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# A SINGLE CENTRE OBSERVATIONAL STUDY ON VITAMIN D LEVELS AND THYROID FUNCTION IN NEWLY DIAGNOSED HYPOTHYROID PATIENTS AND HEALTHY VOLUNTEERS

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**ABSTRACT**

The thyroid gland, a critical endocrine organ located in the neck, is responsible for the production of thyroid hormones, primarily thyroxine (T4) and triiodothyronine (T3), which regulate various metabolic processes. While T4 is the major hormone secreted, it is converted into the biologically active T3 in peripheral tissues. Recent research has suggested a potential link between vitamin D levels and thyroid function, particularly in hypothyroid patients. This study investigates the correlation between vitamin D insufficiency and Thyroid Stimulating Hormone (TSH) levels in newly diagnosed hypothyroid patients compared to normal healthy volunteers. This single-center, non-interventional observational study included 10 participants: 5 newly diagnosed hypothyroid patients and 5 healthy volunteers. The primary objective was to assess the significance of vitamin D in maintaining thyroid function in hypothyroid patients. Secondary objectives included analyzing and comparing vitamin D levels between the hypothyroid and healthy groups, and examining the correlation between vitamin D and thyroid hormone levels. Data on T3, T4, TSH, and vitamin D levels were collected and analyzed. The findings revealed a notable correlation between vitamin D insufficiency and altered TSH levels in hypothyroid patients, suggesting that vitamin D may play a crucial role in thyroid health. The study highlights the potential benefit of vitamin D supplementation in managing hypothyroidism. However, further research with a larger cohort is recommended to confirm these preliminary findings and to explore the underlying mechanisms of this relationship.

**KEY WORDS:**
**Hypothyroidism**
**Vitamin D insufficiency**
**Thyroid Stimulating Hormone (TSH)**
**Thyroid function**
**Observational study**
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## INTRODUCTION

**Background:** The thyroid gland, resembling a butterfly, is positioned in the midline of the neck, inferior and adjacent to neck muscles, anterior to the trachea. Although it appears as a single gland, it is anatomically divided into right and left lobes, with a central portion known as the isthmus. Within the thyroid gland are four small, independent glands, the parathyroid glands, which regulate calcium metabolism and are anatomically associated with the thyroid.

The primary function of the thyroid gland is to synthesize and release thyroid hormones into the bloodstream, where they interact with specific cellular proteins called thyroid hormone receptors. The two main thyroid hormones produced and secreted are thyroxine (T4) and triiodothyronine (T3). While T4 constitutes the majority of thyroid hormone secretion, T3 is the biologically active form. T4 circulating in the blood can be converted into T3 in various tissues by a specific enzyme, deiodinase, which removes one iodine molecule from T4.

**METHODOLOGY**

**Aim:** This study aims to investigate vitamin D (Vit-D) insufficiency and TSH levels in newly diagnosed confirmed hypothyroid patients compared to normal healthy volunteers.

**Methodology**

**Primary Objective:** The primary objective of this study is to provide evidence of vitamin D's significant role in maintaining thyroid levels in confirmed hypothyroid patients.

**Secondary Objectives:**

- Analyze vitamin D levels in the confirmed hypothyroid study population.
- Compare vitamin D levels between the hypothyroid study population and normal healthy volunteers.
- Correlate vitamin D levels with thyroid levels in the study population.

**Inclusion Criteria:**

- Male or female patients aged 18 years or above.
- Patients who have provided written informed consent.
- Patients previously diagnosed with hypothyroidism and normal healthy volunteers for comparison.
- Body Mass Index (BMI) recorded.
- Complete Thyroid Stimulating Hormone (TSH) profile available from the past month's laboratory tests.
- Vitamin D report available.

**Exclusion Criteria:** None

**Keywords:** Thyroid patients; Observational data collection; Vitamin D levels.

**RESULTS & SUMMARY:**The study titled "A single-center non-interventional observational study to define correlation between Vitamin D levels and Thyroid levels in newly diagnosed confirmed hypothyroid patients and Normal Healthy Volunteers" obtained institutional ethics committee approval. The study included a total of 10 participants.

Of the total study population, 5 subjects were confirmed hypothyroidism patients and 5 were normal healthy volunteers. All participants consented to participate, providing their clinical data and required medical reports.

In this non-interventional study, the following data was collected, analyzed, and summarized:

- Total number of participants: n = 10
- Group A (Diseased Population): n = 5

**Group B: (Normal Healthy Volunteers) n = 5**We collected the following data including values of T3, T4, TSH, and Vitamin-D.

**CONCLUSION:**

there is a significant difference in vitamin D levels between the two groups. Specifically, compared to healthy volunteers, thyroid patients exhibit lower levels of vitamin D. This study confirms a correlation between Vitamin D and thyroid hormone levels.

GROUP A (DISEASED PATIENTS)

| Sno | Subject Initias | Gender | Date of Birth | Age | Date of icf | Date of Enrollement | Height | Weight | BMI | Temp | BP | RR | PR | T3 | T4 | TSH | Vit D Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M-M | F | 01-01-1960 | 58 | 10-12-2018 | 10-12-2018 | 1.53 | 89 | 38.0 | 98.6 | 120/80 | 24 | 96 | 143 | 13.6 | 22.5 | 16 |
| 2 | K-S | F | 01-01-1964 | 54 | 10-12-2018 | 10-12-2018 | 1.46 | 56 | 26.3 | 98.3 | 130/80 | 22 | 97 | 154.5 | 14.6 | 52.4 | 13 |
| 3 | K-O | F | 01-01-1955 | 23 | 11-12-2018 | 11-12-2018 | 1.71 | 75 | 25.6 | 98.4 | 120/80 | 23 | 95 | 135.2 | 15.7 | 15.7 | 15 |
| 4 | YKC | M | 01-01-1990 | 28 | 16-12-2018 | 16-12-2018 | 1.67 | 74 | 26.5 | 97.8 | 125/80 | 24 | 94 | 145.6 | 16.4 | 19.2 | 17 |
| 5 | KJS | M | 01-01-1962 | 56 | 16-12-2018 | 16-12-2018 | 1.65 | 69 | 25.3 | 98.6 | 120/85 | 26 | 93 | 170.8 | 18.2 | 25.2 | 14 |

GROUP B ( HEALTHY VOLUNTARYS)

| Sno | Subject Initias | Gender | Date of Birth | Age | Date of icf | Date of Enrollement | Height | Weight | BMI | Temp | BP | RR | PR | T3 | T4 | TSH | Vit D Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BSC | M | 01-01-1988 | 30 | 17-12-2018 | 17-12-2018 | 1.69 | 75 | 26.3 | 97.5 | 125/80 | 24 | 94 | 200 | 12.5 | 3.5 | 40 |
| 2 | B-S | M | 01-01-1991 | 27 | 19-12-2018 | 19-12-2018 | 1.68 | 80 | 28.3 | 98.6 | 120/80 | 25 | 96 | 180 | 7.5 | 3.2 | 41 |
| 3 | K-S | M | 01-01-1988 | 30 | 19-12-2018 | 19-12-2018 | 1.72 | 76 | 25.7 | 98.4 | 120/80 | 26 | 95 | 190 | 9.3 | 2.9 | 38 |
| 4 | M-G | M | 01-01-1988 | 30 | 22-12-2018 | 22-12-2018 | 1.67 | 78 | 28.0 | 97.6 | 120/80 | 23 | 95 | 187 | 11.2 | 3.1 | 84 |
| 5 | K-V | M | 01-01-1994 | 24 | 22-12-2018 | 22-12-2018 | 1.7 | 73 | 25.3 | 98.2 | 120/85 | 24 | 94 | 179 | 10.8 | 2.8 | 42 |

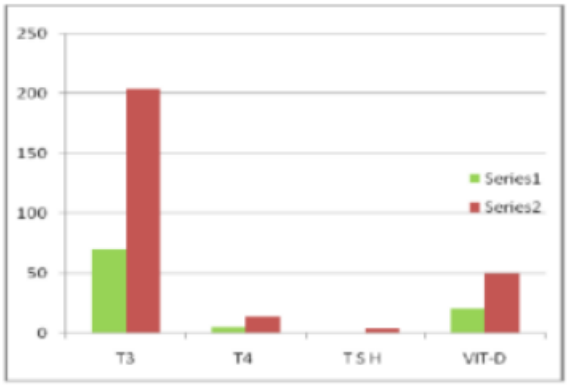
**TABLE-3 ASSESSMENT VALUES OF GROUPA/DISEASED PATIENTS**

| Height | Weight | BMI | Temp | BP | RR | PR | T3 | T4 | TSH | Vit D Value |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.53 | 89 | 38.0196 | 98.6 | 120/80 | 24 | 96 | 143 | 13.6 | 22.5 | 16 |
| 1.46 | 56 | 26.2713 | 98.3 | 130/80 | 22 | 97 | 154.5 | 14.6 | 52.4 | 13 |
| 1.71 | 75 | 25.6489 | 98.4 | 120/80 | 23 | 95 | 135.2 | 15.7 | 15.7 | 15 |
| 1.67 | 74 | 26.5338 | 97.8 | 125/80 | 24 | 94 | 145.6 | 16.4 | 19.2 | 17 |
| 1.65 | 69 | 25.3444 | 98.6 | 120/85 | 26 | 93 | 170.8 | 18.2 | 25.2 | 14 |
| AVERAGE | | 28.4 | | | AVERAGE | | 149.8 | 15.7 | 27.0 | 15.0 |

**TABLE-4 ASSESSMENT VALUES OF GROUP B/ HEALTHY VOLUNTEERS**

| Height | Weight | BMI | Temp | BP | RR | PR | T3 | T4 | TSH | Vit D Value |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.69 | 75 | 26.25958 | 97.5 | 125/80 | 24 | 94 | 200 | 12.5 | 3.5 | 40 |
| 1.68 | 80 | 28.34467 | 98.6 | 120/80 | 25 | 96 | 180 | 7.5 | 3.2 | 41 |
| 1.72 | 76 | 25.68956 | 98.4 | 120/80 | 26 | 95 | 190 | 9.3 | 2.9 | 38 |
| 1.67 | 78 | 27.96802 | 97.6 | 120/80 | 23 | 95 | 187 | 11.2 | 3.1 | 84 |
| 1.7 | 73 | 25.25952 | 98.2 | 120/85 | 24 | 94 | 179 | 10.8 | 2.8 | 42 |
| AVERAGE | | 26.7 | | | AVERAGE | | 187.2 | 10.3 | 3.1 | 49.0 |

**Graphical Representation of Normal Ranges of Thyroid Profile**




| NORMAL RANGES OF THYROID PROFILE & VIT -D | | | |
|---|---|---|---|
| PARAMETER | MINIMUM | MAXIMUM | UNITS |
| T3 | 70 | 204 | ng/ml |
| T4 | 5.13 | 14.06 | µg/Dl |
| T S H | 0.4 | 4.5 | µIU/ml |
| VIT-D | 20 | 50 | ng/ml |

- **GROUP A (DISEASED PATIENTS)**
- *GROUP A*

| T3 | T4 | TSH | Vit D Value |
|---|---|---|---|
| 143 | 13.6 | 22.5 | 16 |
| 154.5 | 14.6 | 52.4 | 13 |
| 135.2 | 15.7 | 15.7 | 15 |
| 145.6 | 16.4 | 19.2 | 17 |
| 170.8 | 18.2 | 25.2 | 14 |
| **149.8** | **15.7** | **27.0** | **15.0** |

- *AVERAGE VALUES*

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