INTRODUCTION: Insufficiency of Vitamin D is a global health problem. Vitamin D is a steroid which is formed by skin and it regulate the expression of various genes. The main action of Vitamin D is regulation of calcium and phosphorus homeostasis. Studies have shown that Vitamin D deficiency is associated with increased risk of diabetes Mellitus, infectious diseases, atherosclerosis and autoimmune situation similar to autoimmune thyroiditis. Since both Vitamin D and thyroid hormones act via steroid receptors, so any alteration in the level of Vitamin D is possible to increase problems related with hypothyroidism. Vitamin D mediates its achievement through binding to vitamin D receptor (VDR) and commencement of VDR responsive genes. VDR gene polymorphism was established to associate with autoimmune thyroid diseases. There are about 42 million people in India who suffer from thyroid disorders. Hypothyroidism is predictable to be prevalent in 11% of the Indian population, with 9% being subclinical hypothyroid. Elderly people as well as children and young adults are potentially at high risk for Vitamin D deficiency. Prominently, both vitamin D and thyroid hormone bind to similar receptors called steroid hormone receptors. A different gene in the Vitamin D receptor was shown to predispose people to autoimmune thyroid disease including Graves’ disease and Hashimoto’s thyroiditis. Serum 25(OH)D3, the most abundant circulating precursor of active Vitamin D, is the most reliable and widely accepted indicator of Vitamin D status. Vitamin D deficiency is defined as a 25(OH)D3 below 20 ng/ml and Vitamin D insufficiency as 25(OH)D3 of 21–29 ng/ml. Levels of 25(OH)D >30 ng/ml are considered to be optimal. The association studies between Vitamin D insufficiency and primary hypothyroidism have given mixed results. The high prevalence of hypothyroidism and Vitamin D insufficiency in the Indian population provided us a unique opportunity to assess the association between these two variables.

METHODOLOGY

The reason of this trial was to examine the association among hypothyroidism and vitamin D deficiency. This is a cross-sectional study. Institutional Ethics Committee approval and written consent was taken from patient participating in the study. Patient came to Rama Medical College and Hospital from September 2018 till March 2019 was enrolled in the study. Patient came to Rama Medical College and Hospital from September 2018 till March 2019 was enrolled in the study. Inclusion criteria:

Adults aged more than 18 year of both the sexes diagnosed with primary hypothyroidism were enrolled for this study.

Exclusion criteria:

Patients with post radioiodine hypothyroidism, hepatic or renal dysfunction, on anti epileptic medications or vitamin D supplementation were excluded from the study. Age- and sex-matched euthyroid controls were chosen from the Department of Medicine.

A detailed history and clinical examination were performed to identify the signs and symptoms related to hypothyroidism and vitamin D deficiency. Thyroid-stimulating hormone (TSH), free T4 (fT4), Free T4, and 25 hydroxy Vitamin D levels were assayed for each patient in the primary hypothyroidism group. Vitamin D levels were assayed for the control group with normal TSH.

Sample size and statistical analysis:

The mean standard deviation (SD) and the range were calculated for all continuous variables. Student’s t-test was used to compare the means of TSH, Vitamin D levels between the different groups (hypothyroid and euthyroid). Chi-square test was used to compare the prevalence of severe VDD among the TPO-Ab positive and negative groups. Statistical analysis was performed using the software SPSS for Windows version 18.0. The value of P < 0.05 was considered statistically significant.

RESULT

At the study baseline, we engaged 230 members; though, 30 patients were excluded from the study because of not fulfilling the inclusion criteria. In the current study, 200 patients (n=100) and placebo (n=100) in our study 59% patients have deficiency of vitamin D 21% patients shows insufficient in vitamin D. 20% patients had sufficient level of vitamin D. There was a major disparity in the level of Vitamin D in all the cases.

CONCLUSION: Overall, the current study demonstrated that vitamin D have quite important relation with the hypothyroidism.

Table 1: General characteristics of study participants

<table>
<thead>
<tr>
<th></th>
<th>Placebo group (n=100)</th>
<th>Vitamin D group (n=100)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>36.8±19.1</td>
<td>35.9±11.0</td>
<td>0.40</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>166.7±2.8</td>
<td>168.3±4.2</td>
<td>0.30</td>
</tr>
<tr>
<td>Weight at study baseline (kg)</td>
<td>73.0±19.7</td>
<td>76.2±11.9</td>
<td>0.50</td>
</tr>
<tr>
<td>BMI at study baseline (kg/m2)</td>
<td>28.0±5.2</td>
<td>30.3±4.9</td>
<td>0.62</td>
</tr>
<tr>
<td>BMI at end of trial (kg/m2)</td>
<td>27.1±4.2</td>
<td>30.4±4.8</td>
<td>0.65</td>
</tr>
</tbody>
</table>
In the general characteristics of study participants there is no significant difference in the Age of the placebo group and vitamin D group. The age of placebo and vitamin D group have P value of 0.40. The height of the placebo group participant and vitamin D group participant is almost similar. BMI of both the groups remain almost unchanged before and after the trial as seen by P values in table 1

In our study there were 160 cases of euthyroid in which the TSH levels were between 0.25-5 UIU/ml. There were 24 cases of subclinical hypothyroid and 16 cases of overt hypothyroidism. The mean levels of Vitamin D in subclinical and overt hypothyroidism were 16.73±10.67 and 15.11±11.48 ng/ml respectively. There was a major disparity in the level of Vitamin D in all the cases. The mean TSH level in this study euthyroid cases was 2.56±1.30 UIU/ml. our finding shows the mean TSH levels in subclinical and overt hypothyroidism were 16.73±10.67 and 15.11±11.48 ng/ml respectively. There was imperative difference in TSH levels over hypothyroidism were 6.95±0.57 and 18.24±16.32 uIU/ml. our finding shows the mean TSH levels in subclinical and overt hypothyroidism were 2.94±34.18 and 6.95±0.57 respectively. There was a major disparity in the level of Vitamin D in all the cases. The mean TSH level in this study euthyroid cases was 2.56±1.30 UIU/ml. our finding shows the mean TSH levels in subclinical and overt hypothyroidism were 16.73±10.67 and 15.11±11.48 ng/ml respectively. There was imperative difference in TSH levels over hypothyroidism were 6.95±0.57 and 18.24±16.32 uIU/ml. corresponding. There was imperative difference in TSH levels amid the three graphs (P<0.05) (Table 3).

DISCUSSION

Vitamin D play role in bone and mineral homeostasis, and it has been shown recently that its deficiency is linked with a variety of diseases such as cardiovacsular disease, cancer, infection, and adiposity as well as osteoporosis. The best indicator of vitamin D status is Serum concentration of 25(OH)D. Many studies have been conducted in order to find any important alliance between the levels of vitamin D and hypothyroidism and to decide whether vitamin D deficiency involves in the pathogenesis of hypothyroidism or somewhat a consequence of the disease and those that yielded at odds results. There are 7-95% females and 1-2% males across the world that has variable thyroid conditions. In our current study Vitamin D deficiency was seen in 59% of the subjects irrespective of the thyroid status. Our study findings were in agreement with the study conducted by Giovannucci et al to determine the Vitamin D status amongst men and Gross MD et al20 to find the function of prevention of prostate cancer. Study conducted by Nirensingh et al in North Indian population of Meerut, there were 53.94% were found to be Vitamin D deficient. Byron Richards studied the effect of vit D deficiency on thyroid gland in he reported that a lack of vitamin D contributed to the possibility of low thyroid hormones. On the, other study conducted in Netherlands showed that Vitamin D deficiency is not associated with early stages of thyroid autonomy.

CONCLUSION

Overall, the current study demonstrated that vitamin D have quite important relation with the hypothyroidism. Our study shows the prevalence of Vitamin D deficiency is higher in hypothyroid patients when compared to the normal population in present study deficiency of Vitamin D associate with raise in levels of TSH. Consequently there should be usual screening of Hypothyroid patients for deficiency of Vitamin D.