Research Article

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A CROSS-SECTIONAL STUDY ON THE FREQUENCY OF KURAIVEETHANA NOI (SUBCLINICAL AND CLINICAL HYPOTHYROIDISM) AMONG CHRONIC KIDNEY DISEASE PATIENTS

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ABSTRACT

Background: Thyroid hormones have a major role in renal development and physiology. It has been shown that in chronic kidney disease (CKD), as the Glomerular Filtration Rate (GFR) falls, there is a higher possibility of developing clinical and subclinical hypothyroidism (SCH). With falling GFR, several abnormalities are growing in the thyroid gland at both structural and functional levels. Objective: To estimate the frequency of kuraiveethana noi (subclinical and clinical hypothyroidism) among CKD patients through lab investigation (Thyroid Function Test). Materials and Methods: It is a cross-sectional study carried out on 50 CKD patients reporting at the National Institute of Siddha using a non-random sampling method. After obtaining informed consent, Blood samples were collected from each patient to document their Thyroid profile. Results: Based on their report of thyroid profile, 19 patients had subclinical hypothyroidism, and 6 patients had clinical hypothyroidism. Conclusion: The study concludes that the frequency of subclinical and clinical hypothyroidism is found to be 38% (19 patients) and 12% (6 patients), respectively, among 50 chronic kidney disease patients who visited OPD of Ayothidoss Pandithar Hospital, National Institute of Siddha, Tambaram sanatorium.

Keywords: subclinical hypothyroidism, clinical hypothyroidism, chronic kidney disease, kuraiveethana noi, cross-sectional study.

INTRODUCTION

Major symptoms of progressive chronic kidney disease (CKD) are indefinite complaints such as general fatigue, oedema, shortness of breath and dizziness. However, similar symptoms are present in hypothyroid patients. Thus, hypothyroidism underlying CKD might be unnoticed by clinicians, although such a disease may require treatment. Multiple groups have investigated the interaction between CKD and hypothyroidism, but no definite analysis and assessment have been performed [1].

Different studies are published in different parts of the world, showing a high prevalence of hypothyroidism in chronic kidney disease. Internationally, a study shows a prevalence of 24.4% with subclinical hypothyroidism in chronic kidney disease and 56% with hypothyroidism in chronic kidney disease [2,3].

Thyroid Hormones have critical effects on renal physiology by increasing renal blood flow and glomerular filtration rate. Hypothyroidism can reduce renal blood flow and glomerular filtration rate and vice versa [4]. Thyroid function has been suggested to be related to kidney function and CKD. It has been hypothesized that hypothyroidism may lead to altered kidney function via effects on cardiac output, intra-renal hemodynamics and renin-angiotensin-aldosterone system (RAAS), as well as structural changes, including decreased kidney-to-body weight ratio, truncated tubular mass and altered glomerular architecture [5].

Clinical Manifestation of Hypothyroidism in Renal

Decreased renal blood flow and glomerular filtration rate contribute to delayed and overall decreased water excretion, which can manifest as mild hyponatremia [6].

CHRONIC KIDNEY DISEASE

Definition: Chronic renal failure (CRF) is an irreversible deterioration in renal function that classically develops over years. Initially, it is manifest only as a biochemical abnormality. Eventually, loss of the excretory, metabolic and endocrine functions of the kidney leads to the development of the clinical symptoms and signs of renal failure, referred to as uraemia [7].

It is associated with a falling glomerular filtration rate (GFR) and is a progressive disease characterized by an increasing inability of the kidney to maintain normal low levels of the products of protein metabolism (e.g., urea), normal blood pressure and hematocrit, and sodium, water, potassium and acid-base balance [8].

Pathophysiology: With progressive nephron loss, the ability of

the diseased kidney to concentrate urine is impaired, resulting in polyuria and nocturia. At this point, fluid and salt restriction may be hazardous as it may lead to severe extracellular volume depletion.

Late in CRF, the remaining nephrons cannot excrete an average amount of sodium, so dietary salt is retained, usually resulting in hypertension and volume overload with CCF (Congestive cardiac failure) and oedema. At this point, fluid and salt restriction is mandatory.

The abnormalities in uremia, i.e. signs and symptoms, typically appear late, when GFR is < 25% of normal [9].

Thus, CKD reduces iodide excretion, which results in increased serum inorganic iodide level, thyroid gland iodine content and consequent thyroid gland enlargement. Structural changes in the thyroid among CKD patients include an increased prevalence of goitre (especially among women), thyroid nodules, and thyroid carcinoma compared to the general population [10].

MATERIALS AND METHODS

This cross-sectional study was carried out among the patients reporting at Ayothidoss Pandithar Hospital, National Institute of Siddha, Tambaram Sanatorium, Chennai. This study was conducted after obtaining approval from the Institutional Ethics Committee IEC NO- NIS/IEC/2021/MP-4. The study was also registered in CTRI (Clinical Trials Registry-India) - CTRI/2022/02/040222.

All the patients who came with CKD were screened for this study. Patients were then selected by using a non-random sampling method.

After obtaining informed consent, blood samples were collected from each patient to document their thyroid profile, serum creatinine, serum urea, serum albumin and eGFR. Individual data were filled simultaneously into an Excel sheet. Data analysis was done after obtaining the required sample size (50 patients).

Inclusion Criteria: The patients who have already been diagnosed with CKD, both male and female, aged between 18 and 70 years.

Exclusion Criteria: Age below 18 years and above 70 years, pregnant women, lactating women.

OBSERVATION AND RESULTS

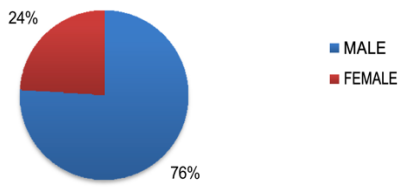

Figure 1: Distribution of Gender

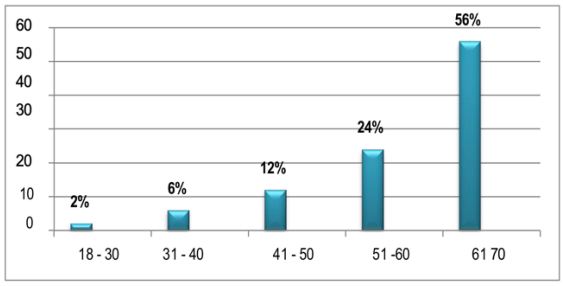

Figure 2: Distribution of age

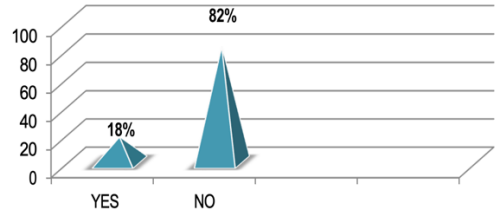

Figure 3: Distribution of history of hypothyroidism

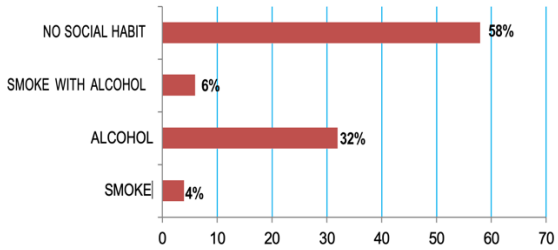

Figure 4: Distribution of social habits

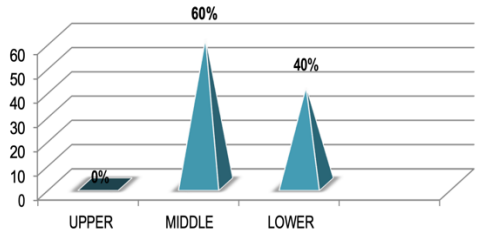

Figure 5: Distribution of Socioeconomic Status

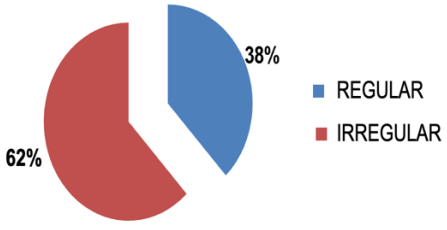

Figure 6: Distribution of sleep pattern

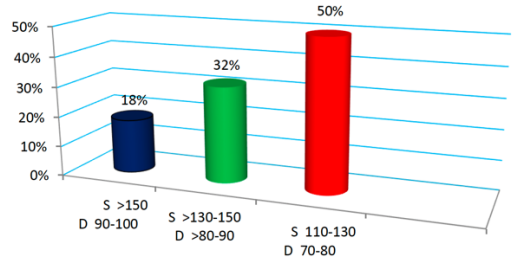

Figure 7: Distribution of blood pressure

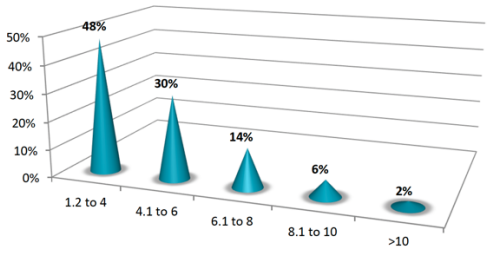

Figure 8: Distribution of serum creatinine

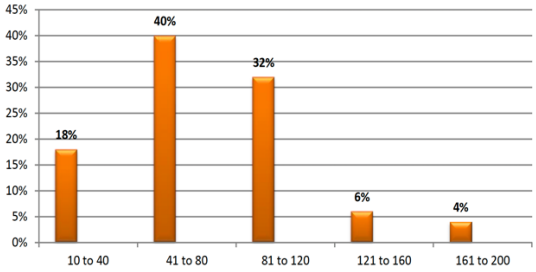

Figure 9: Distribution of serum urea

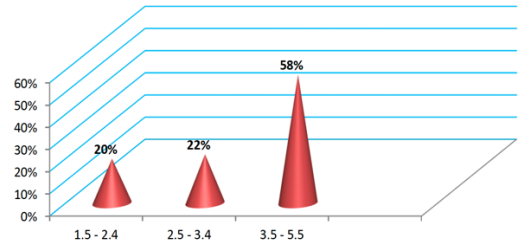

Figure 10: Distribution of serum albumin

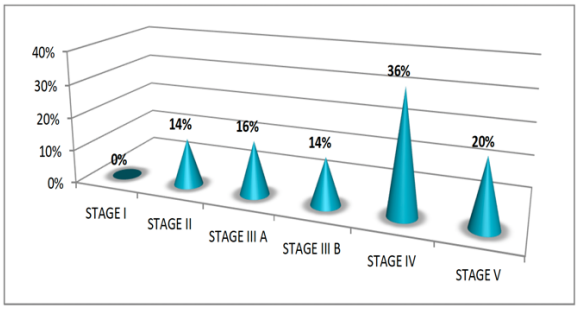

Figure 11: Distribution of eGFR

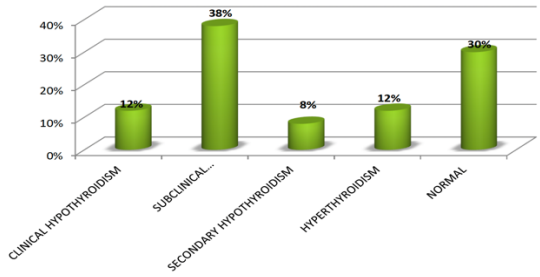

Figure 12: Distribution of thyroid profile in CKD patients

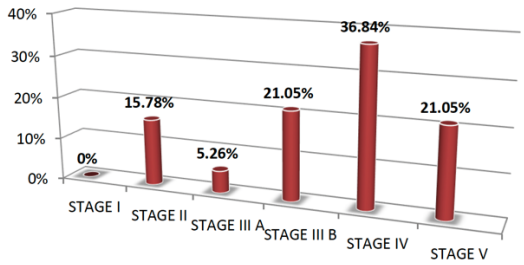

Figure 13: Distribution of Subclinical Hypothyroidism with CKD stage

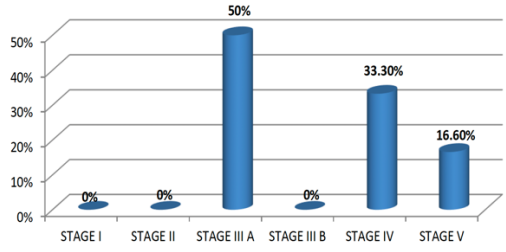

Figure 14: Distribution of Clinical Hypothyroidism with CKD stages

DISCUSSION

This study aimed to assess the frequency of subclinical and clinical hypothyroidism among chronic kidney disease patients.

Out of 50 CKD patients in this study, of which 38(76%) were males while 12(24%) were females, most of the patients (56%) were affected in the age group of 61-70 years of age.

Out of 50 patients, 9(18%) had a history of hypothyroidism.

Out of 50 patients, 58% of patients have no social habits, 32% of patients have a history of alcohol intake, 6% of patients have an account of smoking with alcohol, and 4% of patients have a smoking habit.

Out of 50 patients, 30(60%) in the middle category were mainly affected.

Out of 50 patients, 19(38%) have regular sleep patterns, and 31(62%) have irregular sleep pattern.

In this study, 50% of patients have systolic blood pressure in the range of 110-130 mmHg and diastolic blood pressure in the range of 70-80 mmHg, 32% have systolic blood pressure in the range of above 130-150 mmHg, and diastolic is above 80-90 mmHg,

18% have systolic blood pressure in the range of above 150 mmHg and diastolic blood pressure in the range of 90-100 mmHg.

Out of 50 CKD patients, 24 had raised serum creatinine levels within the range of 1.2-4 mg/dl (48%), followed by 4.1-6 mg/dl (30%).

Out of 50 CKD patients, 20 had raised serum urea levels within 41-80 mg/dl (40%), followed by 81-120 mg/dl (32%).

Out of 50 patients, 29 had normal serum albumin levels of 3.5-5.5 g/dL (58%), followed by 2.5-3.4 g/dL (22%).

In this study, out of 50 patients, 18 cases (36%) had stage IV GFR, 10(20%) had stage V GFR, 8(16%) had stage IIIA GFR, 7(14%) had stage IIIB GFR, and 7(14%) had stage II GFR. In this study, out of 50 patients, 19(38%) have subclinical hypothyroidism, 15(30%) have normal thyroid profile, 6(12%) have clinical hypothyroidism, 6(12%) have hyperthyroidism, 4(8%) have secondary hypothyroidism.

Out of 19 subclinical hypothyroidism patients, 7(36.84%) were stage IV CKD, 4(21.05%) were stage V CKD, 4(21.05%) were stage IIIB CKD, 3(15.78%) were stage II CKD and 1(5.26%) was stage IIIA CKD.

Out of 6 clinical hypothyroidism patients, 3(50%) were stage IIIA CKD, 2(33.30%) were stage IV CKD, and 1(16.60%) was stage V CKD.

Subclinical hypothyroidism (SCH) is recognized as a risk factor for atherosclerotic cardiovascular disease, hyperlipidemia, low-grade inflammation, and hypercoagulability. End-stage renal disease and subclinical hypothyroidism are independent risk factors for cardiovascular disease mortality; patients suffering from both disease entities may have a higher cardiovascular disease risk [3].

From previous studies, it was observed that the stages of CKD are directly proportional to the increased prevalence of subclinical hypothyroidism [11]. In this study, it was observed that 4th stage CKD patients had more frequency of occurrence of subclinical hypothyroidism when compared to other stages.

CONCLUSION

The study concludes that the frequency of subclinical and clinical hypothyroidism is found to be 38% (19 patients) and 12% (6 patients), respectively, among 50 chronic kidney disease patients who visited OPD of Ayothidoss Pandithar Hospital, National Institute of Siddha, Tambaram sanatorium. In this study, out of 50 CKD patients, 25 were reported with hypothyroidism (subclinical and clinical), from which it might be concluded that one in two CKD patients have hypothyroidism. Further research must be done to confirm this result in a large population. It was found that comorbidities also worsen the stages of CKD. Thus, proper medication for comorbidities, meditation, and a balanced diet prevent CKD.

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