

**Prevalence of Anemia in Chronic Kidney Disease in Tertiary Care Hospital of North India****Madhu Balla<sup>1</sup>, Vijay Kumar<sup>2\*</sup>, Manpreet Kour<sup>3</sup>**<sup>1</sup>Resident, Department of Pathology, Government Medical College, Jammu, Jammu and Kashmir, India<sup>2</sup>Resident, Department of Internal Medicine, Government Medical College, Jammu, Jammu and Kashmir, India<sup>3</sup>Resident, Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India

Received: 09-11-2021 / Revised: 16-12-2021 / Accepted: 13-01-2022

**Abstract**

**Background:** Chronic kidney disease (CKD) has emerged as a public health challenge in countries around the world. Anemia is a well-known complication in chronic kidney disease (CKD) and associated with progression of CKD, poor quality of life, and increase in morbidity and mortality. Early identification and treatment of anemia may improve CVS morbidity and mortality however, its identification and management have been reported to be suboptimal. **Aim of study:** This study aimed to determine the prevalence of anemia in chronic kidney disease patients in a tertiary care hospital. **Methods:** A cross sectional and observational study was conducted in a tertiary care hospital during the study period of August 2017 to February 2018. **Results:** A total of 121 participants were included to estimate the prevalence of anemia among chronic kidney disease patients. Most of the patients (47.10%) belonged to the middle age group 40 to 60 years. Female patients (58.67%) were suffering from more CKD than the male patients (41.32%). Most of the patients (61.15%) were anemic. 46.28% CKD patients also suffering from diabetes mellitus. Most of the patients (54.54%) treated with oral iron agents for anemia in CKD patients. **Conclusion:** In this study most of the chronic kidney disease patients were anemic. Each center should determine the treatment strategy according to the patient's characteristics. Periodic screening and intervention programs for anemia of CKD should be practiced to change the existing situation in the setting.

**Keywords:** Anemia, Chronic Kidney Disease.

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**Introduction**

Chronic kidney disease (CKD) is a progressive, irreversible deterioration of renal function in which the body's ability to maintain metabolic, fluid electrolyte, and balance fail, which results in uremia or azotemia and can be classified into stages 1 to 5 based on the deterioration of glomerular filtration rate (GFR), with each increasing number indicating a more advanced stage of the disease[1]. The National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (KDOQI) defines CKD based on glomerular filtration rate (GFR) and divides the disease into five distinct stages. In Stage 1 CKD, the GFR is  $\geq 90$  ml/min/1.73 m<sup>2</sup>. Stages 2, 3, and 4 CKD are defined by a GFR of 60–89 ml/min/1.73 m<sup>2</sup>, 30–59 ml/min/1.73 m<sup>2</sup>, and 15–29 ml/min/1.73 m<sup>2</sup>, respectively. The final stage, Stage 5, occurs when the GFR is  $< 15$  ml/min/1.73 m<sup>2</sup> or when patients require dialysis[2].

Complications of CKD included anemia, metabolic bone disease, metabolic acidosis, fluid and electrolyte imbalance and uremia, which imposed considerable burden on health care resources[3,4,5-8].

Anemia is the commonest complication of CKD which accounts significant burden of cardiovascular diseases. CKD decreases the quality of life of patients[9].

Anemia in CKD patients is significantly associated with worsening CKD, and development of heart failure and stroke. It contributes to impaired physical activity, neurocognitive dysfunction and poor quality of life[5-7,10-16]. Anemia in CKD is typically normocytic, normochromic, and hypoproliferative[17]. Anemia occurs due to the reduction of function of kidney. One of the lesser known functions of the kidneys is the production of erythropoietin, a signaling 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 anemia, a condition in which the number of circulating red blood cells, and therefore the level of hemoglobin, is lower than normal[18]. Other possible causes of anemia in CKD patients include iron deficiency, inflammation, and the accumulation of uremic toxins[19]. Since the introduction of recombinant human erythropoietin, erythropoiesis-stimulating agents (ESA) have become the cornerstone of CKD anaemia treatment and have reduced requirements for transfusion, improved the quality of life and reduced left ventricular hypertrophy and morbidity and mortality in these patients[20]. Taken all the international guidelines we should consider administration of ESA when the Hb level becomes  $< 11$  g/dl in pre-dialysis patients and  $< 10$  g/dl in dialysis patients[21]. The aim of the present study was to evaluate the prevalence of anemia in chronic kidney disease patients in the adults ( $> 18$  years of age) at a tertiary care hospital.

**Study design**

A prospective observational and cross-sectional one point analysis study, which was conducted from August 2017 to Feb. 2018 after taking permission from institutional ethics committee. The study group comprised of patients attending Medicine OPD at tertiary care hospital Jammu.

**Material and methods**

This study comprised of 121 patients attending Medicine OPD in tertiary care hospital, Jammu. Patients with age  $> 18$  years and above were included in the study. Those study subjects who provided informed consent and only known case of chronic kidney disease patients were included in the study.

**Exclusion criteria**

- Patients with known cause of anemia other than kidney disease
- pregnant women,
- those unwilling to participate.

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**Data collection**

Data were collected through an investigator administered pretested questionnaire. Patients were interviewed to obtain demographic data, and the patients' medical records were reviewed to obtain information on relevant medical history and laboratory parameters. The determination of the primary cause of kidney disease was based on clinical history, physical examination, and laboratory investigations including complete blood count, urinalysis, blood chemistry, ultrasound and HIV serology. Written informed consent were taken from all the patients. After taking informed consent and informing details about the procedure, blood

sample was taken for measuring hemoglobin. If the patient hemoglobin level <13 g/dl (male) or <12g/dl (female) then he or she considered as an anemic. All filled questionnaires were entered into the computer for subsequent analysis using SPSS method version 20.1.

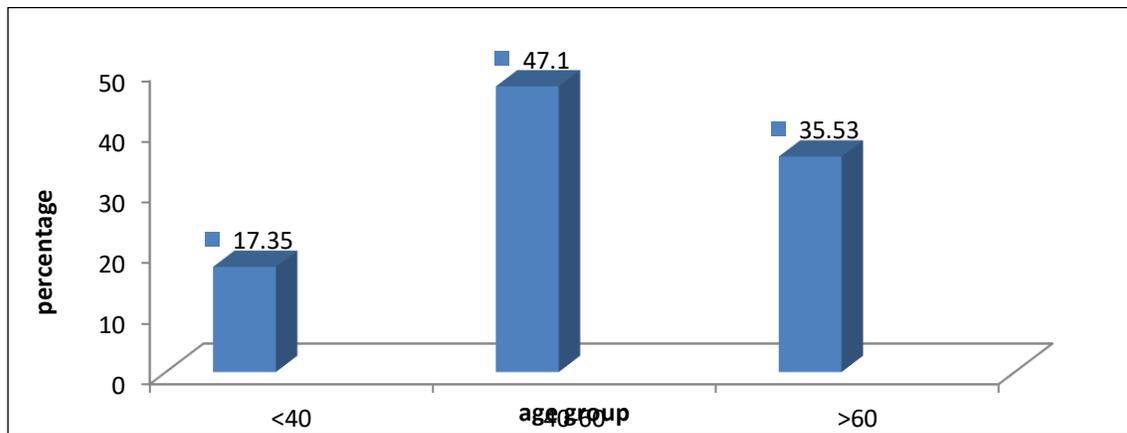
**Results**

The current study was carried over a period of six months with 121 patients aged 18 yrs and above who were known cases of chronic kidney disease.

The results of the study are tabulated as follows:

**Table 1: Age wise Distribution of the CKD patients (n=121)**

Age in years (Range 18-85 years)	No.	%age
<40	21	17.35
40-60	57	47.10
>60	43	35.53

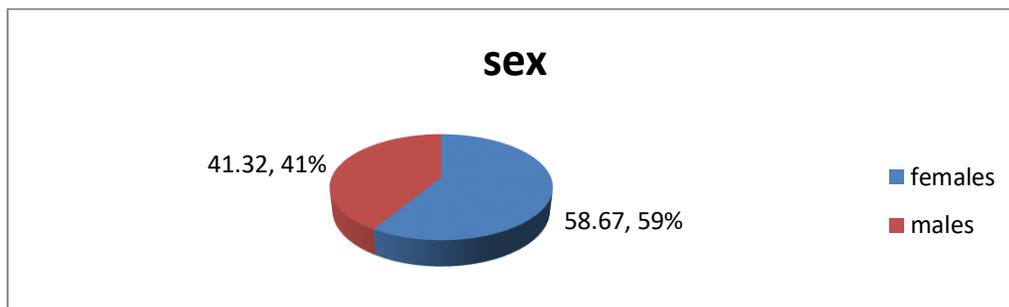


**Fig 1: Age wise Distribution of the CKD patients**

Table 1, figure 1 shows the age structures of the patients which have been categorized in years into three groups. Overall 21 (17.35%) patients were in < 40 years old while 57 (47.10%) patients were 40-60 years old, 43 (35.53%) patients belong to > 60 years age group. Most patients belonged to the middle age group 40 - 60 years.

**Table 2. Sex wise distribution of CKD patients( n=121)**

Sex	No.	%age
Female	71	58.67
Male	50	41.32

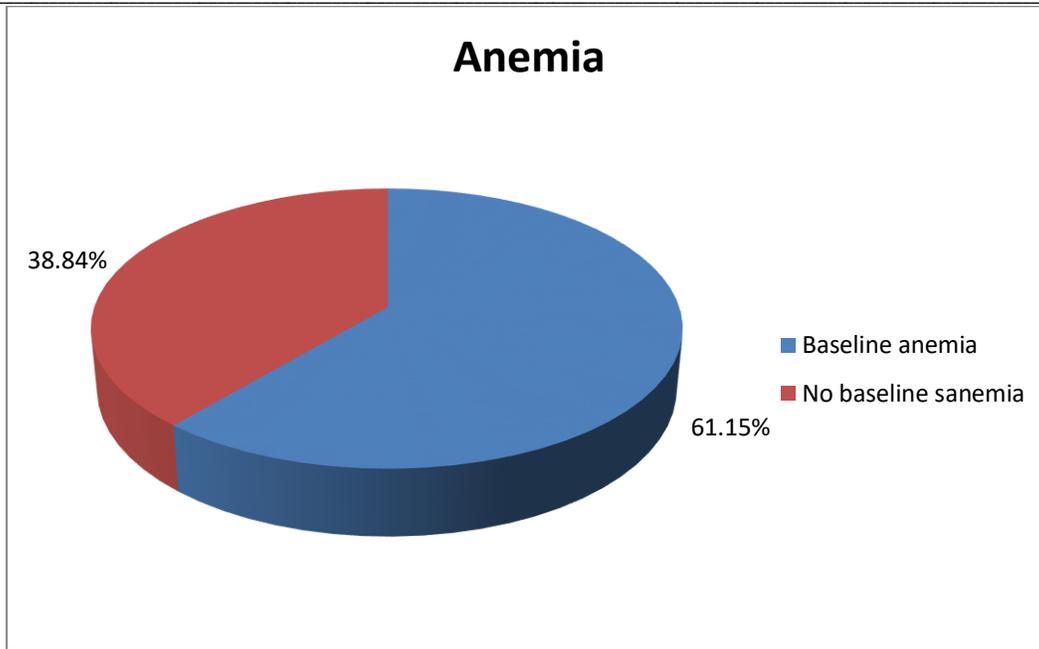


**Fig 2: Pie chart showing percentage of sex distribution of patients.**

According to table 2, figure 2: Total numbers of patients both male and female were 121. It comprised of 71 (58.67%) female and 50 (41.32%) male. Female patients are suffering from more CKD than the male patients.

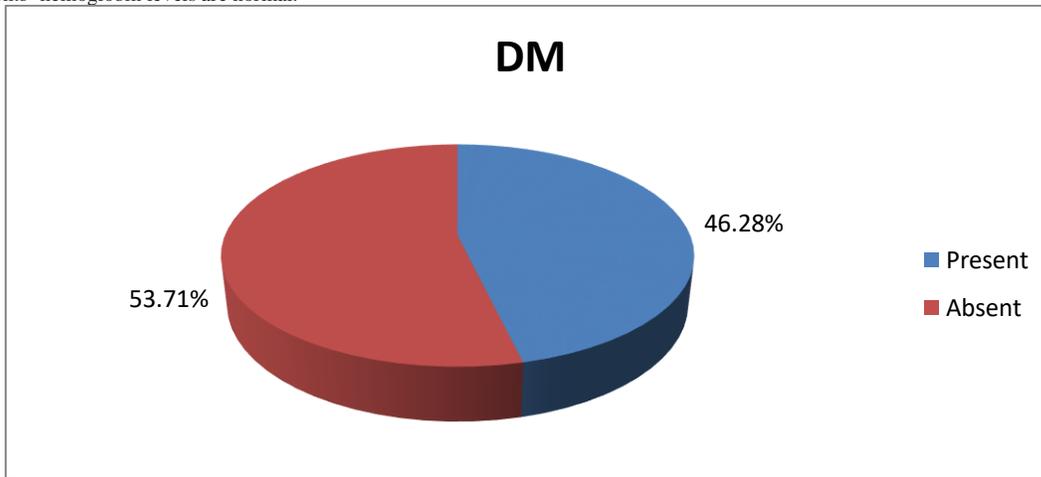
**Table 3. Hemoglobin status of CKD patients**

Anemic status	No.	%age
Baseline anemia	74	61.15%
No baseline anemia	47	38.84%



**Fig 3: Hemoglobin status of CKD patients**

Table 3, figure 3 showing distribution of patients on the basis of anemia. 74 (61.15%) CKD patients suffering from baseline anemia. 47 (38.84%) CKD patients' hemoglobin levels are normal.



**Fig 4: Pie chart showing presence of Diabetes Mellitus in CKD patients(n=121)**

According to figure 4, 46.28% of CKD patients suffering from diabetes mellitus.

**Table 4. Management of anemia of the CKD patients (n=121)**

Treatment	No.	%age
Oral iron	68	56.19%
Erythropoietin agent	20	16.52%
Oral iron +Erythropoiten agent	33	27.27%

According to table 4: Most of the patients (56.19%) treated with oral iron agents for anemia in CKD patients. 16.52% patients treated with erythropoietin agent and 27.27% patients treated with both oral iron and erythropoietin agent.

**Discussion**

Anemia is a highly prevalent and modifiable risk factor for many adverse events in patients with chronic kidney disease (CKD)[22]. The greatest declines in the hematocrit level are observed in the early stages of kidney disease, with the reductions getting smaller in moderate to advanced renal failure. Thus, early detection and monitoring of anemia are required in CKD patients[23].

The result of the current study showed that the 58.67% female patients were suffering from CKD in comparison to 41.32% male

which is in accordance to the study conducted by **Anupama and Uma (2014)** [24]. Their study revealed that female patients (54.43%) suffering from more chronic kidney disease than male patients. Dissimilar results were obtained in the study conducted by **Amoako et al. (2014)**[6] who revealed that male patients (64.5%) suffering from more chronic kidney disease the females. In our study, the most (47.10.%) common age groups were 40-60 years. Similar results were obtained in the study conducted by **Bapat et al. (2008)**. Their study showed that 41-60 years patients (42.6%) suffering from more

chronic kidney disease than other aged patients[25]. In our study 61.15% CKD patients suffering from anemia which is higher than the number reported by Alan S. GO. et al. (2006) study. In their study they reported that 42.58% patients suffering from baseline anemia[26]. This study has clinical implications in that the high magnitude of anemia in patients with CKD should guide healthcare professionals to minimize the risk of anemia by guiding the patient who could be detected in health checkups, give information about possible risk factors during routine patient care, and provide knowledge about the potential risk of anemia. In our study 46.28% CKD patients also suffering from DM. Similar results were obtained in the study conducted by Finkelstein, FO et al. (2009). Their study stated that 45.7% CKD patients suffering from DM[27]. In our study 56.19% patients treated with oral iron agent for anemia in CKD patients. Dissimilar results were obtained in the study conducted by Sang Royl Ryu et al. (2016)[28]. In their study they stated that 27.7% patients treated with oral iron agent.

In conclusion, we found a large prevalence of anemia among CKD patients who were not given RRT. We found that some of these patients did not receive ESA treatment. Thus, there is a need to improve the timing of anemia intervention and the quality of care for these patients. Clinicians should be aware of this risk, identify and work up the anemic patients, and implement appropriate therapy.

#### Limitations of the study

- Less number of patient
- Limited number of observations
- Lack of follow up.

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**Conflict of Interest: Nil Source of support: Nil**