Ubiquitousness of Anaemia in Patients with Chronic Kidney Disease in Tertiary Care Hospital: A Prospective Observational Study

Hema Manogna Narne[1], Geethika Reddy Battula[2], Sushanth Sekhar Kadali[2], Vintha Yaswanth Reddy[2], Pattan Ayubkhan khan[2]

[1]*Assistant professor, Department of pharmacy practice, SIMS College of pharmacy, Andhra Pradesh, India.*

[2]*Student, Department of pharmacy practice, SIMS College of pharmacy, Andhra Pradesh, India.*

Corresponding Author: hemamanogna.narne@gmail.com

Abstract: - The aim of the study was to monitor the prevalence of anaemia in chronic kidney disease in a tertiary care hospital. A prospective, observational, cross-sectional study was conducted on patients who visited to tertiary care hospital between November 2019 to April 2020, with a sample size of 150. A total of 150 pts were included in the study, of those 22% (33 pts) have no other comorbidities, 23.3% (35 pts) also have hypertension alone and 35.3% (53 pts) have diabetes and 19.3% (29 pts) have both diabetes and hypertension. Of these 65.3% (98 pts) have glomerular filtration rate (GFR) less than 15 ml/min, 14% (21 pts) have GFR between 15-29 ml/min, 9.3% (14 pts) have GFR between 30-59 ml/min, 6% (9 pts) have GFR in between 60-80 ml/min and 5.3% (8 pts) have GFR greater than 90 ml/min. In the present study, 81 pts (54%) were suffering from anaemia. This study concludes that anaemia is more prevalent in chronic kidney disease conditions and glomerular filtration rate is the key factor to assess the disease progression and estimate the relation between the developments of anaemia in kidney failure condition, as the kidney function gets decreased, the risk for development of anaemia gets increased.

Key Words: — ***Chronic kidney disease, Glomerular filtration rate, Anaemia.***

I. INTRODUCTION

The kidneys function as filters of the blood, removing waste products and controlling the balance of fluid and electrolytes. Filtration occurs via bundles of capillaries called glomeruli (singular, glomerulus). A reduction in the glomerular filtration rate (GFR) to 60 mL/min/1.73 m2 indicates chronic kidney disease (CKD), as do structural or functional renal abnormalities, which may be present in people with normal GFR [1].

One of the lesser-known functions of the kidneys is the production of erythropoietin, a signalling molecule that stimulates red blood cell production, in response to decreased oxygen levels in the blood. Any disruption of this process, e.g., secondary to a functional abnormality due to CKD, has the potential to produce anaemia, a condition in which the number of circulating red blood cells, and therefore the level of haemoglobin, is lower than normal [2].

Anaemia is a well-known complication in chronic kidney disease (CKD) and is associated with progression of CKD, poor quality of life, and increase in morbidity and mortality [2-6]. The mechanism of anaemia in CKD is multifactorial: erythropoietin deficiency from reduced renal mass, iron and nutritional deficiencies, various pro-inflammatory mediators commonly elevated in CKD may affect the erythropoiesis in CKD [7].

Other possible causes of anaemia in CKD include iron deficiency, inflammation, and the accumulation of uremic toxins [2,8]. Thus, the abnormal composition of blood or urine is an additional indicator of kidney damage.

Anaemia in CKD is associated with cognitive impairment, sleep disturbances, CKD progression, cardiovascular comorbidities, and higher mortality [2,3,9,10]. Direct

Manuscript revised November 19, 2021; accepted November 20, 2021. Date of publication November 22, 2021.

This paper available online at www.ijprse.com

ISSN (Online): 2582-7898; SJIF: 5.494

healthcare costs are higher in CKD patients with anaemia than in those without [3], and quality of life issues (e.g., fatigue, reduced productivity) are common [2,9]. The prevalence of anaemia (with or without CKD) increases with age [11,12], which means that, as the US population ages, the number of people affected by anaemia in CKD will also increase.

1.1 Impact of Anaemia

The impact of anaemia on patients with CKD is profound. In addition to the well-known symptoms of fatigue, dizziness, and shortness of breath, anaemia has been associated with more severe adverse outcomes, such as cardiovascular complications including left ventricular hypertrophy and congestive heart failure. In patients with diabetes, anaemia has been associated with a decline in kidney function, which often occurs in patients with diabetes. Hypoxia caused by anaemia stimulates the renin-angiotensin-aldosterone system and contributes to renal vasoconstriction. These factors further exacerbate proteinuria by increasing protein in the renal tubules in patients with diabetes [13]. Of note, in patients with type 2 diabetes, anaemia has been shown to be an independent risk factor associated with the loss of kidney function [14]. In patients with diabetes, anaemia can also contribute to the severity of cardiovascular disease and independently increase the risk of retinopathy. Anaemia is also thought to hasten the progression of diabetic neuropathy [14]. Other general complications associated with anaemia include reduced cognitive function and mental acuity, impaired quality of life, and the need for blood transfusions [15-18].

Correction of anaemia has been shown to improve cardiac function possibly by reducing exercise-induced myocardial ischemia [15]. Treatment of anaemia associated with CKD has also been shown to result in improvements in exercise capacity; physical performance features such as endurance; energy; and physical mobility [16]. Patient satisfaction increases when anaemia is corrected, as evidenced by higher quality-of-life scores, improved sexual function, better cognition, less depression, and better socialization [17]. In non–dialysis-dependent CKD patients, stabilization of renal function has been associated with the treatment of the anaemia of CKD [15]. Finally, treatment of anaemia has been shown to reduce hospitalization and mortality rates [18].

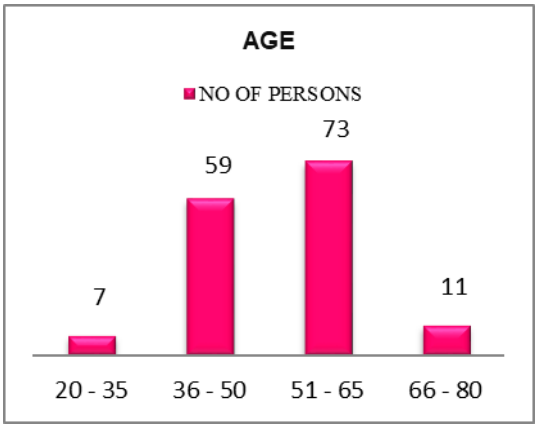
As a result of the potentially severe consequences of anaemia in CKD, early recognition and management of anaemia are imperative. Consequently, monitoring Hb and detecting anaemia in patients with diabetes is essential.

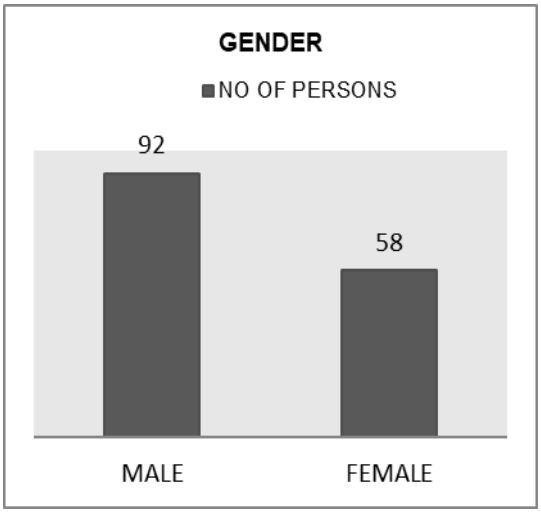
II. Materials And Methods

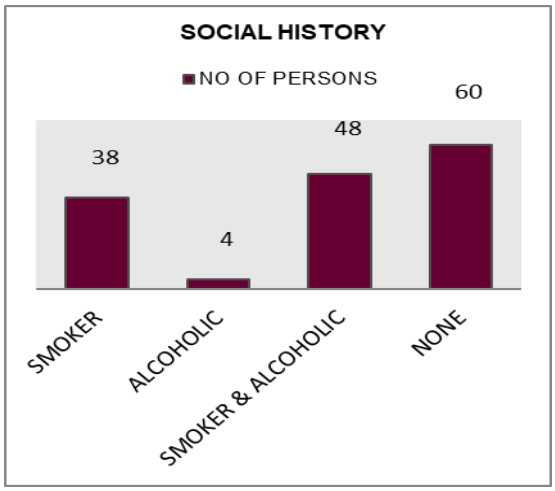
In a tertiary care hospital, at the nephrology department, a prospective, observational, cross-sectional study was conducted on patients visited between November 2019 to April 2020, with a sample size of 150. Data was collected from the case sheets available in wards and followed. Patients of all age groups, both males and females of CKD patients with other comorbidities were included in the study. Patients from the outpatient department, pregnant women, and patients with other kidney problems were excluded from the study and the data was analyzed by using SPSS software.

III. Results

3.1 Demographic Details:







Demographic details reveal that the patients of age between 51-65 were more (73 patients) followed by 36-50 (59 patients), then 66-80 (11 patients) and 20-35 (7 patients). This describes the effect of the age factor on disease distribution.

Analysis of 150 patients diagnosed with CKD in nephrology department during our study period reveals that prevalence was more in males (92) than females (58).

According to social history, it was found that 38 patients (25.33%) were smokers, 4 patients (2.66%) were alcoholics, 48 patients (32%) have both smoking and alcohol habits, and 60 patients (40%) doesn't smoke or consume alcohol.

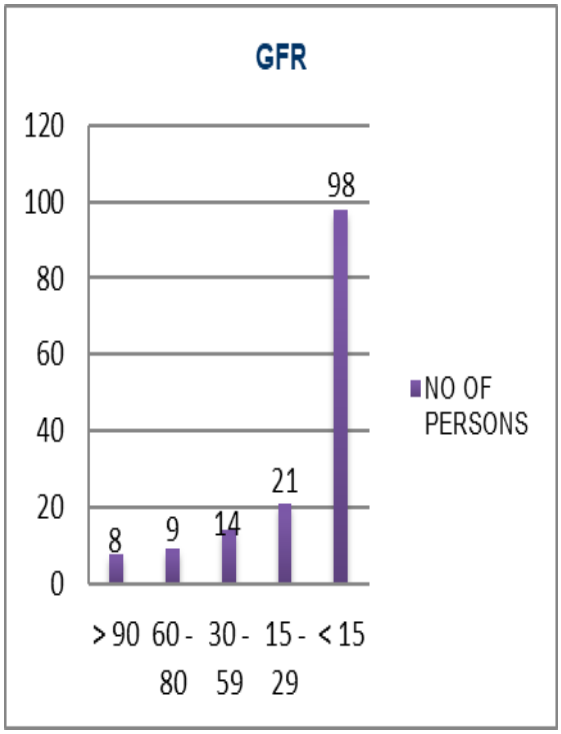
Table.1. Distribution of comorbid diseases

Comorbidities	No of persons	Percent
DM	53	35.33%
HTN	35	23.33%
DM & HTN	29	19.33%
None	33	22%
Total	150	100%

In many patients (88%) along with the main diagnosis, comorbid conditions were observed. Of those, Diabetes Mellitus was the most common comorbid condition (35.33%), followed by Hypertension (23.33%) and both diabetes mellitus and hypertension (19.33%) were observed.

Table.2. GFR observed

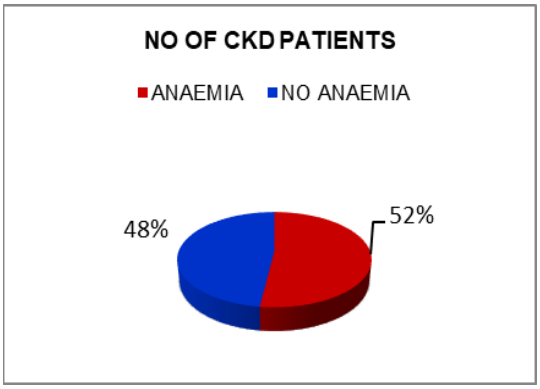
GFR	No of persons	Percentage
>90	8	5.33%
60 – 80	9	6%
30 – 59	14	9.33%
15 – 29	21	14%
< 15	98	65.33%
Total	150	100%



Of 150 patients, 98 patients (65.33%) have GFR less than 15 ml/min, followed by 21 patients (14%) with GFR ranges from 15-29 ml/min, 14 patients (9.33%) with GFR range of 30-59 ml/min, 9 patients (6%) with GFR range of 60-80 ml/min and 8 patients (5.33%) with GFR greater than 90 ml/min.

Table.3.Distribution of anaemia in CKD patients

No of CKD patients	No of persons	Percentage
Anemia	78	52%
No anemia	72	48%
Total	150	100%



Anaemia is a common condition associated with chronic kidney disease. Of 150 patients, 78 patients (52%) were observed with anaemia and 72 patients (48%) don't have anaemia at the time of the study period.

IV. CONCLUSION

Our study concludes that anaemia is more prevalent in chronic kidney disease conditions and glomerular filtration rate is the key factor to assess the disease progression and estimate the relation between the development of anaemia in kidney failure condition, as the kidney function gets decreased, the risk for development of anaemia gets increased.

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