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Original Research Paper

Nephrology

A CROSS-SECTIONAL STUDY OF CO-MORBIDITY ILLNESS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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ABSTRACT **Background:** Chronic kidney disease is defined as abnormalities in kidney structure or function with decreased GFR for 3 months or more. The Prevalence of anemia veritably high among CKD cases and it's an important complication to cover. OBJECTIVE: To study the most frequently occurring co-morbidity illness in patients with CKD and determine the prevalence and management of anemia in CKD and analyze their hemoglobin level in the male and female population. **Methodology:** A cross-sectional observational study was conducted in the Nephrology department of Govt. Medical college and hospital, Nagapattinam. **Results:** the most frequently occurring co-morbidity in CKD subjects was Anemia with 78.75%. Prevalence of anemia significantly higher in male patients with CKD compared to females (p=0.03) and patients who attended elementary school were considerably higher than their counterparts(p=0.04) and it also had a higher prevalence in smokers(p=0.05). Out of 63 patients, 39.6% were moderately anemic(8-10g/dl) and 19% were life-threatening anemic conditions (<6.5g/dl) and they are treated with vitamins, minerals, and phosphate binders and blood transfusion in severe conditions. **Conclusion:** This study reported a high prevalence of anemia compared to other illnesses. Assessing the anemic status of patients in earlier stages of the disease will contribute greatly to managing the complication.

KEYWORDS : Chronic kidney Disease, Glomerular Filtration Rate, Complication, Anemia

INTRODUCTION:

CKD is a major public health-related issue, it is the leading cause of death and suffering in the 21st century. Chronic kidney disease (CKD) is a worldwide disease and it is associated with multiple co-morbidity illnesses (1). CKD is defined as kidney damage or glomerular filtration rate (GFR) of less than 90 mL/min/1.73 m2 for three months or more, irrespective of cause or evidence of kidney damage(2). The kidney's main function is to filter out the metabolic waste products from the plasma and release them into the urine. Some of the underlying causes like Hypertension, Diabetes mellitus, Family history of CKD, Smoking, Alcohol consumption, Cardio Vascular diseases, etc., may reduce the functioning of the kidney and loss of neurons and to begins an irreversible process that results in to decrease of Glomerular Filtration Rate (GFR) (3)

Table1: Classifications& stages of CKD (4)

STAGE	DESCRIPTION	GFR, ml/min per 1.73 m2
Stage 1	Kidney damage with normal	≥90
Stage 2	Kidney damage with mild decreased GFR	60-89
Stage 3	Moderately decreased GFR	30-59
Stage 4	Severely decreased GFR	15-29
Stage 5	Kidney failure	<15(or dialysis)

The clinical presentation of CKD is they are generally absent in stage1 & 2 and may be minimal during stages 3 and 4 General symptoms associated with stages 1 – 4 include Oedema, Cold intolerance, Shortness of breath, Palpitations, Cramping, Muscle pain, and stage 5 is called End stage renal failure. (5)

The kidney secretes 90% of the endogenous hormone erythropoietin, an endogenous hormone that is necessary for erythropoiesis, declining kidney function can lead to a deficiency of erythropoietin and anemia. Anemia may elevate the rate of CKD progression, Prolonged anemia with CKD leads to left ventricular hypertrophy and heart failure. Anemia of CKD may lead to altering the erythropoietin release as well as loss of peritubular cells. One hypothesis involves decreased regulation of erythropoietin production in response to a decreased GFR. So, early detection decreases mortality. (6)

AIM AND OBJECTIVE:

1. To study and determine the most frequently occurring comorbidity illness in patients with CKD
2. To study and determine the prevalence and management of Anemia in CKD.
3. To analyze the Hemoglobin level in the male and female population of anemia in CKD

MATERIALS AND METHODS:

It is a cross-sectional observational study.

Place Of Study:

Nephrology department of Government Headquarters Hospital, Nagapattinam

The Period Of Study:

6 Months (April 2022- September 2022)

Inclusion Criteria:

1. Patients of either sex, age 18 years or more
2. Diagnosed by the clinician to have Chronic kidney disease with multiple comorbidities and currently on drug treatment

Exclusion Criteria:

1. Pregnant and Lactating women
2. Patients not willing to participate
3. Patients undergo hemodialysis or peritoneal dialysis.

DATA COLLECTION METHOD:

Data were collected from patient profile forms using standard data collection forms. Data missing in the profile forms were collected from participants verbally. Data gathered included demographic details, past medical history, past medication history, family history, present illness, and lab values related to CKD and anemia

Statistical Analysis:

Data were entered and analyzed using SPSS Statistics for Windows Version IBM 22. Descriptive analysis was performed, and significance tests were applied where applicable one-way ANOVA tests were applied to determine the relationship between variables, $p>0.05$ was considered statistically significant.

RESULTS:

A total of 80 patients fulfilling inclusion criteria were studied over a period of 6 months in Government Headquarters Hospital, Nagapattinam. Among those 80 patients with Chronic kidney disease 50(62%) were identified as male and 30(38%) were identified as females. So, the male had a higher predominance over female patients

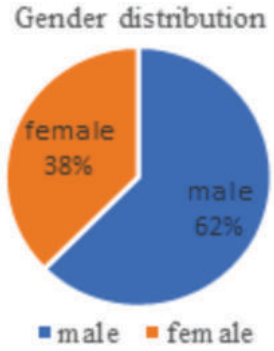

Figure1: Gender distribution in subjects

The age-wise distribution of patients with CKD found that the Maximum number of subjects (37.5%) belongs to the age group of 46-60 years and the mean age was 54.6 ± 4.5 years.

Table2: Age-wise distribution of subjects

AGE (YEARS)	NUMBER	PERCENTAGE %
16-30	6	7.50%
31-45	15	18.75%
46-60	30	37.50%
61-75	22	27.50%
>75	7	8.75%

1. CO-morbidity Illness Of Patients With CKD:

Out of 80 subjects, the most frequently occurring comorbidity in CKD subjects was Anemia at 78.75% in 63 subjects followed by Hypertension at 67.5% in 54 subjects, respiratory disease at 53.75%.

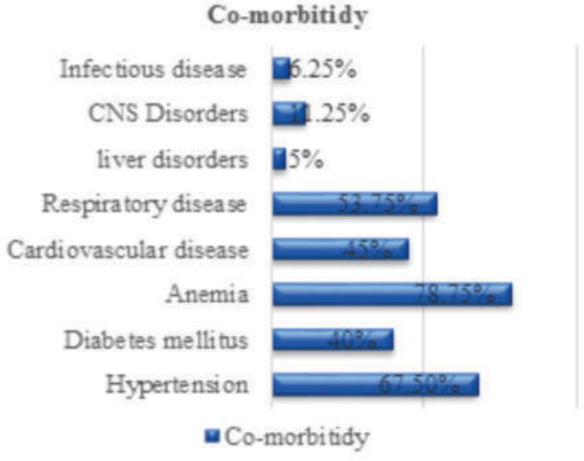

Figure 2: Co-morbidity illness of CKD patients

2. Prevalence And Management Of Anemia In CKD:

Out of 80 patients in the study population 63 patients had Anemia with CKD

ANEMIA IN CKD	63 (78.75%)
NON – ANEMIA IN CKD	17 (21.25%)

Table 3: Management of Anemia in CKD

Drugs	No. Of. Patients (n=63)	Percentage (%)
Phosphate binders		
Calcium gluconate	2	3.1%
Calcium acetate	1	1.5%
Calcium carbonate	10	15.8%
Hematopoietic agents		
Iron sucrose	2	3.1%
IF	2	3.1%
Vitamins & Minerals		
Folic acid supplement	24	38%
Vitamin B complex	53	84.1%
Calcium	40	63.4%
Multivitamin tablet	6	9.5%
Vitamin C tablet	12	19%
Zinc sulfate	3	4.7%
Vitamin K tablet	2	3.1%
Calcium + D3	2	3.1%
Thiamine	1	1.5%
Vitamin B12	1	1.5%

The treatment used for the patients with anemia with CKD was vitamins and minerals that most frequently prescribed drugs were Folic acid, and BCT, followed by phosphate binders, and blood transfusion is used in severe cases. The Prevalence of anemia in the gender population male had higher at 57.1% of 36 subjects compared to females and the prevalence of anemia was 34.9% in response who attended elementary school it was higher for smokers and it was also statically significant by using IBM SPSS software.

Table 4: Distribution of anemia by demographic, clinical, and behavioral characteristics among patients in CKD

Variables	Category	ANEMIA (n=63)				Total (n=80)		Sig
		Yes(n=63)		No(n=17)				
		n	%	n	%	n	%	≤.05
Sex	Male	36	57.1	14	85.3	50	62.5	0.03
	Female	27	42.8	3	17.6	30	37.5	*
Age	18-30	2	3.17	4	23.5	6	7.5	0.62
	31-45	7	11.1	8	47	15	18.7	
	46-60	28	44.4	2	11.7	30	37.5	
	61-75	20	31.7	2	11.7	22	27.5	
	>75	6	9.52	1	5.8	7	8.75	
Marital status	Married	55	87.3	15	88.2	70	87.5	0.84
	Unmarried	4	6.3	1	5.8	5	6.2	
	Divorced	4	6.3	1	5.8	5	6.2	
Work status	Employed	34	53.9	11	64.7	45	56.2	0.64
	Unemployed	29	46.1	6	35.2	35	43.8	
Educational status	Graduated Elementary school or less	22	34.9	3	17.6	25	31.2	0.04 *
	Graduated middle school	19	30.1	3	17.6	22	27.5	
	Graduated high school	10	15.8	8	47	18	22.5	
	Graduated college unknown	8 4	12.6 14.2	2 1	11.7 5.8	10 5	12.5 6.2	
Smoking habit	Never	30	47.7	8	47	38	47.5	0.05
	Former	17	26.9	1	5.8	18	22.5	*
	current	16	25.3	8	47	24	30	
Alcohol habit	Never	32	50.7	7	41.1	39	48.7	0.25
	Former	15	23.8	1	5.8	16	20	
	current	16	25.3	9	52.9	25	31.2	

*Indicates the value is statically significant (P value ≤0.05 indicates the value is statically significant)

3. Hemoglobin Level Of Anemia In Male And Female Study Populations:

Table 5: Haemoglobin level in anemic patients

HEMOGLOBIN LEVEL	MALE%	FEMALE%	TOTAL%
Mild (10-12g/dl)	7 (19.4%)	4 (14.8%)	11 (17.4%)
Moderate (8-10g/dl)	17 (47.4%)	8 (29.6%)	25 (39.6%)
Severe (6.5-7.9g/dl)	4 (11.1%)	8 (29.6%)	12 (19%)
Life-threatening (<6.5g/dl)	8 (22.2%)	7 (25.9%)	15 (23.8%)

Mostly, the male and female populations were anemic with hemoglobin of 8-10g/dl 39.6 % out of 63 in the study population followed by life-threatening condition hemoglobin less than 6.5g/dl 23.8 % out of 63 in the study population.

DISCUSSION:

Chronic kidney disease is a worldwide disease it is associated with multiple co-morbidity illnesses. That anemia is the most common comorbidity because declining kidney function can lead to a deficiency of erythropoietin and anemia. Among the study population, male patients (62%) were found to be higher than female patients (32%). Male predominance had also higher in the study of Conrial Marion tauro(7).and Putta Rajasekhar(8). In the study, the maximum number of patients observed in the age group of 46-60 years was 30(37.5%) which is significant to the study conducted by Birhie Alemu(9).

Anemia (78.75%) followed by hypertension (67.5%) is the most frequently occurring comorbidity in patients with CKD it is significant with the study of S.Rakshana and preetha selva(10). The study findings were similar to the results of Abdullah Zaawari(11) as they also reported that the prevalence of anemia in CKD patients is greater than 70% in the study population also male has a higher prevalence of anemia in CKD and Ryu S-R, Sue K. Park(12) reported that unemployed compared to employed patients and patients with education with high school are found to be a higher prevalence of anemia in CKD

The study findings were similar to the results of Behera(13) as they reported that severe and life-threatening anemia is most commonly occurring followed by moderate anemia are occurring in patients with anemia in CKD

CONCLUSION:

In this study, we concluded that patients with CKD show abnormal hematological parameters. Evaluation of hematological parameters and early detection in these patients helps in classifying the severity of anemia, aids in choosing the correct treatment, and decreases mortality. Therefore, specific preventive strategies should be developed to reduce the prevalence of anemia in this patient group.

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