



## 25OH CHOLECALCIFEROL LEVELS IN HYPERTENSIVE PATIENTS

## Medicine

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## ABSTRACT

**Background-** Hypertension is one of the leading causes of the global burden of disease. Elevated blood pressure affects more than one billion individuals (1) and causes an estimated 9.4 million deaths per year. Vitamin D is an essential component of our body. A growing body of evidence suggests that low levels of Vitamin D may adversely affect the cardiovascular (CV) system. **Objective-** To assess the correlation of Vitamin-D levels in hypertensive patients. **Methodology-** The study was conducted including all hypertensive patients admitted in Medicine ward or attending medicine OPD and were on anti hypertensive treatment. Serum 25 OH Cholecalciferol were measured in baseline samples and were assessed. **Result-** Among all study subject who were hypertensive 61.1% were Vit-D deficient while 20.37% had insufficient levels, Rest being normal 18.52%. Vitamin-D deficiency causes inappropriate action of Renin angiotensin Active System that leads to hypertension.

## KEYWORDS

Hypertension, 25 OH Cholesterol levels, Vitamin-D, Anti-hypertensive treatment.

## INTRODUCTION

Hypertension is one of the leading causes of the global burden of disease. Elevated blood pressure affects more than one billion individuals (1) and causes an estimated 9.4 million deaths per year. Hypertension doubles the risk of cardiovascular diseases, including coronary heart disease (CHD), congestive heart failure (CHF), ischemic and hemorrhagic stroke, renal failure and peripheral arterial disease (PAD). Vitamin D is an essential component of our body. A growing body of evidence suggests that low levels of Vitamin D may adversely affect the cardiovascular (CV) system. Low levels of 25-hydroxyvitamin D (25 OH cholecalciferol) are associated with many markers of CV disease; for example, hypertension, increased vascular resistance, and increased left ventricular mass index (2). In addition, 25 OH Cholecalciferol levels correlate inversely with coronary calcification, an indicator of atherosclerosis, and a precursor of CV events (3). Vitamin D acts to modulate toll like receptor signalling, which results in reduces the gene expression and protein release of proinflammatory mediators (4). Vitamin D, the sunshine hormone was shown to regulate the Renin Angiotensin Aldosterone system at the clinical, pathophysiological and molecular levels in animals and human studies (5,6). Deficient or insufficient serum 25 OH Cholecalciferol levels have been documented in patients with myocardial infarction, heart failure, stroke, diabetic CV disease, and peripheral arterial disease (7-10). Vitamin D supplement has been shown to improve endothelial functions (11). More than 1 billion people currently are at risk for vitamin D deficiency worldwide (12). Black people absorb more Ultraviolet-B Rays in the melanin of their skin than white people; therefore, black people are more prone to develop vitamin D deficiency. This pandemic of hypovitaminosis D can mainly be attributed to decreased exposure to sunlight (for example, reduced outdoor activities and air pollution) (13-14).

## OBJECTIVES:-

To assess the correlation of Vitamin-D levels in hypertensive patients.

## MATERIAL AND METHODS

The study was conducted by department of Medicine at LLRM Medical College and SVBP Hospital, Meerut U.P. in 2019-2020. It was a cross sectional study including all hypertensive patients admitted in Medicine ward or attending medicine OPD and were on anti hypertensive treatment. Study subjects included diagnosed Hypertensive patients of both the sex were on that of moderate to severe category. The Blood Pressure of all participants was categorised with moderate to severe category. Study participants were interviewed and detailed history was taken regarding hypertension a detailed

personal history including dietary pattern and sunlight exposure was taken. Detailed clinical and physical examination was also done, informed consent was obtained from all the study participants.

Patient's information was collected on a pretested/preformed questionnaire regarding complete socio-demographic & biosocial profile. Serum 25 OH Cholecalciferol were measured in baseline samples using the immune assay analyzer, CLIA (chemiluminescent immunoassay). Samples were collected in the morning after 8 to 12 hour overnight fast. Samples were stored at -80°C.

## INCLUSION CRITERIA-

1. Patient with diagnosed hypertension according to JNC-8 classification of Blood Pressure.

Classification	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Stage 1 HTN	140-159	90-99
State 2 HTN	≥160	≥100

1. Age greater than >18 year.
2. Those who gave prior consent for the study and were willing for serum 25 OH cholecalciferol levels.

## EXCLUSION CRITERIA-

1. Cases of secondary hypertension suffering from chronic illness such as diabetes mellitus, tuberculosis, chronic kidney disease or coronary and CLD.
2. Participant who had taken Vitamin D supplementation in the last 3 months

**Study Design:** Cross sectional study Study period September 2019 to January 2020

**Sample size:** With reference to the study done by Shalini Priya, Abhishek Singh et al, (15) on hypertension in the year 2017, the prevalence was found to be 80. The sample size was calculated taking the confidence interval as 95% with error with 6.29%. Sample size calculated was 162 study subjects of hypertension.

## RESULTS

In the present study among 162 hypertensive participants, being males 93 (57.4%) and female 69 (42.59%). Majority of the age groups in

study subjects were of 35-44 years and the mean age was 42.7 years as shown in figure-1. Study Revealed That among 162 study subject males were higher 57.4% and female were 42.59% with hypertension as shown in figure-2. Among all study subject who were hypertensive 61.1% were Vit-D deficient while 20.37% had insufficient levels, Rest being normal 18.52% as shown in Table 1 and Figure-3. So this reveals 81.48 % had inadequate 25 hydroxy cholecalciferol levels in hypertensive individuals. It was found that Vit-D levels in relation to various categories of hypertension there was no significant difference in Vit-D levels. So in all vitamin D levels were low in hypertensive individuals. Similar findings were observed in the study conducted by Cynthia A. Smith et al (2015) (16) revealing that Vitamin-D deficiency was much higher in those having systolic Hypertension. Similar findings were also seen by Babikir Kheiri, Ahmed Abdalla et al (2018) (17) Vitamin-D deficiency causes inappropriate action of Renin angiotensin Active System that leads to hypertension. Many studies have shown the vice-versa correlation with Vitamin –D deficiency and hypertension.

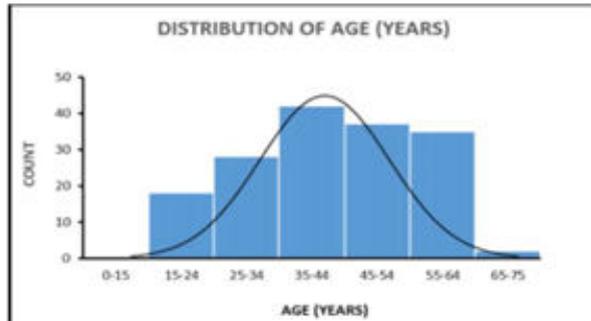


Figure:1 Distribution of Age of hypertensive patients

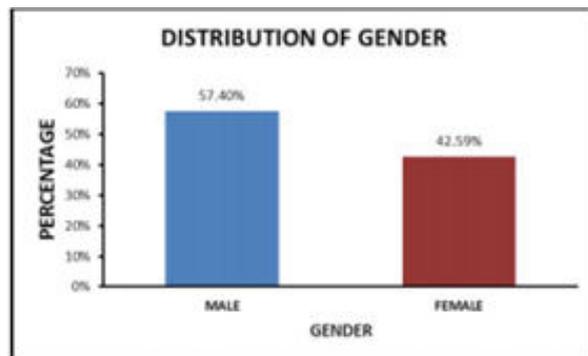


Figure: 2 Gender-wise distribution of hypertensive patients

Table 1: Distribution of the participants in terms of 25 OH Cholecalciferol of hypertensive patients

Vit D Level	Freq uency	Percentage
Deficient	99	61.11%
Insufficient	33	20.37%
Normal	30	18.52%
Total	162	100%

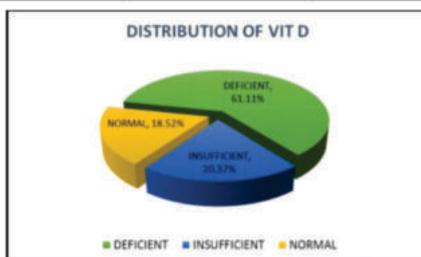


Figure: 3 Distribution of 25 OH Cholecalciferol of hypertensive patients

**CONCLUSION**

In all study subject (162), 81.48% were having low Vitamin D/ (25 OH Cholecalciferol) levels. So This study reveals very high prevalence of low Vitamin D levels in Hypertensive individuals and this creates need for screening vit D deficiency disorders in all NCDs. Study recommends supplementation of Vitamin D in all hypertensive individuals of any grade and also recommends more research on correlation of treatment of Hypertension with Vitamin D levels. Because deficiency of vitamin D a fat soluble vitamin may create a vicious cycle of disease progression to severe form. And in covid arena hypertension with vitamin D deficiency doubles the risk of having morbid covid sickness.

**Conflict of interest: None**

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