

Frequency of Subclinical Hypothyroidism Among Patients with end Stage Renal Disease on Hemodialysis Presenting to A Tertiary Care Hospital

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ABSTRACT

Objective: Aim of this study was to determine the frequency of subclinical hypothyroidism among patients with end stage renal disease presenting to tertiary care hospital.

Study Design: Cross sectional study.

Place and Duration of Study: Department of Nephrology, Sharif Medical City Hospital, Lahore. Pakistan, from Mar 2020 to Dec 2020.

Methodology: A total of 200 cases studied. Informed consent was obtained from them. Data was noted in the proforma. Using aseptic techniques blood sample was taken for testing serum TSH and free T4 levels through radioimmunoassay. Results were collected by the researcher next day and were labeled and noted as subclinical hypothyroidism according to its clinical definition. Privacy of the data was maintained.

Results: In 200 study cases age interval was 15-80 years with mean age of 46.22±19.67 years. The minimum Serum TSH level was 4.1 and maximum was 4.6 with mean serum TSH level was 4.31±0.16. The minimum Serum T4 levels was 0.5 and maximum was 2.1 with mean Serum T4 levels was 1.28±0.68. Duration of chronic kidney disease was 3-60 months with mean duration of 17.58±14.14 months. It was observed that there were 56.5% male patients while females were 43.5%. Subclinical Hypothyroidism was present in 9.5% patients with ESRD reporting to tertiary care hospital while it was absent in 90.5% patients.

Conclusion: The frequency of subclinical hypothyroidism was found as 9.5% among patients with end stage renal disease presenting to tertiary care hospital.

Keywords: Chronic kidney disease, End stage renal disease, Subclinical hypothyroidism.

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INTRODUCTION

Prevalence of chronic kidney disease and ESRD is increasing worldwide. According to a report its prevalence in India is 200-800 cases per million people.¹ Main causes of CKD include chronic interstitial nephritis in 20.4% cases, diabetic nephropathy in 29.6%, hypertensive nephropathy in 11% cases and chronic glomerulonephritis in 17.4% cases.² In sub-clinical hypothyroidism serum TSH level is elevated (normal 4.2-10 uIU/ml) while free T4 level is in normal limit (0.93-1.7 ng/dl).³ Literature reported that prevalence of subclinical hypothyroidism (SCH) is 4-8% among men and women both while especially among women its prevalence is 15-18%.⁴ SCH is a risk factor for hypercoagulation, cardiovascular diseases, mild inflammation and hyperlipidemia.⁵ SCH and ESRD both are risk factors for cardiovascular disease (CVD)

and when combined risk of CVD is further increased.⁶ Previous data has shown increased frequency of SCH among ESRD patients.⁷ Literature has reported that in ESRD decreased GFR induces development of clinical or subclinical hypothyroidism.⁸ One theory suggests that reduced GFR causes functional or anatomical abnormalities in thyroid gland and thyroid volume is increased in such cases.⁹ Combination of both diseases ESRD and hypothyroidism make is much difficult for the clinicians to treat as morbidity is very high in such cases.¹⁰ This study was conducted to report data of such diseases in our population, to emphasize the disease burden and its importance in treating ESRD cases.

Practical implication: Prevalence of CKD is increasing worldwide with the passage of time. It is a major health issue in our population. This disease finally leads to ESRD. In Pakistan number of cases with CKD and ESRD are increasing. Hypothyroidism is frequently found in such cases. It is a neglected major health problem in our region. This study helps us to

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know frequency of hypothyroidism in ESRD cases so that this disease may be evaluated and treated properly in such cases to reduce disease morbidity and mortality.

METHODOLOGY

This is a cross sectional study carried out in the department of nephrology, Sharif Medical City Hospital, Lahore Pakistan, from 10-03-2020 to 18-12-2020. Sample size of 200 cases was determined taking 95% confidence level, margin of error 4% and taking expected percentage of subclinical hypothyroidism among patients of end stage renal disease as 8%. Sampling was done by non-probability consecutive sampling method

Inclusion Criteria: The inclusion criteria was age 15 to 80 years, both sexes and patients with End stage renal disease (as per operational definition) for a duration of at least 3 months.

Exclusion Criteria: The exclusion criteria were those not agreed to participate in the study, patients having acute infection determined by history of fever (temp >100 F) and TLC >11000 cell/mm³

Patients having deranged liver function test (PT >13 sec and APTT >34 sec) or abnormality in liver size (enlarged or shrunken liver) or coarse echotexture on ultrasonography.

Known cases of thyroid disease or thyroid surgery determined by history and medical record.

Patient taking Beta blockers, diuretics or interferon therapy in the last six months determined on history.

About 200 patients of end stage renal disease according to inclusion criteria and presenting to the department of nephrology, Sharif Medical City Hospital Lahore were enrolled into the study. Informed consent was taken from them. All the Information obtained by the researcher was noted in the proforma. Using aseptic method blood sample collected and sent to pathology laboratory for testing serum TSH and free T4 levels through radioimmunoassay. Results were collected by the researcher next day and were labeled and noted as subclinical hypothyroidism (as per operational definition) in the pro forma as well. Confidentiality of the data was ensured.

Data was entered and analyzed using SPSS version 22. Numerical variables i.e. age, TSH level, T4 level and duration of CKD were summarized as mean and standard deviation. Percentages and frequencies were calculated for qualitative variables like sex and

subclinical hypothyroidism. Means with standard deviation were determined for quantitative variables like age and duration of chronic kidney disease etc. Chi-square test was used for data analysis. Significant *p*-value was <0.05.

RESULTS

From 200 patients age was 15-80 years with mean age as 46.22±19.67 years. Serum TSH level was 4.1-4.6 with mean value of 4.31±0.16. Serum T4 levels was 0.5-2.1 with mean value of 1.28±0.68. Duration of chronic kidney disease was 3-60 months with mean duration of 17.58±14.14 months.

There were 113 (56.5%) males and 87 (43.5%) females. Subclinical Hypothyroidism was found in 19 (9.5%) patients with ESRD reporting to tertiary care hospital while it was absent in 181 (90.5%) patients.

No significant association was found between Subclinical Hypothyroidism and age of the cases (*p*-value=0.075). More over association between Subclinical Hypothyroidism and duration of chronic kidney disease was not significant (*p*-value=0.992). Association between Subclinical Hypothyroidism and gender was not significant as well (*p*-value=0.069).

Table-I: Descriptive statistics (n=200)

	Min	Max	Mean ± SD
Age	15	80	46.22 ± 19.67
Serum TSH Level	4.1	4.6	4.31 ± 0.16
Serum T4 levels	0.5	2.1	1.28 ± 0.68
Duration of Chronic kidney disease	3	60	17.58 ± 14.14

Table-II: Stratification with respect to age and stratification with respect to Duration of Chronic kidney disease (n=200)

	Subclinical Hypothyroidism		Total	<i>p</i> -value
	Present	Absent		
Age				
<47 years	6	96	102	0.075
>47 years	13	85	98	

Duration of Chronic Kidney Disease

<1 year	11	105	116	0.992
>1 year	8	76	84	

Table-III: Stratification with respect to Gender (n=200)

Gender	Subclinical Hypothyroidism		Total	<i>p</i> -value
	Present	Absent		
Male	7	106	113	0.069
Female	12	75	87	
Total	19	181	200	

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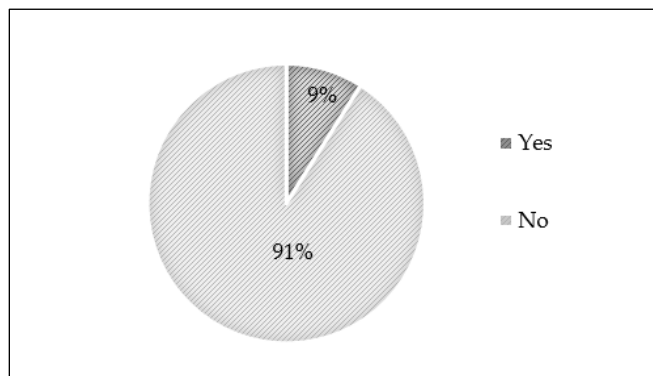


Figure-I: Frequency of hypothyroidism in study group

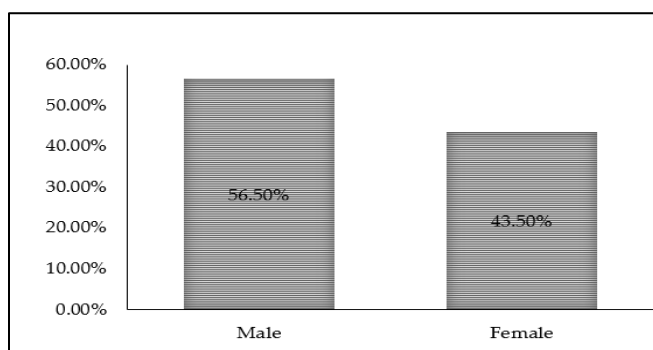


Figure-II: Gender distribution in study group

DISCUSSION

Chronic kidney disease (CKD) is defined as the presence of kidney damage (usually detected as urinary albumin excretion of 30 mg/day or more, or equivalent).¹¹ In this study range of age was 15-80 years with mean age of 46.22±19.67 years. Serum TSH level was 4.1-4.6 with mean value of 4.31±0.16. In this research, males were 56.5% while females were 43.5%. Subclinical Hypothyroidism was present in 9.5% patients with ESRD reporting to tertiary care hospital while it was absent in 90.5% patients.

Existing literature showed that out of 137 ESRD patients (mean age: 43±13.38 years), 107 were males (78.1%), 45 diabetics (32.8%), 127 hypertensives (92.7%), and 38 smokers (27.7%).¹² Previous study has reported prevalence of SCH 24.8%. In unadjusted (OR: 3.37, 95% CI: 1.91-5.21) and adjusted (for age, gender, HbA1C, and albumin/creatinine ratio; OR: 3.11, 95% CI: 2.15-4.98) logistic regression analysis, serum albumin was significantly associated with SCH. Further, multiple linear regression identified that for every 1 g/dl drop in serum albumin TSH increased by 4.61 mIU/l.¹³

In the population of Sweden, out of 137 cases hypothyroidism prevalence was 24.8%. There were

78% males, mean age was 43±13 years. There were 92.7% cases with hypertension, 32.8% cases with diabetes mellitus, 27.7% were smokers.¹⁴ Another study stated that with each 1g/dl decrease in serum albumen level TSH level increases 4.61 mIU/L. Previous data has shown strong association between serum albumen and TSH level.¹⁵ Roy *et al.* conducted study on 230 cases with mean age of 47.2 years. Male to female ratio was 5:1. In their study 11.8% cases were smoker. Subclinical hypothyroidism was found in 17.4% cases while normal thyroid profile was found in 82.6% cases. In their study all cases with hypothyroidism were hypertensive as well.¹⁶ Memon *et al* conducted study on 301 cases with median age of 54 years including 55% male and 44.5% females. Diabetes mellitus was the cause of renal failure in 45.8% cases while hypertension was causative factor in 45.5% cases. In their study SCH was present in 28% cases of patients on hemodialysis.^{17,18} Mehmood *et al.* conducted study on 72 cases with mean age of 41.9 years, including 61% males and 39% females with male to female ratio of 1.6:1. In their study mean disease duration was 5.7±2.1 years and prevalence of hypothyroidism among CKD patients was 31.9%.¹⁹ Rubina *et al* in their study conducted on 90 cases including 63.3% males and 36.7% females with mean age of 46.9±3.2 years. In their study SCH was found in 21.1% cases.²⁰ According to another study done by Rashid *et al.* male patients were 76% and females 24%. Frequency of SCH was 18%. In their study 60% cases belonged to middle socioeconomic status. About 56% were having age >60 years.²¹

CONCLUSION

The frequency of subclinical hypothyroidism was found as 9.5% among patients with end stage renal disease presenting to tertiary care hospital. This is a significant high number. Considering this condition patients with ESRD can be managed accordingly.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

WA & STS: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

IA & SA: Data acquisition, data analysis, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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