



## A STUDY ON THE ASSOCIATION OF SERUM VITAMIN D LEVEL WITH GLYCEMIC STATUS IN TYPE 2 DIABETES MELLITUS IN A PERIPHERAL HEALTH CARE CENTRE

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**ABSTRACT** A number of studies have shown in past the relation of vitamin D3 and development of diabetes. Interestingly vitamin D3 levels are also associated with the development of adverse cardiovascular events in the patients with type 2 diabetes mellitus. There is sufficient data though not concrete that shows low vitamin D3 as a risk factor for the development of insulin resistance and development of diabetes. This study was carried to find out the degree of association between glycaemic status in type 2 diabetes patients and their vitamin D levels in a peripheral health care center. Patient and methods: The study was carried out at civil hospital Nagrota Bagwan, Kangra, H.P. in which 50 patients of type 2 Diabetes Mellitus were enrolled. 50 age and sex matched healthy subjects were taken as controls. Biochemical parameters like FBS, PPBS, Urea, Creatinine, HbA1c, lipid profile. **Results:** The patients with poor glycaemic control had low levels of vitamin D3 signifying negative correlation. Conclusion: the low vitamin D3 definitely has effect on the glycaemic control of the patients with type 2 diabetes mellitus.

### KEYWORDS :

#### Introduction:

It is estimated according to ADA that 25.8 million people (8.3%) in 2010 in the United States had diabetes mellitus. Out of which almost 1 million have type 1 diabetes and most of the rest have type 2 diabetes. Another subgroup termed as other specific disorders denotes a smaller fraction of the patients. Of importance the prevalence of type 2 diabetes is increasing in the world and similarly in our country also the number is increasing tremendously. No doubt obesity remains as a predominant etiological cause but other environmental factors needs to be considered when it comes to managing the disease. Similarly in our country where type 2 diabetes is quite prevalent in the population with low BMI other factors become equally important. In our setting the hypovitaminosis D is very common. Literature too has shown linkage between the occurrence of diabetes and low vitamin D3 levels. As it is known that there is constant decline in the level of vitamin D with the increasing age and simultaneously the prevalence of diabetes increases with age [1-3]. The study was conducted to again look into the relation and further strengthen the previous available research.

#### Patient and Methods:

The study was carried out at civil hospital Nagrota Bagwan, H.P. it was a single centre cross sectional study. A total of 50 routine patients of type 2 Diabetes were enrolled attending our diabetic clinic. A well informed written consent was obtained from all the enrolled patients. 50 age and sex matched patients with no diabetes were enrolled as controls. Various biochemical parameters like fasting blood sugar, (HbA1C) and serum vitamin D levels were estimated. The following patients were excluded as per the following exclusion Criteria:

1. Acute severe illness including acute complications of type 2 diabetes
2. Pregnancy
3. Cancer patients
4. Patients on vitamin D supplementation
5. Patients on drugs which interfere with vitamin D3 levels

A total of five ml of blood was collected with overnight fasting of 10 hours from all enrolled patients and healthy controls for the assessment of lipid profile urea and creatinine levels. Various demographic parameters were noted along with complete clinical examination. Various biochemical investigations were carried out in our laboratory as per standard protocol. The statistical analysis was done using statistical package for social sciences 23.0 (SPSS) for windows. The demographic data was tabulated in Microsoft Excel. Measures of central tendency (mean, median) were calculated for all quantitative variables along with measures of dispersion (standard deviation, standard error) are presented as mean, median, range, etc. Comparison between discrete variables will be done by Chi square test.

#### Results:

In our study 50 type 2 diabetes mellitus patients were selected. 38 of them were uncomplicated cases and 12 had chronic micro vascular complications. Mean age in years was  $58.2 \pm 5.3$ . Majority of

uncomplicated cases were within 48-52 years. Majority of complicated cases were within 56-68 years. Occurrence of complications was lower in younger age group (30-50 years) with male predominance. Complications were higher in older age group (60-75 years) and were slightly higher in females. It was interesting to note that the control group too had low levels of vitamin D3 signifying the prevalence of hypovitaminosis D in our setting. P- Value was statistically significant ( $p < 0.05$ ) in the variable likes blood sugar fasting and post prandial, serum creatinine, serum triglyceride levels as shown in table 1. A more statistically significant ( $p < 0.001$ ) results were seen in vitamin D3 and HbA1C level. Similarly the patients with good glycaemic control had comparative higher levels of vitamin D3 levels ( $r$  value = 0.003;  $p$ -value = 0.045) as depicted in table 2

**Table 1. Baseline variables in study and control group**

Variable	Control group(n=50)	Study group(n=50)	p-value
Blood sugar (fasting) mg/dl	90.08±6.56	138±18.54	<0.05
Blood sugar (post prandial) mg/dl	112.23±11.65	216.76±23.6	<0.05
Creatinine mg/dl	0.86±0.1	1.03±0.5	<0.05
Triglycerides mg/dl	116.5±16.54	136.8±24.3	<0.05
HbA1C (%)	4.3±0.23	7.9±0.97	<0.001
Vitamin D3 ng/ml	38±5.4	16.2±0.65	<0.001

**Table 2. Comparative variables in the subset of cases group**

Variable	Complicate cases(n=12)	Uncomplicated cases(n=38)
Blood sugar (fasting) mg/dl	221.8±8.4	149±6.5
Blood sugar (post prandial) mg/dl	267.4±9.6	178.9±5.4
Creatinine mg/dl	1.01±0.7	1.89±1.0
Vitamin D3 ng/ml	13.6±2.3	18.9±3.6

#### Discussion:

As the prevalence of type 2 diabetes is on regular increasing trend worldwide and our country is no exception to the same. Available data reveals the association of a number of environmental and dietary factors are associated with the occurrence of type 2 diabetes. Many studies link the role of hypovitaminosis D and insulin resistance [4-8]. Current literature validates to some extent the probable linkage with majority of studies have mixed results [9-12]. In our study type 2 diabetes mellitus patient had low vitamin D3 levels than in a control group. Also an inverse relationship was observed between HbA1C levels and 25(OH) D3 levels in the patient group, these findings indicate the potential role of vitamin D3 supplementation in patients with type 2 diabetes. Also it can be concluded with some confidence that adequate vitamin D3 levels may help in achieving better glycaemic control. As Vitamin D deficiency is prevalent in our population further studies and well formulated trials are needed to further strengthen the association. As the vitamin supplementation is an easily achievable intervention, it

can be a boon to the patients with type2 diabetes. We have data with us to support this linkage still the actual reason behind this association is yet to be established. As ours is a cross sectional study, we cannot determine causation and further investigational studies are warranted.

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