



Prevalence of anemia among dialysis dependent CKD patients at tertiary care hospital

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Abstract: Background: Anemia is one of the prevalent CKD adverse

effects that has been associated to negative outcomes

Objective: The objective of this study was to find out the Prevalence of anemia among dialysis dependent CKD patients at tertiary care hospital

Material and

method: The present prospective cross-sectional study was conducted

at Balochistan Institute of Nephrology- Urology Quetta from January

2025 to June 2025 after taking permission from the ethical board of the

hospital. Samples were collected through non-probability consecutive

method. Individuals of both gender and different age groups (16-86

years) presented to the nephrology OPD with chronic kidney disease

and dependent on hemodialysis were included. Written consent was

taken from each participant. Patient medical history was recorded.

Structured questionnaires were used to collect data all the required

data. Each patient's blood sample was collected by a nurse in 5mL

chemical test tubes (2-3mL each). The samples were tested using a

hematology analyzer. Complete blood counts (CBCs) and peripheral

morphology were also assessed. Anemia was defined based on

hemoglobin levels. SPSS version 24 was used for data

analysis.

Results: A total of 200 individuals with chronic kidney

disease, dependent on dialysis were enrolled in this study out of which

males were 120(60%) and females were 80(40%). the mean age of the

study participants was 51.62± 21.991 (ranged 16-86) years. The

prevalence of anemia in the study population was 148(74%). The

results showed that males 80 (66.6%) had a considerably lower

frequency of anemia than females 70 (87.5%). Individuals with

illiteracy had highest frequency 42(89.3%).With the duration of the

disease, the incidence of anemia increased. Anemia was substantially

higher in diabetes patients 64 (80%) than in non-diabetics 65

(54%).Similarly, a higher prevalence of anemia 64(80%) compared to

65 (54%), has been associated to hypertension.

Conclusion: The present study concluded that dialysis-dependent CKD patients had

significant frequency of anemia (74%).

Keywords: Prevalence; Anemia; dialysis dependent CKD patients

INTRODUCTION

Chronic kidney disease (CKD) is a challenging global public health issue. It is defined as disorders in the structure or function of the kidneys that have lasted for more than three months .1 It affects over 500

million people globally, with more than three to four out of them living in developing countries.2 Major risk factors of CKD are anemia, infections, acute renal damage, mineral and bone problems, hospitalization and cardiovascular disorders.3 Anemia is a prevalent

CKD adverse effect that has been associated to negative outcomes such as sleep problems, cognitive impairment, the development of CKD, cardiovascular and cerebrovascular events, a higher likelihood of hospitalization and all-cause mortality, and lower standards of life.⁴ The kidney disease enhancing global outcomes anemia guidelines state that CKD is a possible reason of anemia whenever the glomerular filtration rate (GFR) is less than 60 mL/minutes/1.73 m², and anemia in CKD is defined as a hemoglobin (Hgb) level of less than 13 g/dL in males and less than 12 g/dL in women.⁵ Anemia in individuals with chronic kidney disease has many different and intricate causes. These include inflammation with elevated hepcidin levels, absolute including/or physiological iron deficiency, and a reduction in intrinsic erythropoietin production. Signaling molecules that promote the synthesis of red blood cells are reduced when erythropoietin production is inadequate. Conversely, elevated hepcidin levels are recognized to prevent the intestinal absorption of iron from meals and its release from iron reserves. Other potential causes of anemia linked to CKD include severe viral processes, inflammatory illnesses, cancer, and uremic toxins that suppress erythropoiesis.⁶ As CKD progressed, the frequency of anemia increased gradually, from 8.4% during Stage 1 to 53.4 percent in Stage 5.⁷ Anemia prevalence increased from 1% to 33% in males while it rose from 1% to 67 percent in women as CKD progressed, according to a another study.⁸ Anemia is prevalent in people with stage-V chronic kidney disease, although it is widespread in all stages of the illness. Iron, vitamin B12, or folic acid depletion or blood loss are potential causes of it.⁹ As a developing country, Pakistan has a high prevalence of this CKD, which is often associated with anemia.

Common concurrent diseases including hypertension, diabetes mellitus, & malnutrition augment the increased prevalence of anemia in this population. Therefore the current study was carried out to determine the prevalence of anemia among dialysis dependent CKD patients at tertiary care hospital.

Material and method

The present prospective cross-sectional study was conducted at Balochistan Institute of Nephrology-Urology Quetta from January 2025 to June 2025 after taking permission from the ethical board of the hospital. Samples were collected through non-probability consecutive method. individuals of both gender and different age groups (16-86 years) presented to the nephrology OPD with chronic kidney disease and dependent on hemodialysis were included while individuals not dependent on hemodialysis, did not give informed consent and younger than 16 years of age were not included in this study. Written consent was taken from each participant. Patient medical history was recorded. Structured questionnaires were used to collect data all the required data. Each patient's blood sample was collected by a nurse in 5mL chemical test tubes (2-3mL each). The samples were tested using a hematology analyzer. Complete blood counts (CBCs) and peripheral morphology were also assessed. Anemia was defined based on hemoglobin levels. SPSS version 24 was used for data analysis. Male hemoglobin was less than 12 g/dL, whereas female hemoglobin was less than 11 g/dL was defined as anemia.

Results

A total of 200 individuals with chronic kidney disease, dependent on dialysis were enrolled in this study out of which males were 120(60%) and females were 80(40%). the mean age of the study participants was 51.62± 21.991 (ranged 16-86) years as presented in table 1. The prevalence of anemia in the study population was 148(74%) as presented in figure 1. We examined important demographic, clinical, & behavioral characteristics associated to anemia status in order to investigate the prevalence and distribution of anemia within patients receiving maintenance hemodialysis. The results showed that males 80 (66.6%) had a considerably lower frequency of anemia than females 70 (87.5%). Individuals with illiteracy had highest frequency 42(89.3%), whereas those with college-level education had a comparatively lower incidence 25(46.2%). With the duration of the disease, the incidence of anemia gradually rose, reaching 41 (82%) among individuals with CKD for a duration of three years or more. Anemia was somewhat more common among behavioral variables in 50 (71%) ever-smokers than in non-smokers. Anemia was substantially higher in diabetes patients 64 (80%) than in non-diabetics 65 (54%). Similarly, a higher prevalence of anemia 64(80%) compared to 65 (54%), has been associated to hypertension as presented in table 3.

Table 1. Demographic features of the study population n=200

Gender	
Male	120(60%)
Female	80(40%)
Mean age in years	51.62± 21.991 (ranged 16-86)

FIGURE1.PREVALENCE OF ANEMIA IN THE STUDY POPULATION

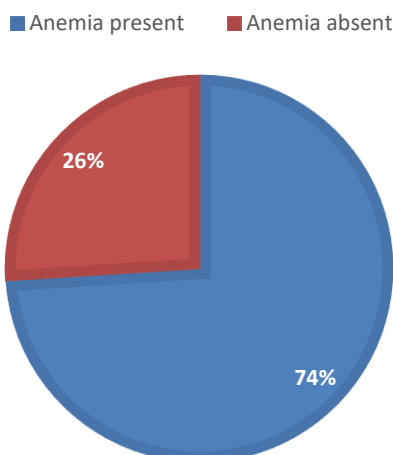


Table 3. Distribution of anemia by age, sex, level of education, duration of chronic kidney disease, smoking history, and associated diseases such as diabetes and hypertension

Features	Anemia present	Anemia absent	Total
Age in years			
16–30	3(60%)	2(40%)	5
31-45	50(83.3%)	10(16.6%)	60
46-60	60(83.3%)	15(16.6%)	72
61-75	45(84.9%)	8(15.09%)	53
Above 75	9(90%)	1(10%)	10
Gender			
Male	80(66.6%)	40(33.3%)	120
Female	70(87.5%)	10(12.5%)	80
Education status			
Illiterate	42(89.3%)	5(10.6%)	47
Read and write	27(77.1%)	8(22.8%)	35
Primary	20(66.6%)	7(25.9%)	27
Secondary	20(54.05%)	17(45.9%)	37
College	25(46.2%)	29(53.7%)	54
CDK duration			
Less than 1 year	60(66.6%)	30(33.3%)	90
2 to 3 years	45(75%)	15(25%)	60
More than 3 years	41(82%)	9(18%)	50
History of smoking			
Yes 70	50(71%)	20(29%)	70
No 130	85(65%)	45(52%)	130
Currently smoking			
Yes 6	5(83.3%)	1(16.6%)	6
No 194	100(51%)	94(49%)	194
Hypertension			
Yes 140	95(67.8%)	45(32.1%)	140
No 60	30(50%)	30(50%)	60
Diabetes			
Yes 80	64(80%)	16(20%)	80
No 120	65(54%)	55(46%)	120

DISCUSSION

End-stage renal disease is one of the main causes of death and morbidity for individuals worldwide, and it has presented significant difficulties to health care systems across the world. This chronic, debilitating disease is affecting every region of the world, and its prevalence is increasing in both western and eastern nations.¹⁰ Not only do kidneys affect the body's excretory function, but they also influence homeostasis overall, and patients may need lifetime care in one form or another.¹¹ Long-term impairment of the renal system can lead to several hematological and biochemical issues. Throughout the clinical course of CKD, a person may face different problems. But the most prevalent and occasionally most challenging to treat is anemia.¹² Patients with chronic renal disease may require dialysis or get conservative treatment with medications that increase their risk of iron deficiency anemia. Gaffer-Gvilli et al. came to the conclusion that individuals with chronic renal failure are more likely to experience anemia for a variety of causes. In these individuals, anemia is also a predictor of death, and the severity of anemia significantly influences mortality. Anemia should be routinely checked for in patients with chronic kidney disease.¹³ The current study was carried out to determine the prevalence of anemia among dialysis dependent CKD patients at tertiary care hospital. The prevalence of anemia in the study population was 74%. The results of this study is similar to the study carried out by Suhail et al in which the prevalence was 73% which support our findings.¹⁴ However our results are not comparable to study done by Bishaw et al in which they reported 85% prevalence.¹⁵ This incidence is significantly more than that found in other areas, such as Tanzania (33%), Korea (44.9%).¹⁶⁻¹⁷ The discrepancy between these studies may be caused by variations in the study population and the inclusion of individuals who have advanced stages of CKD. Furthermore, a significant amount individuals with late-stage CKD may be the cause of the significant frequency of anemia shown in this study. In our study male had (66.6%) a considerably lower frequency of anemia than females 87.5% possible gender-related variances in erythropoiesis or dietary habits among patients on dialysis. A research at Addis Abeba hospitals found that female participants were twice as likely as males to develop anemia .¹⁸ These findings support our study. The results of our study revealed that Individuals with illiteracy had highest frequency 89.3%, whereas those with college-level education had a comparatively lower incidence (46.2%). With the duration of the disease, the incidence of anemia gradually rose, reaching (82%) among individuals with CKD for a duration of three years or more. these results are similar to the previous study .¹⁴ Anemia was somewhat more common among behavioral variables in 50 (71%) ever-smokers than in non-smokers. Anemia was substantially higher in diabetes patients

64 (80%) than in non-diabetics 65 (54%). Similarly, a higher prevalence of anemia 64(80%) compared to 65 (54%), has been associated to hypertension. Similar results were obtained from the study of Bishaw et al¹⁵ which further support our findings. A research at Addis Abeba hospitals found that individuals with diabetes were twice as likely to develop anemia as non-diabetic patients. Patients with hypertension were roughly three times as likely to develop anemia as non-hypertensive people.¹⁸

CONCLUSION

The present study concluded that dialysis-dependent CKD patients had significant frequency of anemia (74%). Females and individuals with diabetes or hypertension, and patients with longer CKD duration were more susceptible.

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