology, Tamilnad Hospital and Vijaya Health Centre, Chennai points out, “Blood pressure is dependent on the amount of blood that is pumped by the heart per beat and the resistance against which it is pumped. The resistance is determined by the state of the blood vessels. If the blood vessels are constricted, pressure will be high.

Blood pressure is also affected by the emotional state of a person.
Excitement, anger or tension can cause BP to rise but it comes down to normal within a couple of minutes.

“Women have lower morbidity and mortality rates from any level of hypertension and it takes higher BP to hurt women. More men than women are affected, but some women can develop high BP during pregnancy but soon after childbirth the blood pressure usually comes down to normal”, adds Dr. I. Sathyamurthy, Director of Cardiology, Apollo Hospitals, Madras.

“To established that a person has hypertension at least three readings should be high”, he cautions.

Often patients do not even know they suffer from high blood pressure as hypertension does not produce symptoms in the early stages. When symptoms do occur it is rather late.

Dr. Sivarajan observes, “It is a misconception that if your BP is high you will experience symptoms like giddiness. Most of the time symptoms are incidental. The only way to know is to have your BP recorded.

More than the disease itself it is the complications of high BP which produce symptoms. Hypertension slowly erodes end organs like the kidney, heart, brain and eyes. It can lead to heart attacks, thickening of the heart muscle (from the heart having to generate enormous pressure to propel the blood out), heart failure or enlargement, strokes, cerebral haemorrhages of smaller blood vessels, renal failure and poor vision.

Since there is no cure for hypertension it is important to treat the patient to prevent end organ damage. But the actual cause in a large majority of cases is a mystery. Says Dr. N. Sivarajan, “In 95 percent of the cases, we do not know the cause that is primary or essential hypertension. Secondary hypertension is when the patient suffers from some organs disease which raises blood pressure.”
These include renal artery stenosis, congenital diseases like coarctation of the aorta, endocrinal abnormalities, adrenal glands tumours, certain types of brain tumours, repeated urinary infections in women which cause both kidneys to shrink and raise blood pressure.

Says Dr. Thanikachalam, Director, Cardiac Care Centre, Sri Ramachandra Medical College and Research Institute, Madras, “One thing is certain: it runs in families. Studies in the US by Dr. Norman Kaplan on why some families were more prone to hypertension than others, discovered that people born in to hypertensive families when given excess salt are not able to excrete it readily. Thus the problem with the kidney is functional, not structural.

When excess salt is deposited in the cells they react differently to stimuli and tend to constrict, causing blood pressure to rise. Hypertensive people are generally A-type personalities: target-oriented, aggressive people who cannot tolerate being looked down upon. Their sympathetic nervous system is overactive and this constricts the blood vessels.”

Thus those who have a family history of hypertension, hold stressful jobs, are obese or already have one risk factor—smoking, diabetes, high cholesterol levels—should undergo regular checks from the age of 40.

Says Sathyamurthy, “For mild hypertensive, non-pharmacological methods or non drug therapy is the first line of treatment. These include a low salt diet, quitting smoking, reducing weight, limiting alcohol consumption, practising yoga or meditation, exercising regularly and increasing intake of fruits, vegetables and fibrous foods.”.

If non-drug therapy does not work over a period of three to six months, drug therapy should be start. However many patients do not take the drugs regularly and report to the doctor for periodic monitoring. This, doctors emphasize, is a
mistake. Drugs must be taken lifelong and prescriptions tailored according to the patients needs. Some drugs do produce side-effects like fatigue or impotence, while some are unsuitable for asthmatics. Dr. Sivarajan says, “If these interfere with your lifestyle, let your doctor know. For even a marginal reduction in BP can help reduce morbidity.”

With regular medication, hypertensives can live full and normal lives.

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<tr>
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<th>Systolic</th>
<th>Diastolic</th>
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<tbody>
<tr>
<td>Mild Hypertension</td>
<td>140-159 mm Hg</td>
<td>90-99 mm Hg</td>
</tr>
<tr>
<td>Moderate Hypertension</td>
<td>160-179 „</td>
<td>100-109 „</td>
</tr>
<tr>
<td>Severe Hypertension</td>
<td>180-209 „</td>
<td>110-119 „</td>
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<tr>
<td>Very severe Hypertension</td>
<td>Over 210 „</td>
<td>Over 120 „</td>
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The criteria for the diagnosis of hypertension are arbitrary, because the arterial pressure rises with age and varies one occasion of measurement to another. The most authorities consider hypertension to be present when the diastolic pressure consistently exceeds 100 mm Hg in a person less than 50 years of age or 90 mmHg in person less than 50 years of age. The World Health Organisation has defined hypertension as a state in which systolic pressure is 150 mmHg or more a diastolic pressure is 95 mmHg or more.

Hypertension is uncommon before the age of 20, although recent data suggest a higher frequency if one uses different criteria for children, such as pressure exceeding 90th percentile for age. In young people it is commonly caused by chronic glomeronephritis, renal artery stensis, pyelonephritis or coarctation of aorta.

Transient elevation of blood pressure caused by excitement, apprehension, or exertion and the purely systolic elevation of blood pressure in elderly people caused by loss of elasticity in the major arteries do not constitute hypertensive
disease if the mean blood pressure is less than 107 mmHg. However systolic elevation is a significant disease reflecting atherosclerosis of the aorta and the prognosis is therefore correspondingly less good. Treatment with antihypertensive agents has not been established as effective in decreasing the mortality rate in this group and they must be used cautiously and in small doses to prevent hypertension and decreased cardiac output.

There are three types of hypertension

A. Essential or Primary hypertension

B. Secondary hypertension

C. Malignant hypertension

Essential hypertension may be also defined quite arbitrarily, as being present when the casual arterial blood pressure persistently exceeds 150/90 mmHg or 160/100 mmHg. However, when the effect of age is taken into account, there may be no sharp dividing line between normal and hypertensive blood pressure levels. In the majority of patients there are no specific symptoms attributable to hypertension, which is detected in routine examination or because of one of its complications. Acute hypertension generally causes headache or polyurea, but these are transient.

Approximately 90% of all persons who have hypertension are said to have hypertension meaning hypertension of unknown origin. The commonest variety of hypertension is essential hypertension. Hereditary plays a part of determining, whether a patient develop essential hypertension. Indeed the condition has been described is an inherited tendency to develop high blood pressure in middle life. In an investigation in families where in parent had normal blood pressure and incidence of hypertension was only 3%. When one parent suffered from hypertension the incidence in the children was 45% (Arman). In 1956 a family was reported with
three generation of hypertensive patients (Wear). All of the first generation died of stroke except one who died on high blood pressure, at the age of 62. All three of the sisters married man with moderate hypertension and their 3 children, one of them a girl aged 12 years, all have blood pressure above normal. The hereditary tendency in general & transmitted as a Mendelian dominant (William Boyd).

An estimated 15% of the population of the United States suffers from this cardio vascular disorder (i.e. essential hypertension) which in turn predisposes them two other deadly cardio vascular disorders: heart attack & stroke (MacMahon, Peto, Cutter, et al., 1990). Untreated hypertensives have an average life expectancy of between fifty & sixty years, compared with severity-one years for the population at large.

The function of the cardiovascular system, consisting of the heart & the peripheral blood vessels, is to pump blood through the body, carrying nutrients when they are needed and carrying wastes where they can be disposed of. When a normal persons blood pressure rises too high, the baro receptors convey this information to the brain, and in response to this negative feedback, the brain then relaxes the constricted vessels walls. In hypertensives, however, the regulatory mechanism some how fails to work, with the result that the blood vessels remain chronically constricted and hence the blood pressure chronically high.

In a small percentage of cases, approximately 10 to 15 percent, hypertension linked to an identifiable organic cause, usually kidney disfunction (D. Sharpiro & Goldstein 1982). In remaining cases, known as essential hypertension, there is no known organic causes. Many different factors has been suggested. One is environment. It may be that some essential hypertensives live in environments that are particularly rich in the kind of stressors that increase blood pressure—danger for example. Researchers have noted that people have bouts of high blood pressure when they are in situations requiring constant alertness against danger (Gutmann &
Benson 1971). In light of these findings, it is interesting to note that essential hypertension is twice as common among blacks as it is among whites. While this disparity may be a function of genes, diet, or other factors, one might also hypothesize that blacks as a group are exposed to greater stress than whites. A study of black people in Detroit found that those living in high stress areas—neighbourhood, with lower income, higher unemployment, higher divorce rate, higher crime rate—had higher blood pressure than those living in low stress areas (Harburg, 1978).

Essential hypertension may also be due in part to individual response specificity. In other words, genes or experienced may have programmed the brain to respond to different kind of stress with increase in blood pressure. Recent research has focused on subjects assumed to be at risk for hypertension, including people with at least one hypertensive parent and people who have mildly elevated blood pressure in childhood or early adulthood. When confronted with demanding behavioural and cognitive tasks, such people do experience greater cardiovascular reactions than people without family history of hypertension (Fredrikson, 1990, Steptoe, 1984). Some research suggests that hypertension may be associated with certain personality traits, above all, the tendency to suppress anger.

Because high blood pressure produces no immediate discomfort, many hypertensive are unaware of their condition, with the result that it may go untreated for years. Furthermore, those who are aware that they have hypertension are often unaware that circumstances in their family life or work environment may be aggravating it. Like the baroreceptor mechanism, they have adapted to the stress and no longer see it as stressful. A number of physical factors—above all, smoking, obesity, and high salt intake—have been shown to aggravate hypertension. Obese people are three times more likely to be hypertensive than people who are not overweight (Van Italli, 1985). As for smoking, it apparently combines synergistically with hypertension to create a high risk of heart disease (Wilhelm Sen, 1988).
Etiology of Hypertension:

Essential hypertension does not always have uniform pathophysiologic features, there is evidence that subsets of patients can be identified in terms of factors that regulate the blood pressure and salt & water content of the blood in the normal population. These include baroreceptor activity, cardiac output, systemic vascular resistance, blood volume, activity of the sympathetic and central nervous system and the Renin-angiotension-aldosterone system. Renin, a proteolytic enzyme, is secreted by juxtaglomerular cells surrounding the afferent arterioles in response signal that is related to stretch of the afferent arteriole or to decreased volume or sodium content. Renin exists in the plasma in an inactive (prorenin) and an active renin form. The active renin acts on a substrate( a substance upon which an enzyme acts) in the plasma, producing angio-tension-I which is then acted upon by a converting enzyme to form angiotension II, which is the most pressor substance known. Agiotension II, by an effect on the zona glomerulosa of the adrenal cortex, increases the secretion of aldosterone, (the minerals corticoid hormone, secreted by the adrenal cortex, which regulate electrolyte & water balance by promoting the retention of sodium and excretion of potassium.) Which results in sodium & water retention by its characteristics action on the distal renal tubule, thus restoring blood volume, by negative feed back, the secretion of renin is then reduced until equilibrium results. Approximately 20% of hypertensive patients have low plasma renin but normal aldosterone production, and 15% have high plasma renin in the absence of accelerated malignant phase. Patient with low renin hypertension respond well to drugs. But measurement of renin in clinical practice out side of research centres has limited applications.

There some evidence of increased sympathetic activity in borderline or mild hypertension (raised cardiac output, heart rate, & ejection fraction).
Classification of blood pressure for adults aged 18 years & older (According to fifth joint national committee on detection, evaluation & treatment of high blood pressure, 1993)

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic mmHg</th>
<th>Diastolic mmHg</th>
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<tbody>
<tr>
<td>Normal</td>
<td>&lt;130</td>
<td>&lt;85</td>
</tr>
<tr>
<td>High normal</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage-1 (mild)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage-2 (moderate)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Stage-3 (severe)</td>
<td>180-209</td>
<td>110-119</td>
</tr>
<tr>
<td>Stage-4 (very severe)</td>
<td>≥210</td>
<td>≥120</td>
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Hypertension is an important preventable cause of cardiovascular disease, prospective studies have shown that without treatment, hypertension greatly increases the incidence of cardiac failure, coronary heart disease with angina pectoris & myocardial infarction, hemorrhagic & thrombotic stroke and renal failure. Epidemiologic studies have shown that only a portion of population is receiving effective antihypertensive therapy, education of the physician & patient is necessary to identify by the patient with hypertension to ensure adequate treatment, and to reinforce the concept that treatment is a life long process and that compliance with the treatment program is essential to an effective result. The prevention as well as the reversibility of hypertensive complications by antihypertensive therapy is a major public health concern.

**Hypertension and Motives**

Contemporary societies in both the developed and developing parts of the world are undergoing far-reaching changes such as, the rising number of dual-
career families, rising proportions of working women, part time & casual workers in the work force, and reduction in work hours. These changes are creating new patterns of involvement in family life that need be studies. For instance, in Canada and USA, the centrality of individuals work role in life is perhaps eroding the family as a social institution (e.g. Kanter, 1977); Burke & Weir, 1981). Spiralling rates of divorce and remarriage, and growing emotional deficit among children are often partly attributed to the individual's alienation from the family. On the other hand, in countries like India centrality of the individuals' family role in life has often relegated work of life to a secondary role.

Shapiro et al (1982) studied the variables that influence blood pressure and hypertension include family history, personality and stress (Natural disasters, culture and urbanisation, occupational stress in individuals with a family history of hypertension and type A behaviour). Other factor such as obesity, physical activity, dietary sodium caffeine and alcohol are also noted. The major non pharmacologic approaches to treatment of hypertension involve modification of physical risk factors (sodium restriction, weight loss, reduced caffeine and alcohol, physical training during adherence) and behavioural treatment methods (direct regulation of B.P. with bio-feedback, regulation of sympathetic nervous activity regulation and stress management). These methods are appraised and suggestions are offered on improving the quality of treatment research in selection of patients and initial assessments, maintenance and follow-up and generalisation of treatment effects.

2. Whitehorn D. et al (1983) investigated that spontaneously hypertensive rate (SHR) exhibit locomotor hyperactivity in comparison to its normotensive progenitor Wistar Kyoto (WKY) Strain. The authors investigated whether the hyperactive behaviour was a direct consequence of elevated blood pressure, in the hypertensive rat. Three experimental protocols were used to chronially alter B.P. In the 1st protocol, 8 SHR were given hydralazine (20mg/kg/day) in their drinking
water to lower the blood pressure. These Ss exhibited a significant decrease in B.P. but no change in locomotor activity. In the 2nd protocol 20 male SHRs (4 weeks of age) were treated with same dosage of hydralazine until 16 weeks of age. B.P. was significantly decreased in these Ss with no change in locomotor activity. In the 3rd protocol normotensive W.K.Y. and Sprague Dawley rats were made hypertensive with unilateral renal clips. The resulting increase in B.P. did not alter locomotor activity. Result suggest that locomotor hyperactivity is an inherent property of S.H.R. and is independent of B.P.

3. Knardahl et al (1982) investigated behavioural responsiveness and habituation to discrete stimuli in 27 spontaneously hypertensive (S.H.R.) renovascular hypertensive (R.H.R.) & normotensive (NR) Wistar Kyoto rats in 3 experiments. In exp. No.1 responsiveness to an auditory stimulus, as measured by amplitude and duration of the orienting response (OR) was enhanced in SHR compared to the two groups. In addition SHR needed more trials to attain the habituation criterion. In exp. no.2 no difference were found between the groups in terms of the arrest response to an auditory stimulus. In exp. no.3 the SHR exhibited increased amplitude and duration of the OR to an olfactory compared to the two other groups, but there was no difference in trials needed to attain habituation when the stimulus was repeated. These data together with previous behavioural and psycho-physiological data indicate increased general level of responsiveness in the SHR.

Discuss identifiable patterns that occur in the use of instrumentation and measurement error in both descriptive and manipulative hypertension research. Descriptive research refers to investigations that seeks to identify relationship among environmental elements affecting blood pressure. Manipulating research seeks direct cause effect relationship between treatment and dependent variables. Two methods of B.P. measurements are considered: direct person monitoring by arterial cannulation and indirect occluded cuff method. Source error in B.P. measurement
includes interoserver variation, observer bias, cuffs of incorrect size or application and self measurement. The authors note that research investigator from one discipline may not be current in their knowledge of studies carried out by professionals from other fields.