

# Effect study's the role of serum vitamin D3 level in Hashimoto's thyroiditis disease

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## Abstract

**Background:** Hashimoto's thyroiditis (HT) is classify within the autoimmune disease of thyroid gland caused by diffuse of special lymphocytes into thyroid, lymphocyte product's special antibody lead to destroy gland tissue . Vitamin D (vit.D) is steroid substance bind with special receptor to have it's functions .Vit.D3 has various function in human body such as non skeletal function of vit.D3 is gene regulation that involve in autoimmune disease.

**Materials and methods:** Present study include collection involved tow groups , HT disease group and healthy individuals , then measured vit.D3 , T4, TSH and anti-TPO levels for all groups.

**Results:** Study result's shown after comparison between HT patients group and control group the reduction of serum vit.D level at HT group with present hypofunction of thyroid gland .

**Conclusion :** Concluded this study to must be serumvit.D3 level within normal rang due to vit.D3 has function to regulation genes that effect on autoimmune diseases such as HT via modulation of immune cells secretions that lead to thyroid cells destroy.

**Keywords:** Hashimoto's thyroiditis, Vitamin D3 and Autoimmune disease.

## INTRODUCTION

Hashimoto's thyroiditis (HT) is autoimmune disease affects the thyroid gland tissue caused by thyroid specific autoantibodies that its production from lymphocytic after infiltration into thyroid tissue, HT is more frequent in female and occur at any age. The T cell is lymphocytes type that diffuse into thyroid and product autoantibody such as thyroid peroxidase antibody (TPO- Ab), this results many characterize such as goiter and hypofunctions of thyroid [1]. Also, CD+ type 1 T helper (Th1) infiltration with T cell into thyroid tissue. This disruption led to the balance disorders of immune response between Th1 and Th2 and these conditions promote Th1 is mediate of autoimmune reaction at HT. HT already has no symptoms because the progress of the dis-ease is slowly but at laboratory level can detect TPO- Ab and hypofunction of gland in blood stream [2].

Vitamin D (vit.D) is steroid substance it's has specific receptor called vit.D receptor (VDR) to ac-tivated it in various tissues . The vit.D has two sources endogenous , from cutaneous synthesis via at cholecalciferol form called D3 , and exogenous from diet also as D3 form .Vit.D3 transport to liver then renal for metabolite to become active form called calcitriol by many enzymes activity [3].

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The main functions of vit.D are regulation of bone calcification and serum Ca and PO4 lev-els balance , also recent study confirm that vit.D has non skeletal actions at level genetic dis-eases regulation such as autoimmune , metabolic syndrome and cancers . Vit.D regulated function at gene expression level activated after bind vit. D on VDR in nuclei to target specific gene for regulation it [4].

The study focused on effect level of vit.D and it's function in HT disease at both genders .

## Materials and Methods

Present study included compared between HT cases group and control group as study designed. This comparison was involved individuals with HT disease, consider as case group (NO. 20 individuals) and healthy individuals, consider as control group (NO. 20 individuals). Selection of case individuals were of both genders and age more than 30 years, and diagnosed it depended on criteria of American Thyroid Association (ATA) 5. Blood samples were taken from all individuals in this study (case and control groups) after taken approve from all individuals in this study then separation without any addition to obtain pure serum samples. The serum samples were measured various parameters included thyroid stimulating hormone (TSH), thyroxin (T4), vit. D3 and anti TPO-Ab. All parameters measured by used TOSOH and COBAS instruments and used t-test for statistical analysis, t-test involve mean + standards deviation (SD) with P-values to show differentiation value with significant value (less than 0.05).

## Results

Study's results showed many differntions value when compared between case and control groups according to TSH, T\$, anti TPO-Ab and vit.D3 via used t-test method (mean + SD) to obtain statistic values . This study involved the following results :-

-Increase level of TSH at case group (6.37+0.89) compared with control group (3.80 + 1.02) while normal rang is (0.3-4.3mIU/ml) with significant value .

-Decrease level of T4 at case group (2.91+0.59) compared with control group (7.09 + 2.17) while normal rang is (5-11µg/dl) with significant value.

-Decrease level of vit.D3 at case group(11.4+2.19) compared with control group ( 23.1+4.08) while normal rang is (20-40ng/ml) with significant value.

-Increase level of anti TPO-Ab at case group(66.4+7.06) compared with control group (21.9+ 3.51) while normal rang is (up to 34U/ml) with significant value.

See table 1 below .

Table 1: Comparison of serum TSH , T4, vit.D3 and anti TPO-Ab levels between HT and control groups according to Mean + Standard deviation (SD ) by T- test statistic method

| Parameters level in serum | HT individuals (case group ) , NO. 20 | Healthy individuals (control group ) , NO. 20 | P-value |
|---------------------------|---------------------------------------|---|---------|
| TSH (mIU/ml)              | 6.37 ± 0.89                           | 3.8 ± 1.02                                    | <0.05 * |
| T4 (µg/dl)                | 2.91 ± 0.59                           | 7.09 ± 2.17                                   | <0.05 * |
| vit.D3(ng/ml)             | 11.4 ± 2.19                           | 23.1 ± 4.08                                   | <0.05 * |
| anti TPO-Ab (U/ml)        | 66.4 ± 7.06                           | 21.9 ± 3.51                                   | <0.05*  |

\*Significant value

## Discussion

HT is classified within the autoimmune disease of thyroid gland that characterized by weight gain, constipation, fatigue and other characterizes. This disease caused by diffuse of special lympho-cytes into thyroid gland and these lymphocytes product special antibody led to destroy gland tissue [6]. Vit.D3 has various function in human body while the main function is regulation of PO4 and CA balance, but there is other non-skeletal function of vit. D3 is gene regulation that in-volve in autoimmune disease. Recent studies explain effect of low vit. D3 level on regulation of autoimmune disease, this study show correlation between serum vit. D3 with HT disease [7].

The vit. D3 become biological active after binding with VDR, this VDR located in intracellular and expressed by many cells such as macrophages, T & B lymphocytes and dendritic cells to regulation of its function. The action of vit. D3 in cell is modulation of immune function, vit. D3 promote inhibit dendritic cell maturation with its secretion of cytokines for example IL-12 [8]. This action lead to differentiation T.cell toward TH2 phenotype . Also, the vit. D3 actions are support IL-10 that release from dendritic cell and inhibit production of inflammatory Th1 cytokines like IL-2 that support cell mediated cytotoxicity that can destroy thyroid cell in HT disease. When level of vit. D3 reduce, these steps to thyroid destroy become active and lead to complete thyroid gland destroy [9].

The present study demonstrate decrease serum vit. D3 level in HT patients and confirm role se-rum vit. D3 level in development of HT disease. Current study results agree with BEHERA, Kishore Kumar, et al. 2020 that also studied role serum vit. D3 level and its effects in HT patients and confirm that vit. D3 act as regulation factor on some genes that regulation autoimmune dis-ease such as HT [10].

## Conclusions

Concluded this study to must be serum vit. D3 level within normal rang due to vit. D3 has function to regulation genes that effect on autoimmune diseases such as HT via modulation of immune cells secretions that lead to thyroid cells destroy.

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