

Prevalence Of Vitamin D Deficiency In Hypothyroidism Patients In Relationship With Age And Gender

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Abstract

Vitamin D deficiency has been associated with increased risk of autoimmune disorders like type 1 diabetes, rheumatoid arthritis and autoimmune thyroid disorders like Hashimoto's thyroiditis. The present study is to evaluate the frequency of Vitamin D deficiency in hypothyroidism patients. Purposive sampling was adopted of 96 known samples are collected from private hospitals. Serum T3, T4, TSH, 25 (OH) Vitamin D, serum calcium levels were recorded. There were 85 female patients and 11 male patients. It was observed that 47.4% of patients (n=45) had Vitamin D deficiency and 42.1% of patients (n=40) had Vitamin D insufficiency and 10.5% of patients (n=10) had Vitamin D sufficiency. Serum calcium levels were normal in all subjects. The present study concludes that both Vitamin D deficiency and vitamin D insufficiency were more prevalent in hypothyroid patients. It is recommended that hypothyroid cases need to be regularly monitored for vitamin D levels. Hypocalcaemia was not observed in any patients.

Keywords : Vitamin D deficiency, sufficiency, insufficiency, Hypocalcaemia

1. Introduction

Vitamin D is one of the steroid hormones. The major roles of Vitamin D are the regulation of bone formation and calcium homeostasis. It also performs function which is required for insulin secretion, development of immune system and parathyroid hormone secretion.

1.1 Thyroid hormones

T4 is mostly secreted by thyroid gland; small fraction of T3 hormones is secreted from thyroid gland. T4 is converted to T3 by an enzyme monodeiodinase in the organs like heart, liver, kidney, skeletal system and blood. T3 derived in the blood by T4, so T3 is known as final active agent and T4 is regarded as prohormones. The major functions of thyroid hormones are for the growth and development of skeletal system and neural development. The main causes are dietary iodine deficiency, Hashimoto thyroiditis and surgical procedure or radioactive iodine therapy.

1.2 Vitamin D and Thyroid hormones:

Primary action of Vitamin D is regulation of calcium and phosphorus homeostasis. Studies have shown that increased risk of diabetes mellitus, atherosclerosis, and autoimmune conditions like autoimmune thyroiditis associated with Vitamin D deficiency. Decrease in the levels of Vitamin D is mainly due to inadequate exposure to sun, obesity, and decreased physical activity. Activity of Vitamin D is mediated through vitamin D receptors. Vitamin D and thyroid hormone act through steroid receptors.

2. Objective:

- To know the frequency of Vitamin D deficiency in hypothyroidism..
- To detect hypo calcium in hypothyroidism
- To enquire about the diet rich in Vitamin D in the patients.
- To know the time of Exposure to the sunlight per day.

3. Methodology

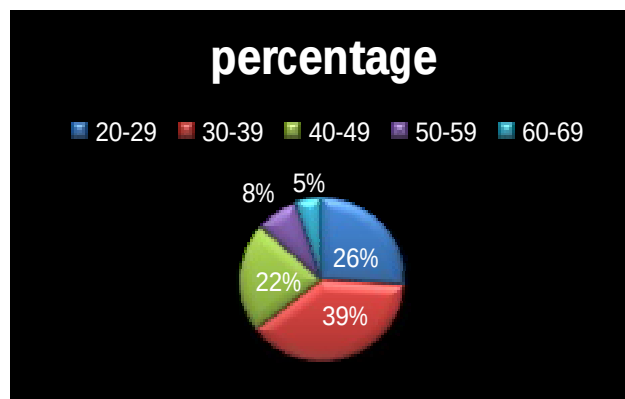
Purposive sampling was adopted of known samples of 96 patients are collected from private hospitals. This study excluded for patients with diabetes, cardiovascular disease, renal disorder, pregnant women. Subject diagnosed with hypothyroidism between the age group of 20-70years were included in our study. Primary data was collected by administering a structured questionnaire and by interviewed on dietary habits. The demographic information including age, sex, dietary habits regarding vitamin D rich foods and exposure to the sunlight per day were recorded. Clinical examination was assessed. Most of the subjects had an inadequate history of sun exposure and low consumption of fish, egg and milk per day. The blood samples were withdrawn under an aseptic condition from antecubital vein and the samples were sent for biochemical examination. The biochemical parameters like Serum T3, T4, TSH were estimated using chemiluminescence method with patients willingness. According to Kaplan MM (1999) reference range (60-200 ng/dl for T3), (4-12 microgram/dl for T4), and (0.5-5.0mIU/l for TSH). 25(OH) D Serum levels were estimated using chemiluminescence method and measured in ng/ml. According to Cranney A et al (2008), Vitamin D deficiency was defined as if serum level less than 20 ng/ml to be regarded as Vitamin D deficiency. Level more than 30 ng/ml regarded as sufficiency. Level between 20-30 ng/ml is insufficiency. Serum calcium was estimated.

4. Statistics analysis:

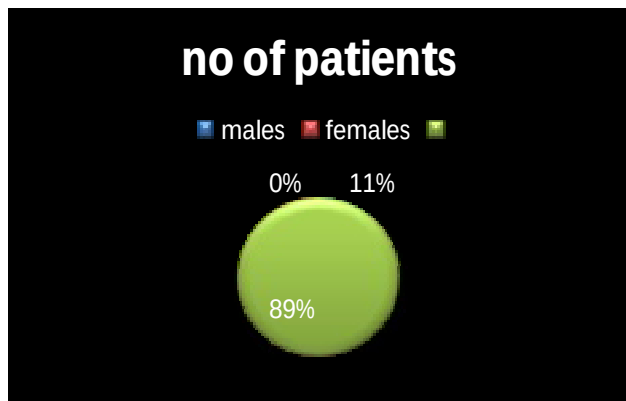
Data was tabulated in Microsoft excel. The data presented as mean, standard deviations frequency and percentage format.

5. Results

Out of 96 subjects, there were 85 females patients (89%) and 11 males patients(11%) were present as shown in figure no 2. 39% of cases are in the age group of 30-39 as shown in figure 1. In my study the predominant age group is between 30-39 years. The baseline characteristics of the subjects were included in table 1. The mean value 25(OH) Vit D (ng/ml) was 21.8(ng/ml) which states the subjects were in levels of insufficiency. The mean TSH values are 7(mU/L) which were raised in hypothyroid cases. The mean serum calcium levels are 9.5(mg/dl) .According to Amal Mohammed et.al(2013), 25(OH) Vit D (ng/ml) was lower in hypothyroid patients compared to control group.



5.1 Figure 1: Age Wise Distribution of Samples



5.2 Figure 2: Sex Wise Distribution of Sample

5.3 Table 1: Baseline characteristics of hypothyroid patients

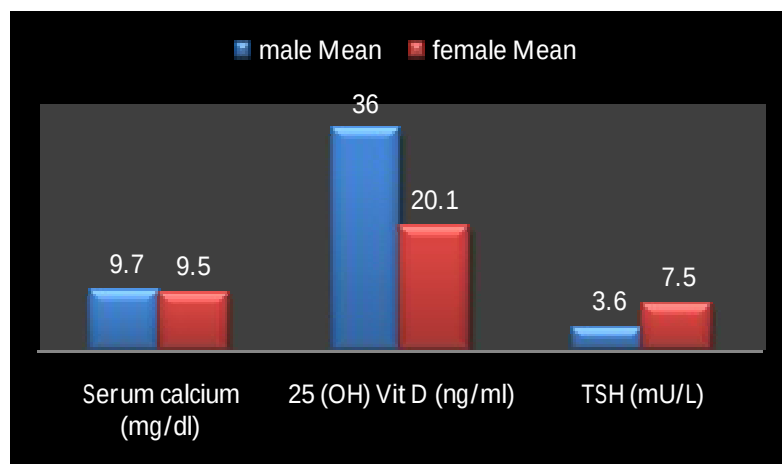
Parameters	Me an	Standard Deviation
Age(ye ars)	36.1	10.6
Se rum calcium(mg/dl)	9.5	0.4
25(OH) Vit D (ng/ml)	21.8	6.8
T3(pg/ml)	108.9	22.8
T4(ng/dl)	9.5	1.9
TSH (mU/L)	7.0	10.6

It was observed in our study that 47.4% of patients (n=45) had Vitamin D deficiency and 42.1% of patients (n=40) had Vitamin D insufficiency and 10.5% of patients (n=10) had Vitamin D sufficiency as shown in table 2. According to Swati Sonawaneet.al(2017) , 58.8% patients (n=53) were in the levels of Vitamin D deficiency, and 21.1% patients (n=19) had Vitamin D insufficiency and 20% of patients (n=18) had Vitamin d sufficiency.

5.4 Table 2: Levels of vitamin d in hypothyroid cases

Vitamin D	Frequency	Percentage %
Deficiency (<20ng/ml).	45	47.4
Insufficiency(20-30ng/ml)	40	42.1
Sufficiency (>30ng/ml).	10	10.5

There are no significant differences in the levels of serum calcium in gender as shown in figure 3. When serum 25(OH) Vitamin D compared, the mean levels in female were 20 ng/ml which falls under deficiency while in males the mean level is 36 ng/ml which is considered to be sufficiency. The serum TSH levels were significantly higher in female (7.5%) than compared to males as shown in figure 3. According to Vikram Sharma et.al(2018) here there is no significant difference in mean of serum calcium, 25(OH) vitamin D, TSH levels of hypothyroid cases between males and females.



5.4 Figure 3: Various mean levels of serum, calcium and Vitamin D

6. Discussion

According to Ritu G et al (2014) Vitamin D deficiency is more prevalent in Indian population and approximately 70-90% of the population been effected. According to M.F Holick, a major role of vitamin D plays in a biochemical mechanism in addition to calcium and bone metabolism, the levels of Vitamin D are low was observed in several

autoimmune disorders like hashimoto's thyroiditis, and some hormonal disease. the effect of vitamin D is mediated through Vitamin D receptors. According to Asli Dogrukunal et al (2014) the levels of Vitamin D may increase the degree of autoimmunity, which can increase the prevalence of autoimmune disorder. In the study Vitamin D deficiency was observed 47% of patients and insufficiency in 41% of patients. so, approximately 86% of patients had either Vitamin D deficiency or insufficiency.. No patients were observed with hypocalcaemia.

7. Conclusion

The present study concludes that Vitamin D deficiency is more familiar in hypothyroid patients. Study recommends hypothyroid cases need to be regularly monitored for vitamin D levels, and also supplementation of vitamin D to the cases that are deficient and also encourage taking diet rich in Vitamin D. Since women have more indoor activity they need to be encourage towards exposure to sunlight.

8. References

8.1 Journals

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