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## Vitamin D levels in type 2 diabetic patients

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### Abstract

Many studies have reported the altered levels of Vitamin D in diabetes mellitus. The role of vitamin D in the pathophysiology of type 2 diabetes is thought to be due to its extra skeletal effects on insulin secretion and insulin resistance. One of the mechanisms involved may be through its effect on calcium homeostasis. Calcium dependent insulin secretion and release has been proved by animal studies. This study puts in an effort to find the alterations if any of Vitamin D in diabetes mellitus.

**Keywords:** Vitamin D, diabetic, Patients, Cholecalciferol, Diabetes Mellitus

### Introduction

Cholecalciferol (vitamin D<sub>3</sub>) is synthesized in skin from 7-dehydrocholesterol on exposure to sunlight. This is then hydroxylated in the liver to form 25-hydroxy Cholecalciferol which is again hydroxylated in the kidney by 1- $\alpha$  hydroxylase to form 1, 25-dihydroxy Cholecalciferol, the active form of vitamin D<sub>3</sub>. Most of the tissues having vitamin D receptors generate 1, 25-dihydroxy Cholecalciferol in a paracrine fashion from 25-hydroxy Cholecalciferol. This paracrine effect may be responsible for its role in cell growth regulation, the adaptive and innate immune system functioning, insulin secretion by pancreatic  $\beta$  cells, blood pressure regulation and normal neuromuscular functions <sup>[1]</sup>. It is a well-known fact that vitamin D is essential for proper skeletal development and its deficiency has been associated with calcium and bone homeostasis. Recently there have been many studies pointing to the essentiality of vitamin D beyond bone health. Many studies had shown that vitamin D deficiency was associated with increased risk for developing various types of cancers including cancers of the colon, prostate, breast and esophagus <sup>[3-7]</sup>. There are overwhelming scientific evidences for association of low vitamin D levels with tuberculosis <sup>[8]</sup> metabolic syndrome, <sup>[9, 10]</sup> cardiovascular diseases <sup>[11, 12]</sup> and stroke <sup>[13]</sup>. Many studies support the fact that Type 2 diabetes is also found to be more prevalent in individuals with hypovitaminosis D <sup>[14]</sup>. All these are evidences for the extra skeletal benefits of the so called sunshine hormone vitamin D. This study puts in an effort to find the alterations if any of Vitamin D in diabetes mellitus.

### Aims and Objectives

To estimate the Vit D levels in Diabetes Mellitus.

### Materials and methods

This study is done in the Department of Biochemistry, Srinivas Institute of Medical Sciences, Mangalore.

This study was done from August 2018 to July 2021.

This study is a descriptive study.

This study was done in Ninety patients who were known to be diabetics.

### Inclusion Criteria

- H/O Diabetes for atleast since 1 year

### Exclusion criteria

- Other metabolic disorders were discarded.
- People on steroid therapy.

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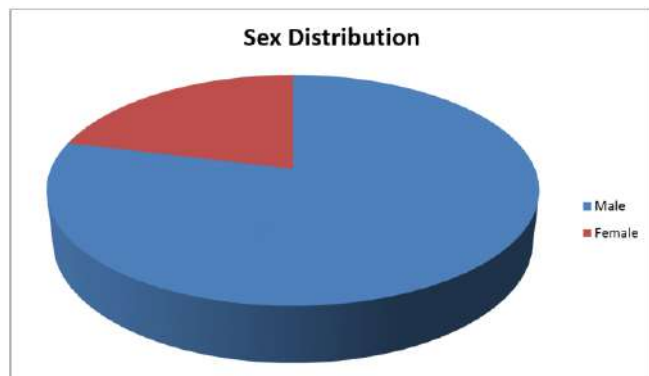
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## Results

**Table 1: Age**

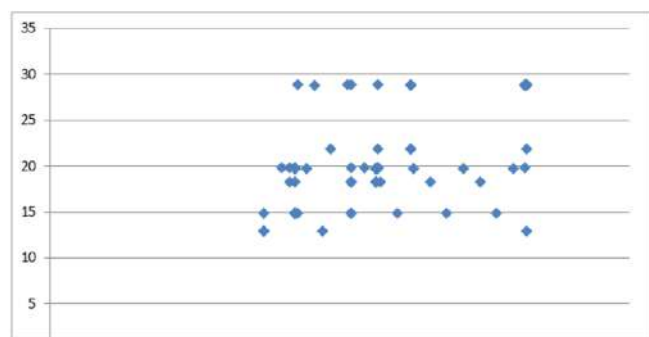
Number	Mean age	Std Deviation
60	61.54	$\pm 12.39$



**Graph 1: Sex Distribution**

**Table 2: Vitamin D Levels**

Total	Vit D Levels	Std Deviation
90	19.94	$\pm 8.20$



**Graph 2: Scatter plot**

## Discussion

The role of vitamin D in the pathophysiology of type 2 diabetes is thought to be due to its extra skeletal effects on insulin secretion and insulin resistance. One of the mechanisms involved may be through its effect on calcium homeostasis. Calcium dependent insulin secretion and release has been proved by animal studies [15, 16]. The endopeptidase essential for the human proinsulin conversion also needs calcium [17]. Studies have proved the presence of vitamin D receptors in pancreatic  $\beta$  cells [18] and also the expression of the enzyme 1- $\alpha$  hydroxylase that activates vitamin D in the  $\beta$  cells [19]. The association between the polymorphism of vitamin D receptors and type 2 diabetes was observed in some genetic studies [20]. It has also been shown that the vitamin D response element is present in the insulin gene [21]. All these evidences support the fact that vitamin D deficiency may lead to the development of type 2 diabetes. The study conducted by Cigolini *et al.* showed increased level of triglycerides in type 2 diabetic patients with hypovitaminosis D [22]. Further in the study done by Jaydip Ray Chaudhuri vitamin D deficiency was shown to be independently associated with elevated triglycerides and decreased HDL levels in Indian subjects [23]. Our study is in agreement with other studies.

## Conclusion

The study is successful in estimating the levels of Vitamin D in Diabetes mellitus. This study is intended to help the practicing physicians to know this and correct it immediately as the biochemical functions of this vitamin is vast and will help the patients.

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