



## "EFFECT OF AGE ON THYROID PROFILE IN CHRONIC KIDNEY DISEASE"

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**ABSTRACT** **Aim:** The aim of this study was to establish a correlation & find effect of Age on Serum T3,T4, TSH values of Chronic kidney disease patients.

**Study Design:** A hospital based Non-Experimental Observational Cross-sectional & Correlation Study was conducted on patients of both sex attending the Out Patient Department & In Patient Department of Nephrology & Medicine of SMI Hospital, P.Nagar Dehradun for a period of 4 months from January 2014 to April 2014. Study comprises 54 Chronic kidney disease patients which were divided into five age groups i-e Age group- 15-29yrs, Age group- 30-44yrs, Age group-45-59yrs, Age group- 60-74yrs, Age group- ≥75yrs. Inclusion criteria was patients with evidence of Chronic kidney disease selected randomly of both sex & age above 15 years. Exclusion criteria was age <15 years & those not willing to participate.

**Methodology:** Consecutive sampling technique & Bio-physiological method of collection of Data was used. 5ml blood was collected in sterile tubes from the fasting (8-12hrs) Chronic kidney disease patients & was analyzed for Serum T3, T4, TSH values by enzymatic method using VITROS ECIQ, an auto analyser at SMI Hospital, P.Nagar, Dehradun. Correlation coefficient i-e r-value & p-value was analysed using Microsoft office Excel 2007. Positive r- value represented positive correlation between that age group & that parameter & vice versa. P<0.05 was considered significant & P<0.01 was considered highly significant

**Results:** Age group 15-29yrs was found to have positive Correlation coefficient with S. T3, T4 & TSH values of Chronic kidney disease patients & there was significant(P<0.05) relationship of this age group with S. T3, T4, TSH values of Chronic kidney disease patients.

Age group 30-44yrs was found to have negative Correlation coefficient with S. T3, T4 & positive Correlation coefficient with S. TSH values of Chronic kidney disease patients. Relationship of S.T3 & TSH was found to be Non significant (P>0.05) & S.T4 was found to have Highly significant (P<0.01) relationship with this Age group.

Age group 45-59yrs was found to have negative Correlation coefficient with S. T4, TSH & positive Correlation coefficient with S.T3 values of Chronic kidney disease patients. Relationship of S.T3, T4 & TSH was found to be Non significant (P>0.05) with this Age group.

Age group 60-74yrs was found to have negative Correlation coefficient with S. T3 & positive Correlation coefficient with S. T4 & TSH values of Chronic kidney disease patients. Relationship of S.T3, T4 & TSH was found to be Non significant (P>0.05) with this Age group.

Age group ≥75yrs was found to have negative Correlation coefficient with S. T3, T4 & positive Correlation coefficient with S. TSH values of Chronic kidney disease patients. Relationship of S.T3, T4 & TSH was found to be Non significant (P>0.05) with this Age group.

**KEYWORDS :** Chronic Kidney Disease, Age Group, Thyroid Profile.

### INTRODUCTION:

Chronic kidney disease is a silent pandemic.<sup>(1)</sup> Exact prevalence of kidney disease in India is not known due to lack of adequate data both in the Government and insurance sectors. Recently with the support of the Indian society of Nephrology, a kidney disease registry has been formed with the hope of generating adequate information about kidney disease patients in India. Three studies which have been carried out in different parts of India have been reviewed to examine the prevalence of kidney disease, which ranges from 0.79% to 1.4%. Thyroid hormones play a very important role in regulating metabolism, development, protein synthesis & influencing other hormone function.<sup>(2)</sup> Less research has been done in the field of thyroid status in Chronic Kidney disease Patients but disorders in renal functions have been seen to co-exist with specific levels of thyroid hormones so this study is done to expand the knowledge of thyroid status in chronic kidney disease.<sup>(3)</sup> With the introduction of Radio immuno assay & Chemiluminescence assay methods for estimation of thyroid hormones, the thyroid status in Chronic kidney disease has been studied extensively by a host of workers.<sup>(4)</sup>

Most of the authorities have demonstrated biochemical evidence of hypothyroidism even goiter & exophthalmos like Silverberg et al & Carter et al.<sup>(5,6)</sup> Management of Chronic kidney disease should be aimed at slowing the rate of decline of kidney function & minimizing the effects of other complications of chronic kidney disease.<sup>(7)</sup> Late referral is associated with greater subsequent cost of medical care & worse prognosis.<sup>(8)</sup> Although management of patients with early non-progressive Chronic kidney disease is increasingly becoming the responsibility of primary care physicians, nephrologist, need to assess those individuals likely to progress to End stage renal disease to require renal replacement therapy.<sup>(9)</sup> Since 1960s, RRT has provided life- saving and life sustaining treatment for patients affected with End stage renal disease.<sup>(10)</sup> The risk of health from Cardiovascular disease is elevated 30 fold for patient with End stage renal disease as compared to

general population. At time of starting Renal Replacement Therapy prevalence of Cardiovascular disease among Chronic kidney disease patient is high.<sup>(11,12)</sup> There is accumulating evidence that increase in Cardiovascular disease burden is present in patients prior to dialysis, due to both conventional risk factors as well as those specific to kidney disease.<sup>(13)</sup> Thyroid Dysfunction added to dyslipidemia in Chronic kidney disease may further increase Cardiovascular disease risk hence early diagnosis of thyroid dysfunction & dyslipidemia by regular screening & treatment slows the progression of Chronic kidney disease in addition to reduction of Cardiovascular disease risk.<sup>(14)</sup>

**MATERIAL & METHODOLOGY:** A hospital based Non-Experimental Observational Cross-sectional & Correlation Study was conducted on patients of both sex attending the Out Patient Department & In Patient Department of Nephrology & Medicine of SMI Hospital, P.Nagar Dehradun for a period of 4 months from January 2014 to April 2014. Study comprises 54 patients with evidence of Chronic kidney disease selected randomly of both sex & age above 15 years which were divided into five age groups i-e Age group- 15-29yrs, Age group- 30-44yrs, Age group-45-59yrs, Age group- 60-74yrs, Age group- ≥75yrs.. Consecutive sampling technique & Bio-physiological method of collection of Data was used. 5ml blood was collected in sterile tubes from the fasting ( 8-12hrs) Chronic kidney disease patients & was analyzed for Serum T3, T4, TSH levels by enzymatic method using VITROS ECIQ, an auto analyser at SMI Hospital, P.Nagar, Dehradun. Chronic kidney disease was diagnosed by clinical examination & biochemical analysis of the patient. Exclusion criteria for the study was age less than 15 years & those not willing to participate.

Data was analysed using Microsoft office Excel 2007. Test used were unpaired t- test with unequal variance & paired t- test, through that only p value was determined. Other tests applied were correlation analysis, standard deviation and mean values. Value of p < 0.05 was considered significant & p < 0.01 was considered highly significant.

**RESULT:**

Statistically, Age group 15-29yrs was found to have positive Correlation coefficient with S. T3, T4 & TSH values of Chronic kidney disease patients & there was significant(P<0.05) relationship of this age group with S. T3, T4,TSH values of Chronic kidney disease patients as depicted by Figure 1 & Table 1.

Statistical analysis demonstrated that Age group 30-44yrs was found to have negative Correlation coefficient with S. T3, T4 & positive Correlation coefficient with S. TSH values of Chronic kidney disease patients. Relationship of S.T3 & TSH was found to be Non significant (P>0.05) & S.T4 was found to have Highly significant (P<0.01) relationship with this age group as shown by Figure 1 & Table 1.

**TABLE 1- Correlation Coefficient, p value & Level of Significance of Thyroid profile according to Age Group distribution of Chronic Kidney Disease patients.**

THYROID PROFIE		T3	T4	TSH
Age group 15-29yrs	r value	0.818	0.04	0.84
	p value	0.037	0.039	0.02
	LOS	S	S	S
Age group 30-44yrs	r value	-0.37	-0.22	0.69
	p value	8.06	0.0009	2.18
	LOS	NS	HS	NS
Age group 45-59yrs	r value	0.008	-0.17	-0.08
	p value	6.07	2.31	9.18
	LOS	NS	NS	NS
Age group 60-74yrs	r value	-0.132	0.019	0.09
	p value	2.06	1.64	1.3
	LOS	NS	NS	NS
Age group ≥75yrs	r value	-0.53	-0.02	0.50
	p value	1.98	1.57	1.28
	LOS	NS	NS	NS

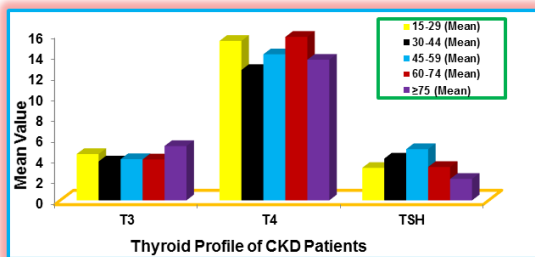
\* LOS- Level of Significance, \*S- Significant, \*NS- Non Significant, \*HS- Highly Significant.

Statistics states that Age group 45-59yrs was found to have negative Correlation coefficient with S. T4,TSH & positive Correlation coefficient with S. T3 values of Chronic kidney disease patients. Relationship of S.T3,T4 & TSH was found to be Non significant (P>0.05) with this age group as visible in Figure 1 & Table 1.

Statistically, Age group 60-74yrs was found to have negative Correlation coefficient with S. T3 & positive Correlation coefficient with S. T4 & TSH values of Chronic kidney disease patients. Relationship of S.T3,T4 & TSH was found to be Non significant (P>0.05) with this age group as demonstrated by Figure 1 & Table 1.

Statistical analysis proved that Age group ≥75yrs was found to have negative Correlation coefficient with S. T3,T4 & positive Correlation coefficient with S. TSH values of Chronic kidney disease patients. Relationship of S.T3,T4 & TSH was found to be Non significant (P>0.05) with this age group as depicted by Figure 1 & Table 1.

**FIGURE 1- Mean Values of Thyroid Profile according to Age Group distribution of Chronic Kidney Disease patients.**



**DISCUSSION:**

Chronic kidney disease is characterized by a slow, insidious, and irreversible impairment of renal excretory and regulatory function<sup>(15)</sup>. In Chronic kidney disease patients set of progressive changes occurs leading to hypertrophy and hyperfiltration of viable nephrons which becomes maladaptive as the increased pressure and flow predisposes to sclerosis and dropout of the remaining nephrons. Increased intrarenal activity of the renin-angiotensin axis appears to contribute both to the initial adaptive

hyperfiltration and to the subsequent maladaptive hypertrophy and sclerosis, the latter, in part owing to the stimulation of transforming growth factor β (TGF-β) explaining the reduction in renal mass from an isolated insult leading to a progressive decline in renal function over many years.<sup>(16)</sup> The mortality rate can range from 7 percent to as high as 80 percent , depending on the severity of renal failure<sup>(17,18)</sup>. Approximately 19 millions of the United States adults have chronic kidney disease (CKD)<sup>(19)</sup>, and an estimated 80,000 person have chronic kidney failure that diagnosed annually. Goiter may be induced by the high serum level of inorganic iodide or retention of goitrogenic substances normally excreted by the kidney<sup>(20)</sup>. Malnutrition may be a contributing factor in altering thyroid function tests<sup>(21)</sup>. This communication presents the results of our attempts to study systematically the pituitary-thyroid axis as well as the peripheral metabolism of thyroid hormones in renal failure.

In this study T3 & TSH was found to have significant relation with 15-29yrs age group & non significant relationship with rest of the age groups.T4 was seen to have significant relation with 15-29yrs age group, relationship was non significant with 45-59yrs,60-74yrs & ≥75yrs age group & Highly significant with 30-44yrs age group.

In 1996, Kaptein et al. Stated that the competitive assays for free hormones (fT3 and fT4) generally give less reliable results in CRF, due to methodological problems.

In 2001, G Avasthi, S Malhotra, APS Narang, S Sengupta did “Study of thyroid function in patients of chronic renal failure”<sup>(22)</sup>,

**CONCLUSION:**

Inspite of the fact that extensive studies are there in the field of thyroid status in Chronic kidney disease patients but the exact thyroid status is still in conclusive so this study is the effort to clarify the status of thyroid in chronic kidney disease patients & this study also tries to emphasize on the effect of age on thyroid profile of chronic kidney disease patients so patients were divided into different age groups. In this study we observed the Level of significance of Thyroid profile to the different age groups and calculated the Correlation Coefficient. In this study T3 had positive Correlation Coefficient with 15-29yrs & 45-59yrs age group & Negative Correlation Coefficient with rest of the age groups. T4 was seen to have positive Correlation Coefficient with 15-29yrs & 60-74yrs age group & Negative Correlation Coefficient with rest of the age groups. TSH had negative Correlation Coefficient with 45-59yrs age group & positive Correlation Coefficient with rest of the age groups.

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