A STUDY ON STATUS OF VITAMIN D3 LEVEL AMONG PATIENTS DIAGNOSED AS CASE OF HYPOTHYROIDISM IN A MEDICAL COLLEGE, TRIPURA

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ABSTRACT

BACKGROUND
Vitamin D3 receptors are present in different body tissues like myocardium, pancreas, thyroid gland etc. Since both Vitamin D3 and thyroid hormones act via steroid receptors, any alteration in the level of Vitamin D3 is likely to increase problems associated with hypothyroidism.

MATERIALS AND METHODS
A hospital based cross sectional study was done from September 2018-January 2019 at Department of General Medicine, Tripura Medical College & Dr BRAM Teaching Hospital, Hapania, Agartala, West Tripura, among 100 hypothyroid patients.

RESULTS
Among the 100 patients with hypothyroidism, 35 patients were found to be vitamin D3 deficient, 39 patients were having insufficient vitamin D3 level and the rest had normal vitamin D3 levels.

CONCLUSION
In this study, deficiency of Vitamin D3 correlates with increase in levels of TSH. There is progressive decrease in level of Vitamin D3 from subclinical to overt hypothyroidism.

KEYWORDS
Vitamin D3, Hypothyroidism

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BACKGROUND
Vitamin D3 is produced by skin and it helps in the regulation of expression of various genes.1 The primary action of Vitamin D3 is regulation of calcium and phosphorus homeostasis. Recent studies have shown that Vitamin D3 deficiency is associated with increased risk of diabetes Mellitus,2,3 infectious diseases,4 atherosclerosis5 and autoimmune condition like autoimmune thyroiditis.6,7 Activity of Vitamin D3 is mediated through vitamin D3 receptors which further leads to activation of various genes.8 Vitamin D3 receptors are present in different body tissues like myocardium, pancreas, and thyroid gland etc.9 Since both Vitamin D3 and thyroid hormones act via steroid receptors; so any alteration in the level of Vitamin D3 is likely to increase problems associated with hypothyroidism.10,11

The present study was conducted with the prime aim to assess the prevalence the deficiency of Vitamin D3 among hypothyroid patients.

Aims and Objectives
1. To assess the prevalence of the deficiency of vitamin D3 among patients with hypothyroidism.
2. To know the status of vitamin D3 level among the patients with hypothyroidism.

MATERIALS AND METHODS
A hospital based cross sectional study was done from September 2018-January 2019 at Department of General Medicine, Tripura Medical College & Dr BRAM Teaching Hospital, Hapania Agartala, West Tripura. A sample calculated to 96 by 4 pg/L2 statistical formula considering Prevalence of Vitamin D deficiency among patients of Hypothyroidism (p) = 60%, q= (1-p), e= absolute allowable error = 10%. The sample size rounded off to 100.

The inclusion criteria for the study was 1) Known case of hypothyroidism 2) Age >18 years. 3) Ready to give informed consent. Any one receiving Vitamin D3 supplement excluded from the study.

After obtaining of permission from ethical committee, known cases of hypothyroidism attending in the out patients department and indoor of the Department of General
Medicine were approached for study. Details of the study were explained to all the study subjects and written consent were taken from them. Blood was collected for serum TSH, FT3, FT4, ANTI-TPO and Vitamin D3 level estimation. Under complete aseptic conditions venous blood was withdrawn from antecubital vein. Levels of FT3, FT4, TSH, Anti-TPOAb and Vitamin D3 were estimated using fluorescence array. Patients with TSH levels greater than 10 uIU/ml were taken as overt hypothyroid. Subclinical hypothyroid: >5-7 uIU/ml and Euthyroid: 0.25-5 uIU/ml. Vitamin D3 deficiency was considered if Vitamin D3 levels were less than 20 ng/ml and if the levels were between 20-30 ng/ml, it was regarded as insufficient and sufficient if the level is more than 30 ng/ml. Collected data were entered in Microsoft excel 2007. Data analysis was done by using SPSS version 20. Results were expressed in terms of frequency, percentage, mean and Standard deviation.

RESULTS
The total number of the participants in the present study were 100. Among them most of the patients were female.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>28</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
</tr>
</tbody>
</table>

Table 1. Distribution of the Participants According to Gender

Average age of the patients was 43.44±12.47 years, mean anti-TPO level were 5.23±2.36 IU/ml, mean FT3 were 4.36±6.25 nm/L, mean FT4 were 4.15±2.95 nm/L , mean TSH were 18.98±16.85 uIU/ml and mean vitamin D3 level was 24.37±7.66 ng/ml.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs.)</td>
<td>43.44 ± 12.47</td>
</tr>
<tr>
<td>Anti-TPO (IU/L)</td>
<td>5.23 ± 2.36</td>
</tr>
<tr>
<td>FT3 (nm/L)</td>
<td>4.36 ± 6.25</td>
</tr>
<tr>
<td>FT4 (nm/L)</td>
<td>4.15 ± 2.95</td>
</tr>
<tr>
<td>TSH (uIU/L)</td>
<td>18.98 ± 16.85</td>
</tr>
<tr>
<td>VIT D3 (g/ml)</td>
<td>24.37 ± 7.66</td>
</tr>
</tbody>
</table>

Table 2. Showing the Descriptive Statistics of Different Variables

Among the 100 patients with hypothyroidism, 35 patients were found to be vitamin D3 deficient, 39 patients were having insufficient vitamin D3 level and level of the rest vitamin D3 level were within normal limit.

<table>
<thead>
<tr>
<th>Status of Vitamin D3</th>
<th>Frequency/Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficiency</td>
<td>35(35%)</td>
</tr>
<tr>
<td>Insufficient</td>
<td>39(39%)</td>
</tr>
<tr>
<td>Sufficient</td>
<td>26(26%)</td>
</tr>
</tbody>
</table>

Table 3. Prevalence of Vitamin D3 Deficiency Among Participants

DISCUSSION
Thyroid diseases are the most common endocrine disorders. Iodine deficiency and fluorosis are two most common endemics in India. Fluoride being more electronegative than iodine, replaces iodine from its binding sites on thyroid leading to thyroid derangements. There are 7-95% females and 1-2% males across the world that has variable thyroid conditions. In previous decades, Vitamin D3 deficiency was considered virtually non-existent in the Indian population as India lies in the tropical area. But now a days various studies have revealed that 50-90% of the Indian population is deficient in Vitamin D3 due to inadequate dietary intake of Calcium.

In our study there was a decrease in the levels of Vitamin D3 amongst hypothyroid patients. Among the 100 patients with hypothyroidism, 35 patients were found to be Vitamin D3 deficient, 39 patients were having insufficient vitamin D3 level and only 26 patients were having Vitamin D3 level within normal limit. In a study conducted by Shilpa et al., there were 56% of the hypothyroid subjects in whom Vitamin D3 levels were below 20 ng/ml, there were only 10% subjects who had sufficient levels of Vitamin D3. Deficiency of Vitamin D3 can lead to Grave's disease and various other autoimmune thyroid disorders. Variation in the VDR(Vitamin d3 receptor) gene are thought to mediate susceptibility to various endocrinal autoimmune diseases. Another reason for decrease in level of vitamin D3 is increased in bone turnover in hyperthyroid patients leads to increase in level of calcium and hence negative feedback on the secretion of parathyroid hormone and Vitamin D3 synthesis.

CONCLUSION
In our present study, deficiency of Vitamin D3 is associated with increase in levels of TSH. There is progressive decrease in level of Vitamin D3 among the patients from subclinical to overt hypothyroidism. So, all the patients with hypothyroidism should be screened for vitamin D3 level and they should be treated with vitamin D3 supplement accordingly.

REFERENCES

[7] Friedman TC. Vitamin D deficiency and thyroid disease. www.goodhormonehealth.com/vitamin D


