INTRODUCTION
Hypertension is the one of the major health problem afflicting the population of the world because of its high prevalence and its association with increased risk of cardiovascular diseases. Prospective studies with varying lengths of follow-up have identified variables that seem to be altered in normotensive individuals whose blood pressures fit the clinical definition of "hypertension" during the follow-up period \[1\].

A growing number of variables are being identified in population cross-sectional studies or in laboratory studies that are related to mechanisms involved in blood pressure control. Although these studies increase knowledge of the pathophysiology of blood pressure control, it is important to differentiate between factors that are altered before the actual blood pressure increase and factors that respond to the blood pressure changes \[2\].

The situation in India is more alarming. Hypertension is a major public health problem in India and in other developing countries. This is obvious from several Indian urban and rural studies. The various studies estimated a prevalence rate of hypertension among urban population ranging from 1.24% in 1949 to 36.4% in 2003 and for rural people from 1.99% in 1958 to 21.2% in 1994. However differential rates are due to different cut off marks in determining the level of hypertension and also differing age groups constituting the study population \[3\]. It has been predicted that by 2020, there would be a 111% increase in cardiovascular deaths in India \[4\].
Blood pressure measurements are classified in stages according to the seventh report of joint national committee on prevention, detection, evaluation and treatment of high blood pressure (JNC7) [5].

- Normal blood pressure: less than less than 120/80 mm Hg [6].
- Pre-hypertension: 120-139/80-89 mm Hg.
- Stage 1 hypertension: 140-159/90-99 mm Hg.
- Stage 2 hypertension: at or greater than 160-179/100-109 mm Hg.

**Complications of hypertension:**

The excessive pressure on arterial walls caused by high blood pressure can damage the blood vessels, as well as organs in the body. The higher the blood pressure and the longer it goes uncontrolled, the greater the damage [7].

Uncontrolled high blood pressure can be lead to.

1) Stroke
2) Aneurysm [8]
3) Coronary artery disease, Heart attack and Heart failure
4) Metabolic syndrome
5) Hypertensive nephropathy
6) Hypertensive retinopathy [9]
Recently, essential hypertension has been associated with various new parameters like Vitamin D and blood profile. So taking them into consideration;

**Biochemical Parameters**- which will be performed in our study include;

1. Vitamin D
2. Blood Sugar
3. Lipid Profile
4. Serum Uric acid
5. Serum Creatinine

**Hematological parameters** - which will be performed in our study include;

1. Hemoglobin levels
2. RBC count
3. WBC count
4. Hematocrit
5. MCV
6. MCH
7. MCHC
Role of Vitamin D in hypertension:

Vitamin D is currently of great public health interest, because vitamin D deficiency is common and is causally associated with musculoskeletal diseases. Several mechanisms have been proposed on how vitamin D could be involved in blood pressure regulation and the pathophysiology of arterial hypertension. Vitamin D effects on the renin angiotensin aldosterone system (RAAS) have been extensively investigated by experimental studies \[^{10}\]. VDR knockout mice exhibit an increased renin expression, arterial hypertension and myocardial hypertrophy \[^{11}\]. Subsequent studies confirmed the molecular mechanisms by which VDR activation down-regulates rennin expression, but it is not clear whether these significant effects observed in vitro are also of relevance. High PTH levels, which are a hallmark of vitamin D deficiency, may also increase blood pressure. PTH receptors are expressed throughout the cardiovascular system and PTH infusions in healthy volunteers increase blood pressure \[^{12}\]. Epidemiological studies have largely, but not consistently confirmed a positive correlation of PTH levels and blood pressure \[^{13}\].

Role of blood sugar in hypertension:

High blood pressure can increase the risk of diabetic complications such as retinopathy and nephropathy. People with diabetes are more likely to also have high blood pressure or hypertension. Similarly, essential hypertensives have an
altered glucose tolerance leading to altered sugar levels \cite{14}.

**Role of lipid profile in hypertension:**

Serum lipid profile is measured for cardiovascular risk prediction and has now become almost a routine test. The test includes four basic parameters: total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides \cite{15}.

The co-existence of hyperlipidemia and hypertension leads to significant amount of cardiovascular mortality in hypertension. If there are additional risk factors like diabetes mellitus or kidney disease or recent CVA, irrespective of lipid profile levels, statins have to be introduced to control the LDL levels below 70mg\% \cite{16}.

**Role of serum uric acid in hypertension:**

Uric acid, which serves no biochemical function other than being an end product of purine metabolism, was first discovered in 1776. A Swedish chemist Scheele isolated it from a urinary tract stone. In 1797, a British chemist Wallaston detected uric acid in a tophus which was removed from his own ear \cite{17}.

Association between hypertension and hyperuricemia was recognized when a family with a unique and unfortunate pedigree attended Hammer Smith hospital in 1957. The father and six of the seven siblings had hyperuricemia,
while the mother and all the siblings had hypertension \[18\]. This raised the question whether a raised serum uric acid was common in patients with hypertension.

Raised serum uric acid has been reported to be associated with an increased risk of coronary heart disease and is commonly encountered with essential hypertension, even untreated hypertension, and type 2 diabetes, which are in turn associated with coronary heart disease. It is not known whether raised serum uric acid increases the risk of hypertension and type 2 diabetes independently of known risk factors such as age, obesity, alcohol consumption, and physical activity \[19\].

**Role of serum creatinine in hypertension:**

Hypertension and renal dysfunction are closely related. Majorities of hypertensive patients are asymptomatic and left untreated. So complication develops and become fatal. Chronic kidney failure usually develops and becomes slowly with few signs or symptoms in early stages \[20\]. Glomerular filtration rate is the best estimate of number of functioning functional renal mass. accurate measure of GFR is time consuming and expensive; but a number of filtered substances may be measured to estimate GFR including blood urea, serum creatinine \[21\]. The elevation of serum creatinine concentration in hypertension may be attributed to the decrease in creatinine clearance due to decrease in GFR.
Creatinine clearance rate determines how efficiently kidneys are clearing creatinine from the blood. Hence it serves as an estimate of kidney function [22].

Essential hypertension is primarily a derangement of peripheral vascular resistance and because DBP is a more specific measure of overall resistance to blood flow than SBP, blood characteristics that influence viscosity will be more strongly related to DBP than to SBP. To maintain blood flow in the face of increase peripheral resistance, blood pressure increases [23]. The deleterious consequence of increasing pressure, presumably to maintain blood flow is partially compensated for by a concomitant decrease in red cell volume, thus attempting to counteract the viscous effects of a larger relative red cell mass with smaller cell size characteristics [24].

So in this study haematological parameters in the name of hematocrit, haemoglobin, RBC count, WBC count, thrombocyte count, MCV, MCH and MCHC will be assessed to find the correlation with hypertension.

The present study will be thus designed to correlate the various biochemical and haematological parameters and their pathogenic role in the development of essential hypertension.