



# EFFECTS OF T4 HORMONES ON HUMANBODY AND THEIR ANALYSIS

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## ABSTRACT:

The diagnosis of thyroid disease fully depends on hormones. Generally doctors use medical history in diagnosis but it is not sufficient because without physical exam and medical hormonal test does not diagnose clearly. In any case if pituitary gland not properly works means T4 functions are not properly work. Thyroid function inter relate with every function in human body. If human body function not properly work then some symptoms overcome in human body as like fatigue, weight gain, mood issue, irregular period, muscle pain cold hand, dry and cracking skin neck swelling etc. Generally thyroid problems are two types' hypothyroidism, and hyperthyroidism. These two different problems have different own symptoms in human body. By the help of Iodine easily maintain thyroid gland hormones because thyroid gland converts Iodine in Thyroxine (T4). Many thyroid cells are in the human body. In this work we analysis the various age group T4 data for Female and Male patients.

**Key words:** T4 hormones, Human body, thyroid hormones, Metabolism

## INTRODUCTION

Thyroid is an endocrine gland, located immediately below the larynx on either side of and anterior to the trachea. 1 The principal hormones of thyroid gland are Thyroxine (T4) and Triiodothyronine (T3) and their concentrations are 93% and 7% respectively. The normal total plasma T4 level is approximately 8 µg/dL (103 nmol/L), and the plasma T3 level is 0.15 µg/dL (2.30 nmol/L). The free T4 in plasma is important in the metabolic control of human body and therefore free T4 is believed to be a direct indicator of thyroid status in an individual. Free T3 like free T4 measurement also reflects the thyroid status of individual accurately.2 These hormones increase the basal metabolic rate and body heat production. (Yilmaz,et.al.,(2020) Complete lack of these hormones, cause the BMR to fall 40- 50% below normal.2 These hormones promote the growth and development of the brain. T3 and T4 are synthesized in the thyroid gland and the gland needs iodine depends on growth, body weight, age, sex, and nutritional statusof the individual. Climate and disease conditions also affect the requirement of iodine.3 The Thyroid Stimulating Hormone (TSH) also known as thyrotropin is an anterior pituitary hormone. The thyroid function is controlled by TSH, whose secretion is controlled by hypothalamus.4 In normal individuals the range of thyroid hormones and TSH in the blood is as follows4: Free Thyroxine (T4) -

0.89–1.76ng/dl Free Triiodothyronine (T3) – 2.3-4.2ng/dl Thyroid Stimulating Hormone (TSH) – 0.5-5.0 µIU/mL Age has an effect on the concentration of T3, T4 and TSH. It is studied that gradual increase in autonomous tissue with age makes individual more susceptible to thyroid problems. (van Gerwen, M., et al.,(2020)Higher frequencies of thyroid problems are noted in people above 40yrs of age.5 Sex has also an effect on the concentration of thyroid hormones.6 Asian women have more economic and domestic responsibilities than men. Poor and illiterate women and their children are more prone to nutritional problems such as goiter, anemia and other disorders. The concentration of hormones decreases with age in both sexes but the drop is more in female than males.7 The effect of season on T3, T4 and TSH has also been noted. Higher levels of T3 and T4 are noted in autumn and winter than in spring and summer.8 The effects of age, sex and seasons on the levels of thyroid hormones had been scarcely researched in western part of India. So, this study was done to further explore the previous researches on these aspects of thyroid hormones.( Peng, F. J., et al., (2022)

The function of the thyroid gland is one of the most important in the human body as it regulates majority of the body's physiological actions. The thyroid produces hormones (T3 and T4) that have many actions including metabolism, development, protein synthesis, and the regulation of many other important hormones. Any dysfunction in the thyroid can affect the production of thyroid hormones (T3 and T4) which can be linked to various pathologies throughout the body. One of the most important conditions that have been less studied is thyroid hormone levels and how they affect the progression of CKD. (Rubin, A. M., et al., (2022) Disorders in renal function have been seen to coexist with specific levels of thyroid hormone. This study is done to simplify the importance of interactions between thyroid function and kidney disease. This information is essential as it shows a link between two separate conditions. Information obtained from this paper will help to increase clinical knowledge and enable clinicians to provide better management for their patients who have thyroid or kidney dysfunction. (Ramhøj, L., et al., (2020)

The diagnosis of thyroid disease fully depends on hormones. Generally doctors use medical history in diagnosis but it is not sufficient because without physical exam and medical hormonal test does not diagnose clearly. In any case if pituitary gland not properly works means T3, T4 and TSH functions are not properly work. Thyroid function inter relate with every function in human body. If human body function not properly work then some symptoms overcome in human body as like fatigue, weight gain, mood issue, irregular period, muscle pain cold hand, dry and cracking skin neck swelling etc. Generally thyroid problems are two types' hypothyroidism, and hyperthyroidism. These two different problems have different own symptoms in human body. By the help of Iodine easily maintain thyroid gland hormones because thyroid gland converts Iodine in thyroxine (T4) and triiodothyroxine (T3). Many thyroid cells are in the human body. These cells absorb Iodine and amino acid tyrosine for creation T3 and t4, t3 and T4 control metabolism of the body. T3, T4 control and manage oxygen and calories and create it into energy. So it is very clear energy cell directed by thyroid hormones and they make continuous flow of metabolism. The pituitary gland manages by another gland known as process TSH releasing hormone (TRH). It is very important in human that T3 and T4 levels must be always in balancing order. If T3 and T4 levels are low then it is required to improve the production of thyroid hormones so pituitary gland releases more TSH. If T3 and T4 levels are high then no need to improve high thyroid hormone production so pituitary gland release low TSH .In this research paper tries to find the combination of T3, T4 and TSH for good health. (Kim, K., et al., (2021)

TREATMENT OF hypopituitarism has improved over the last two decades, due to refined laboratory tests and availability of more physiological replacement regimens. However, it is a well-known clinical notion that quality of life remains impaired despite substitution therapy, including T4, hydrocortisone, sex hormones, and GH. Patients with hypopituitarism have a significantly higher cardiovascular risk, which has been partially attributed to GH deficiency. However, these patients display unfavorable lipid parameters, even when GH

treatment has been established. Adequate T4 treatment in central hypothyroidism (CH) is especially challenging because T4 cannot be titrated according to endogenous TSH. It has been suggested that a free serum T4 level (fT4) in the middle of the reference range indicates appropriate dosage, but other clinicians seem to aim for fT4 in the upper reference range. Accordingly, many clinical studies on patients with pituitary deficiency, e.g. exploring GH treatment, assumed euthyroidism when fT4 values were within the reference range. In contrast, significantly lower fT4 levels in patients with pituitary deficiency compared with healthy controls have been reported, although both groups have been considered to be euthyroid. In addition, GH deficiency, which is common in patients with CH, may impair conversion from T4 into the biologically active T3, thereby masking the lack of adequate T4 dosage. Conversely, higher fT4 levels might be necessary in patients with partial GH deficiency to achieve euthyroidism in all tissues. In a cross-sectional study performed in patients with CH, we found elevated cholesterol levels and increased ankle reflex time (ART) suggesting subtle hypothyroidism, although free serum T3 (fT3) level and fT4 serum concentrations were within the normal range and not different from an age-matched healthy control group. The average dose of T4 in our patients with CH was 1.1 g/kg body weight (bw), which is below the average dose used in primary hypothyroidism (1.6 g/kg bw) (15–18). We hypothesized that these results might indicate suboptimal T4 replacement therapy, not detectable by evaluation of serum fT3 and fT4. Thus, this randomized, double-blind, crossover study was designed to explore whether patients with CH benefit either from a higher T4 dose (1.6 g/kg bw) or a combination of T4 (1.44 g/kg bw) and T3 (0.16 g/kg bw) compared with a usual treatment dose. To our knowledge this is the first randomized trial addressing thyroid hormone dosage in CH. (Akirov, A., et al., (2019)

#### **T4 Method:**

- Take a blood sample with help of injection.
- Taken blood sample centrifuge and separate serum from the blood sample.
- Take a vial and mix it 10 ml Blood serum mix with buffer solution.
- After mixing the blood serum with buffer and incubate 10 min and put it in instrument and check the result.

**DATA ANALYSIS:**

We collect three month of patients T3 test data for thyroid. In that data we get 35 patients in that we have 29 female patients and 6 male patients. As shown in table 1.1.

No.	Age	T3 NORMAL RANGE (4.50–10.90)	No.	Age	T3 NORMAL RANGE (4.50–10.90)
1	5F	9.10	19	38F	10.61
2	10F	7.30	20	39F	13.62
3	21F	7.90	21	40F	6.7
4	27F	14.1	22	42F	9.20
5	27F	14.1	23	42F	7.8
6	28F	8.10	24	43F	9.0
7	28F	7.80	25	44F	8.70
8	29F	14.90	26	45F	8.80
9	30F	10.66	27	45F	8.05
10	31F	7.50	28	49F	11.47
11	32F	12.09	29	50F	10.09
12	33F	10.60	30	9M	8.64
13	34F	14.40	31	15M	9.9
14	35F	15.90	32	20M	11.54
15	37F	8.76	33	24M	6.5
16	37F	8.40	34	32M	4.0
17	38F	10.11	35	33M	8.14
18	38F	11.6			

**Table: 1.1.** Three month of patients T4 test data for thyroid

- In this data we get 1 to 10 age range 2 female 21 to 30 age range 7 female 31 to 40 age range 12 female and 41 to 50 age range 8 female total we have 29 female as shown in table 1.2. and fig 1.1.

1-10 AGE	11-20 AGE	21-30 AGE	31- 40AGE	41-50 AGE
2	0	7	12	8

**Table: 1.2** Number of Female T4 Examine

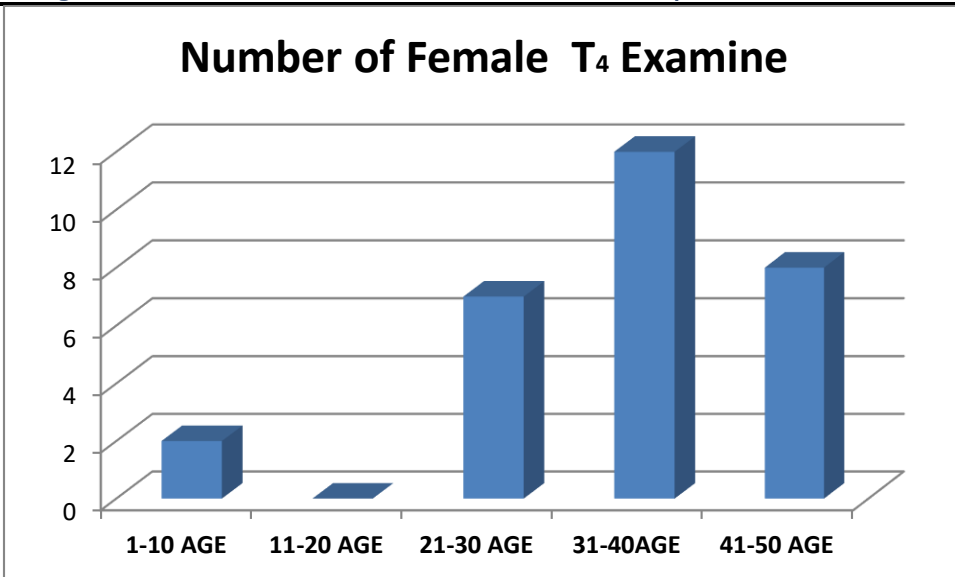


Fig. 1.1 Number of Female T4 Examine

- In this data we get 1 to 10 age range 1 male 11 to 20 age range 2 male 21 to 30 age range 1 male and 31 to 40 age range 2 male total we have 6 male as shown in table 1.3. and fig 1.2.

1-10 AGE	11-20 AGE	21-30 AGE	31-40AGE	41-50 AGE
1	2	1	2	0

Table: 1.3 Number of Male T4 Examine

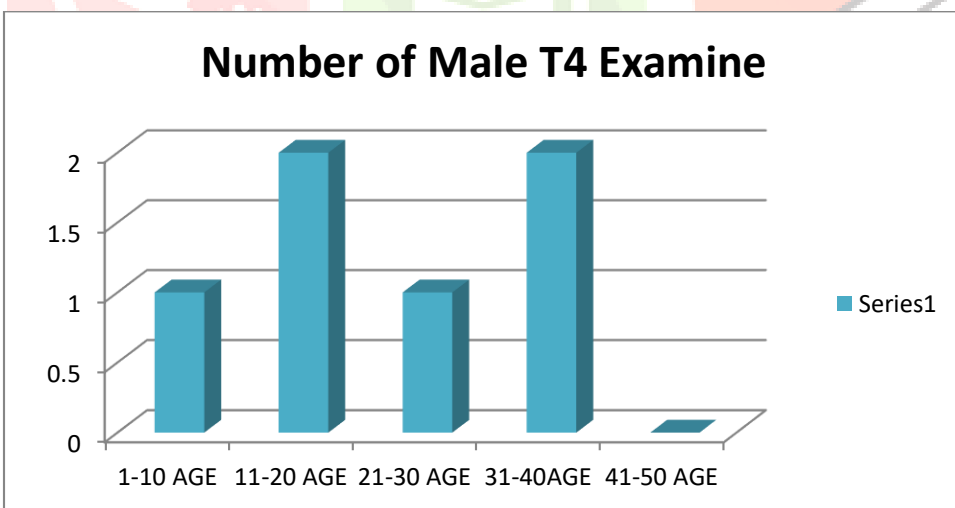


Fig. 1.2 Number of Male T4 Examine

Here we analysis T4 value for various age group Female In this data we get 1 to 10 age range 2 female 21 to 30 age range 7 female 31 to 40 age range 12 female and 41 to 50 age range 8 female total we have 29 female as shown in table 1.4. and fig 1.3,1.4.

0-10 Age	T4	11-20 Age	T4	21-30Age	T4	31-40Age	T4	41-50Age	T4
5	9.10	-	-	21	7.90	31	7.50	42	9.20
10	7.30			27	14.1	32	12.09	42	7.8
				27	14.1	33	10.60	43	9.0
				28	8.10	34	14.40	44	8.70
				28	7.80	35	15.90	45	8.80
				29	14.90	37	8.76	45	8.05
				30	10.66	37	8.40	49	11.47
						38	10.11	50	10.09
						38	11.6		
						38	10.61		
						39	13.62		
						40	6.7		

Table:-1.4 T4 value for various age group Female

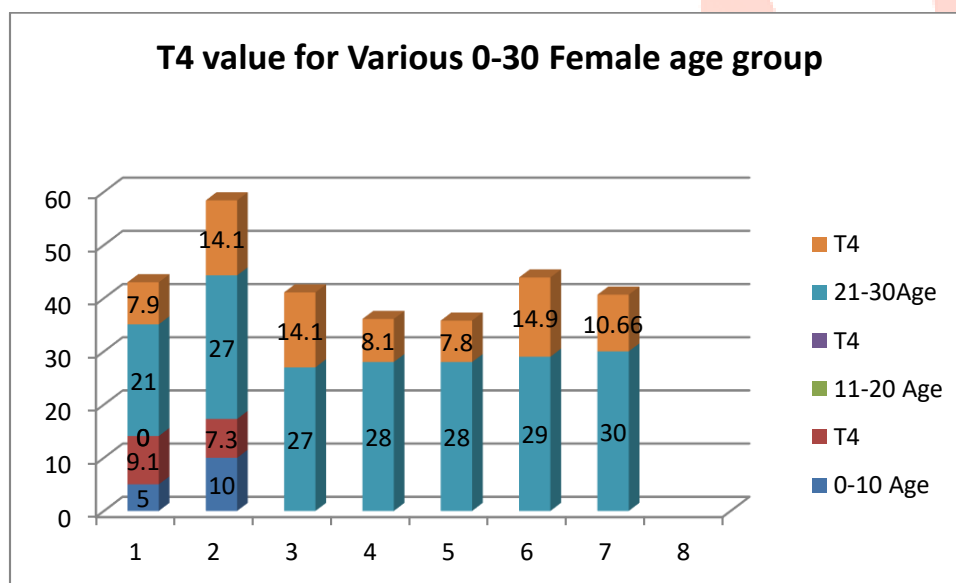


Figure- 1.3 T4 value for various 0-30 Female age group

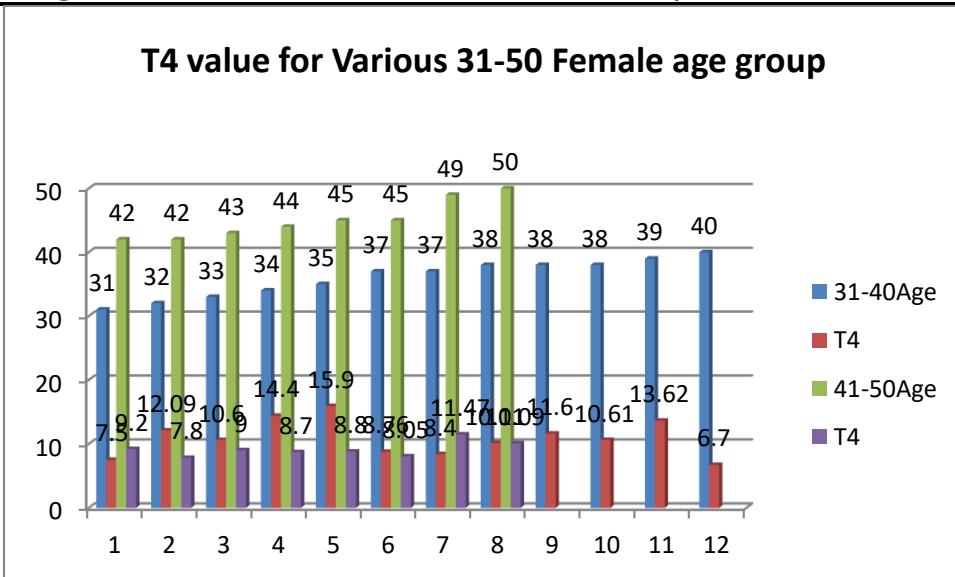


Figure- 1.4 T4 value for various 31-50 Female age group

Here we analysis T4 value for various age group Male In this data we get 1 to 10 age range 2 Male 21 to 30 age range 7 Male 31 to 40 age range 12 Male and 41 to 50 age range 8 Male total we have 29 Male as shown in table 1.5. and fig 1.5.

0-10 Age	T4	11-20 Age	T4	21-30 Age	T4	31-40 Age	T4	41-50 Age	T3
9	8.64	15	9.9	24	6.5	32	4.0	-	-
		20	11.54			33	8.14	-	-

Table. 1.5 T4 value for various age group Male

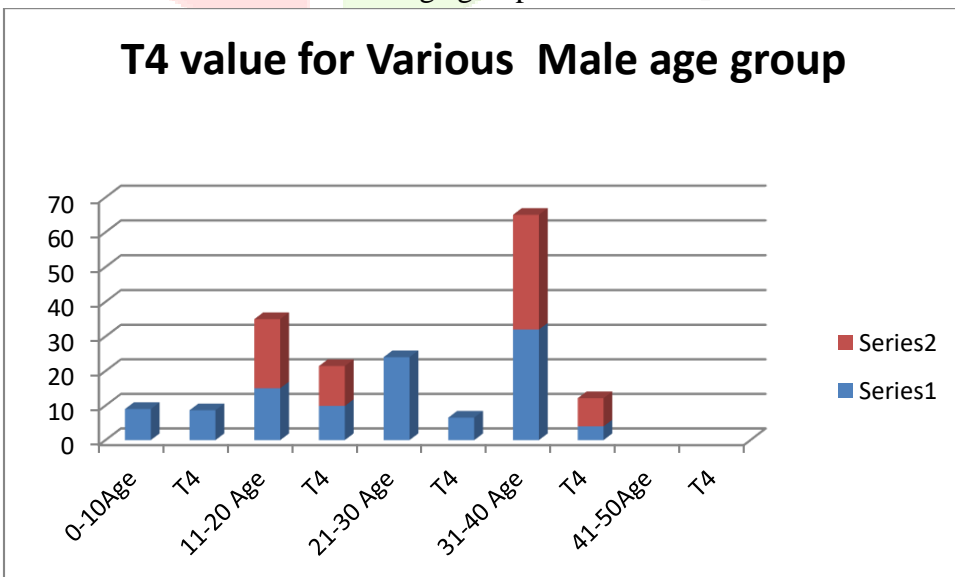


Figure: 1.5. T4 value for various age groups Male

## RESULT:

In study 35 patients T4 test in three months we find out 9 abnormal female their T4 value is more than 10.90 so we get 31.02% abnormal female and we get 1 male out of 6 male patients so 16.66% abnormal male and we get 1 abnormal male their T4 value is less than 4.50. When T4 value is less than 4.50 or more than 10.90 this is the abnormal range of T4. If T4 value in this range cause If human body function not properly work then some symptoms overcome in human body as like fatigue, weight gain, mood issue, irregular period, muscle pain cold hand, dry and cracking skin neck swelling etc. Generally thyroid problems are two types' hypothyroidism, and hyperthyroidism. These two different problems have different own symptoms in human body.

## CONCLUSION:

Our data indicate that T4 abnormal values are more find out in female more than male patient from that we conclude that female patients ratio have thyroid more than male patients.

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