# A INVESTIGATION OF KIDNEY FUNCTION IN THE HYPO-THYROIDISM INDIVIDUALS AT THE TERTIARY HEALTHCARE CENTRE

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**Abstract:** The most prevalent endocrine illnesses worldwide are thyroid disorders. India is also no different. There are thought to be 42 million thyroid ailment sufferers in India, based on projections from numerous research on the condition. to investigate Kidney function in hypo-thyroid individuals at a tertiary medical facility. This cross-sectional investigation was conducted over a one-year period in 100 hypo-thyroid individuals at a Medical College and Hospital in Central India after receiving approval from the institutional ethical committee. The investigation includes similar eu-thyroid participants in addition to the diagnosed hypo-thyroidism individuals who provided consent. Both groups underwent the kidney function test, which included indicators such as creatinine clearance, creatinine urea, and uric acid, among others. Unpaired t-test statistics were computed using SPSS version 22 software. 49 -16%, 50-59 12%, and >60 10%. Women individuals made up 66% of the total population, with male individuals making up 24%. The Creatinine Clearance was considerably poorer in the hypo-thyroidism individuals compared to controls, measuring 102.08±9.98, 80.74±10.56 (P 0.001), Creatinine -0.82±0.102, 0.726±0.0456 (P 0.001), Urea -28.18±3.18, 21.82±3.01 (P 0.001), and Uric acid -5.082±0.7614, 3.124±0.158 (P 0.001). According to the results of our investigation, the majority of hypo-thyroid individuals were women and in the age range of 30-39. They also demonstrated significantly abnormal kidney function tests, such as lower creatinine clearance and higher creatinine, urea, and uric acid levels in comparison to euthyroid individuals.

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**Key Words:** Hypo-thyroidism, Euthyroid, Kidney function Test, Creatinine Clearance, Creatinine Urea, Uric acid.

## 1.INTRODUCTION

The most prevalent endocrine illnesses worldwide are thyroid problems. India is also no different[1-3]. There are thought to be 42 million thyroid ailment sufferers in India, based on projections from numerous research on the condition. Most cells' basal metabolic rate and kidney hemodynamics are controlled by thyroid hormones (TH). Triiodothyronine (T3) and thyroxine (T4), the only iodine-containing hormones in vertebrates, are produced and released by the thyroid gland[4-8]. The thyroid hormone that is biologically active is T3. Nearly all tissues depend on these hormones for healthcare growth, development, and function, and they have a significant impact on metabolic rate and oxygen use[9-11]. A negative feedback loop involving the hypothalamus, pituitary, and thyroid gland controls the production and secretion of TH. The liver in turn metabolises the thyroid hormones and controls their systemic endocrine effects. Thyroid hormones govern the basal metabolic rate of all cells, including hepatocytes[12-15]. Both healthcare hepatic function and healthcare bilirubin metabolism depend on adequate thyroid hormone levels in the blood. Liver function may be affected by thyroid disorders, and vice versa. It has been demonstrated that short-term hypo-thyroidism caused by surgery or medication lowers glomerular filtration rate in experimental animals[16-18].

## 2.MATERIAL AND METHODS

This cross-sectional investigation was conducted over a one-year period in 100 hypo-thyroid individuals at a Medical College and Hospital in Central India after receiving approval from the institutional ethical committee. The investigation includes similar eu-thyroid participants in addition to the diagnosed hypo-thyroidism individuals who provided consent. Both groups underwent the kidney function test, which included indicators such as creatinine clearance, creatinine urea, and uric acid, among others. Unpaired t-test statistics were computed using SPSS version 22 software.

## 3.RESULT

**Table 1: Age wise distribution of the individuals**

| Age group (Yrs.) | No. | % |
|---|---|---|
| 20-29 | 14 | 14 |
| 30-39 | 48 | 48 |
| 40-49 | 16 | 16 |
| 50-59 | 12 | 12 |
| >60 | 10 | 10 |
| **Total** | **100** | **100** |

Table 1.Ages 30-39 made up 48% of the individual population, followed by 40-49, 16%, 50-59, 12%, and >60, 10%.

**Table 2: Distribution of the individuals as per the sex**

| Sex | No. | Parentage (%) |
|---|---|---|
| Male | 24 | 24 |
| Women | 66 | 66 |
| **Total** | **100** | **100** |

Table 2: Women individuals made up 66% of the total population, with male individuals making up 24%.

**Table 3: Distribution of the Cases and Controls as per the Kidney Function test**

| | Controls | Cases | t-Test | P-Values |
|---|---|---|---|---|
| **Parameter** | **Euthyroid Mean±SD (n=100)** | **Hypo-thyroidism Mean±SD (n=100)** | | |
| Creatinine Clearance | 102.08±9.98 | 80.74±10.56 | 10.352 | <0.001 |
| Creatinine | 0.726±0.0456 | 0.82±0.102 | 8.428 | <0.001 |
| Urea | 21.82±3.01 | 28.18±3.18 | 10.126 | <0.001 |
| Uric acid | 3.124±0.158 | 5.082±0.7614 | 17.684 | <0.001 |

From above table 3 it is clear that Creatinine Clearance was considerably poorer in the hypo-thyroidism individuals compared to controls, measuring 102.08±9.98, 80.74±10.56 (P 0.001), Creatinine -0.82±0.102, 0.726±0.0456 (P 0.001), Urea -28.18±3.18, 21.82±3.01 (P 0.001), and Uric acid -5.082±0.7614, 3.124±0.158 (P 0.001).

## 4.DISCUSSION

The phenomena of reversible hypo-thyroidism-induced kidney impairment has gained new significance in light of recent epidemiological studies that found a significant prevalence of thyroid dysfunction among individuals with kidney impairment[16-21]. About 18-20% of chronic kidney disease individuals who do not need kidney replacement treatment also have subclinical hypo-thyroidism (elevated TSH levels with normal FT4 levels) and clinically evident hypo-thyroidism, with the prevalence increasing as the severity of kidney impairment improves. In individuals with subclinical hypo-thyroidism, the advantages of thyroid hormone replacement treatment, especially its effects on kidney function, are still unknown[22-25]. Although there are several potential causes for the pathophysiology of altered kidney function in hypo-thyroidism, the decrease in GFR brought on by the lower cardiac output and kidney blood flow is probably the most important one[26-28]. Thyroxine has also been proposed as a potential mediator of creatinine tubular secretion. Additionally, hypo-thyroidism may cause muscles to release more creatinine. Although readily filtered, creatinine is a poor indicator of GFR due to extra tubular secretion[29-30]. It is necessary to conduct additional research using isotope GFR tests in hypo-thyroidism individuals to determine if an elevated blood creatinine represents real kidney impairment (i.e., lower GFR) or merely increased production, and tubular secretion, of creatinine. Although myalgias are

the most common manifestation of hypo-thyroidism myopathy, acute kidney injury caused by rhabdomyolysis is a rare consequence of hypo-thyroidism. Thyroid hormone replacement therapy improves kidney function and stops rhabdomyolysis[31,32]. Despite the fact that our first individual's creatine kinase level was high, rhabdomyolysis was ruled out by the absence of urinary myoglobin and the normal biopsy results. Despite reports of end-stage kidney disease brought on by hypo-thyroidism, variations in serum creatinine brought on by hypo-thyroidism are often mild. In individuals with hypo-thyroidism, histological abnormalities such as thickening of the basement membrane in the glomeruli and tubules, mesangial enlargement, and inclusions of epithelial and interstitial cells have all been described. These have shown to be both treatable and irreversible[33]. Since thyroxine is tightly protein bound and lost through the urine in nephrotic syndrome, hypo-thyroidism has also been defined as the result of kidney impairment rather than its cause[34]. In our investigation, we discovered that 48% of the individuals were in the 30-39 age range, followed by the age ranges of 40-49, 50-59, and >60. Women individuals made up 66% of the total population, with male individuals making up 24%. Creatinine Clearance was considerably poorer in the hypo-thyroidism individuals compared to controls, measuring 102.08±9.98, 80.74±10.56 (P 0.001), Creatinine -0.82±0.102, 0.726±0.0456 (P 0.001), Urea -28.18±3.18, 21.82±3.01 (P 0.001), and Uric acid -5.082±0.7614, 3.124±0.158 (P 0.001). The findings of HS Chaudhury et al. that the mean (SD) serum creatinine was substantially higher in the hypo-thyroidism group than the euthyroid group (P0.01) were comparable to this. When compared to the euthyroid group, the estimated glomerular filtration rate (eGFR) was lower in the hypo-thyroidism group (p=0.011)[35,36].

## 5.CONCLUSION

According to the results of our investigation, the majority of hypo-thyroid individuals were women and in the age range of 30-39. They also demonstrated significantly abnormal kidney function tests, such as lower creatinine clearance and higher creatinine, urea, and uric acid levels in comparison to euthyroid individuals.

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