

### **Thyroid Dysfunction in Patients of Chronic Kidney Disease**

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#### **Abstract**

**Background and Objectives:** The high prevalence of thyroid dysfunction in chronic kidney disease (CKD) patients reveals significant association between CKD progression and thyroid dysfunction.

**Materials and Methods:** A cross-sectional study will be conducted among CKD patients attending OPD and admitted in Medicine department of GSVM Medical College, Kanpur from January 2018 to October 2019 to investigate thyroid function in CKD patients. A total of 200 participants were enrolled during above period, out of these 200 participants 100 were CKD patients and others 100 were healthy control.

**Results:** Correlation between TSH of case and control group where mean of control group is  $5.04 \pm 5.19$  and case group is  $5.21 \pm 2.89$  where p value is 0.032 with confidence interval of 1.33 to 1.00 with t value of 0.28.

**Conclusions:** In this study observed a high prevalence of Subclinical hypothyroidism (SCH) in CKD patients

**Keywords:** Chronic kidney disease, clinical hypothyroidism, subclinical hypothyroidism, thyroid dysfunction.

Chronic kidney disease (CKD) is becoming a serious health problem; the number of people with impaired renal function is rapidly rising, especially in industrialized countries. Recent reports, however, suggest an abrupt rise in CKD in developing countries from Asia due to increase in concomitant diseases such as type 2 diabetes, hypertension and cardiovascular diseases (CVDs). Associated with rise in CKD numbers is the extensive increase in the health cost for management of CKD especially of 5<sup>th</sup> stage.

The kidney normally plays an important role in the metabolism, degradation and excretion of thyroid hormones. CKD affects the hypothalamus pituitary thyroid axis. CKD affects thyroid function in many ways, including low circulating thyroid hormone levels, altered peripheral hormone metabolism, insufficient binding to carrier proteins, reduced tissue thyroid hormone content and altered iodine storage in the thyroid gland. Thus, in CKD, thyroid hormone metabolism is impaired. CKD is associated with a higher prevalence of primary hypothyroidism, both

overt and subclinical, but not with hyperthyroidism. Prevalence of primary hypothyroidism, mainly in the subclinical form, increases as glomerular filtration rate (GFR) decreases.

Chronic kidney disease (CKD) a terminal event of chronic renal parenchymal disease due to various causes is known more for its morbidity and mortality. The effects of the altered functioning of the renal system are reflected in every organ system of the body. The severity of the consequences of CKD has however undergone profound changes since the advent of dialysis.

### Material and Method

**Study design:** A cross-sectional study conducted among CKD patients attending OPD and medicine emergency of Medicine department of GSVM Medical College, Kanpur from January 2018 to October 2019. A total of 200 patients with 100 newly diagnosed and 100 known CKD cases (stage 3 to stage 5) were included in the study. CKD will be defined on the basis of National Kidney Foundation guidelines of having an estimated glomerular filtration rate (EGFR) < 60 ml/min/1.732 m<sup>2</sup> for more than 3 months. The Modification of Diet in Renal Disease study (MDRD) equation used to calculate Egfr. eGFR between 30-60 ml/min considered as moderate CKD (Stage 3) and eGFR < 30 ml/min considered as severe CKD (Stage 4 & 5) in the present study. The study protocol was approved by the Institutional Review Board of Ethics Committee GSVM Medical College, Kanpur and consents would be obtained from each patient.

**Sample Size:** 100 cases and 100 control of age and gender matched of Age group 20-70 years was taken.

### Selection of study subjects

#### Inclusion Criteria

- Patients between Age 20 -70 years of either sex.

- All patients diagnosed with moderate to severe CKD.

#### Exclusion Criteria

- Age <20 years and >70 yrs.
- Patients with history of hyper or hypothyroidism.
- CKD patients who were or underwent previous dialysis.
- Obesity
- Nephrotic Syndrome.
- Patients on estrogens, corticosteroids, anti-thyroid drugs, dietary supplements, lipid lowering drugs.
- Pregnant Woman
- Acutely ill patients

#### Investigation

Hb, Total leukocyte count ,KFT, LFT, Platelet count, TSH ,FT3,FT4,Lipid Profile(TC, TG, LDL, HDL, VLDL),Hba1c

#### Results

In our study total 200 patients were taken in which 100 were in case group and 100 in control group. Age group of patients was in between 20 to 70 years in both case group and control group.

Table 1: Gender Wise Distribution of Case

Gender	Number
Male	71
Female	29

Table 2: Gender Wise Distribution of Control Group

Gender	Number
Male	66
Female	34
Total	100

Table 3: Mean Value of TSH of Case And Control Group

Mean	Control	CKD
	5.04±5.19	5.21±2.89

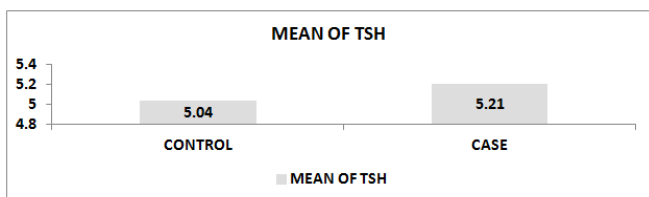
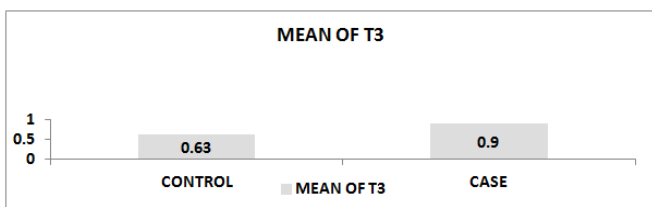


Figure 1: Correlation between TSH of case and control group where mean of control group is  $5.04 \pm 5.19$  and case group is  $5.21 \pm 2.89$  where p value is 0.032 with confidence interval of 1.33 to 1.00 with t value of 0.28.

Table 4: Mean Value of T3 of Case and Control Group

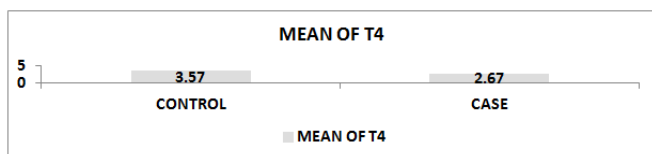
Mean	Control	CKD
	$0.63 \pm 0.46$	$0.90 \pm 0.86$



Correlation between T3 of case and control group where mean of control group is  $0.63 \pm 0.46$  and case group is  $0.90 \pm 0.86$  where p value is 0.0057 with confidence interval of 0.46 to 0.08 with t value of 2.8.

Table 5: Mean Value of T4 of Case and Control Group

Mean	Control	CKD
	$3.57 \pm 2.44$	$2.67 \pm 2.38$



Correlation between T4 of case and control group where mean of control group is  $3.57 \pm 2.44$  and case group is  $2.67 \pm 2.38$  where p value is 0.0083 with confidence interval of 1.56 to 0.23 with t value of 2.66.

### Discussion

Chronic kidney disease (CKD) is a serious health problem and the no. Of people with impaired renal

function is rapidly increasing. Progression of CKD is associated with having a number of complications, including thyroid dysfunction, dyslipidemia and CVD.

We studied 200 patient which are between the age of 20 years to 70 years and diagnose as CKD in which 100 were in case group and 100 were in control group and patient were investigated for thyroid profile in which we are investigating for serum T3 level , serum T4 level and serum TSH level group in biochemistry department laboratory of GSVM medical college, and compared with control.

After that we also assess the thyroid profile that is serum T3 level, serum T4 level and serum TSH level because in many study's authors found that the thyroid level is deranged in many patients so we assess these levels in case group and control group and we found that mean value of serum TSH level in case group was 5.21 and standard deviation was 2.89 and in control group mean value of serum TSH level was 5.04 and standard deviation was 5.19 and these values was higher in case group as compared with control group but not significant.

We assess these levels in case group and control group and we found that mean value of serum T4 level in case group was 2.67 and standard deviation was 2.38 and in control group mean value of serum T4 level was 3.57 and standard deviation was 2.44 and values were lower in case group as compared with control group and was found significant.

We assess these levels in case group and control group and we found that mean value of serum T3 level in case group was 0.90 and standard deviation was 0.86 and in control group mean value of serum T3 level was 0.63 and standard deviation was 0.46 and values were lower in case group as compared with control group and was found highly significant.

## Conclusion

We observed a high prevalence of Subclinical hypothyroidism (SCH) in our CKD patients. SCH is an additional risk factor in CKD patients and the present study finds thyroid dysfunction being SCH to be very common in CKD patients and reveals significant association between CKD progression and thyroid dysfunction.

By the outcomes of our study we can give insight to clinicians that the CKD should be screened for thyroid dysfunction to avoid the risk of CVD morbidity and mortality

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