A Prospective Study on the Proportion of Anemia in Chronic Kidney Disease and To Evaluate the Effect of PatientCounselling.

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ABSTRACT

INTRODUCTION: Chronic kidney disease (CKD) is defined as any abnormality in kidney structure or function present for three months or longer, with implication for health. Anemia is a common consequence of CKD accompanying decline in renal function. The major risk factors of CKD are increasing age, diabetes, hypertension, smoking, obesity, gender and family history.

OBJECTIVE: To assess the proportion of anemia and risk factors associated with CKD and the level of knowledge of patients with CKD using KAP questionnaire.

METHODS AND MATERIALS: A written informed consent as taken from 87 patients with CKD satisfying the inclusion and exclusion criteria. For this study patient's haemoglobin levels (below 11.5g/dl considered anemic) and the common risk factors for CKD will be assessed. Knowledge of patients will be assessed using KAP questionnaire. Proper counselling will be given to the patients and caregivers and the score will be collected before and after counselling.

RESULT: The proportion of anemia was found to be (86.2%) and the major risk factors seen were DM (80.5%), hypertension (79.3%), and dyslipidemia (63.2%). After the proper analysis, the knowledge, attitude and practice were improved.

CONCLUSION: The early detection will prevent the further progression of the disease and also helps to improve the patients' health related outcomes. Early identification and treatment of anemia may improve cardiovascular morbidity and mortality. No large-scale population data are available specifically for patients with CKD regarding prevalence of anemia and subpopulations at risk. Therefore more studies with larger sample sizes should be carried out.

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I. INTRODUCTION

Chronic kidney disease (CKD) is defined as any abnormality in kidney structure or function present for three months or longer, with implication for health. CKD or Chronic Kidney Injury is a progressive irreversible deterioration of renal function that may occur even when the primary insult has been corrected or treated or become inactive. Chronic kidney disease is defined as the kidney damage or glomerular filtration rate (GFR) 60 ml/min/1.73 m2 for three months or more, irrespective of the cause. The lack of community based screening programs has led to patients being detected with CKD at an advanced stage. The severity of CKD is classified from 1 to 5 depending upon the level of GFR[1.]

STAGES	DESCRIPTIONS	GFR
1	Signs of mild kidney disease but with normal or better GFR	Greater than 90 %
2	Mild kidney disease with reduced GFR	60 – 89 %
3	Moderate chronic renal insufficiency	30 - 59 %
4	Severe chronic renal insufficiency	15 – 29 %
5	End- stage renal failure (include only patients on dialysis)	Less than 15 %

Table 1: Stages Of CKD

Anemia is a common feature associated with CKD. It can be described that the condition in which the number of red blood cells in the blood is low. Anemia in CKD is typically normocytic, microcytic and macrocytic. The demonstration of a circulating factor responsible for stimulating erythropoiesis, and the kidney

as the main source of erythropoietin (EPO),where EPO deficiency is a predominant cause of anemia in CKD. Anemia, which affects most patients with CKD, is caused by damage of peritubular cells resulting in a decreased production of erythropoietin (EPO) resulting, a glycoprotein that stimulates red blood cell production in the bone marrow and is released in response to hypoxia. EPO concentrations in patients with kidney failure are lower than in individuals with normal kidney function. Early identification of anemia, particularly in high-risk populations, could lead to effective preventive and therapeutic strategies to improve outcomes. Anemia in CKD is associated with cognitive impairment, sleep disturbances, CKD progression, cardiovascular comorbidities, and higher mortality[2]. A higher prevalence of anemia occurs in the population with an eGFR less than 60 mL/minute/1.73 m2. Anemia, when defined by a haemoglobin of <13 g/dL, was found to increase in prevalence at Stage 3 CKD and become even more prevalent into Stages 4 and 5.

The risk factors associated with CKD are diabetes mellitus, hypertension, dyslipidemia, autoimmune diseases, polycystic kidney disease, cardio vascular diseases, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstructions, and drug toxicity. Initiation factors are medical conditions that directly cause kidney damage and progression of CKD exacerbate this kidney damage and are related to an accelerated decline in kidney function2. The majority of susceptibility factors are not modifiable, but may identify people who are at high risk for developing CKD. In contrast, pharmacotherapy and lifestyle interventions have been shown to modify CKD-related initiation and progression factor. Understanding the risk factors and implementing screening of at risk populations will increase early detection, initiate treatment of modifiable risk factors for ESRD, along with appropriate treatment for CKD[3].

II. OBJECTIVES
To assess the proportion of anemia and risk factors associated with CKD and the level of knowledge of patients with CKD using KAP questionnaire.

III. METHODS AND MATERIALS
The present study was conducted after the clearance from the institutional Human Ethical committee.
It was carried out in the Nephrology Department of a tertiary care centre.
Total 87 patients, with CKD are to be selected from inpatients or outpatients fromthe hospital.

INCLUSION CRITERIA
➢ Patient of both sexes in the age group of 18-85 years with CKD.
➢ Dialysis patients are included in this study.

EXCLUSION CRITERIA
➢ Patients who are not willing to participate in the study.
➢ Patients with associated haematological disorder.
➢ Pregnant women.

IV. STUDY PROCEDURE
A written informed consent was taken from the selected 87 patients as per by ICMRbiomedical research guideline format. A written informed consent will be taken from thepatients with CKD satisfying the inclusion and exclusion criteria. The relevant data willbe collected from patients' medical records and direct interview with patients with thehelp of physicians. The collected data will be entered in pre framed proforma based onvalid suggestions from experts of medical and pharmacy fields. A structured interviewwith by-stander or patient was conducted by using questionnaires to elicit information about the knowledge of Chronic Kidney Disease (CKD). In the study patients proportion of anemia was assessed by the haemoglobin value and various risk factors were assessed from the study population based on the collected data. At the end of the study all the collected parameters and scores were compared from the baseline to the end of the study.

The knowledge, Attitude and Practice (KAP) was assessed by using suitably designed questionnaire prior to counselling. The KAP questionnaire we are using is a validated questionnaire that contains total 25 questions, 10 questions from knowledge part, 8 from attitude part and 7 from practice part. The knowledge and practice part contains 4 options and the attitude part contains only 2 options viz. A counselling was provided to each patients about disease, life style modification and diet using suitable validated Patient Information Leaflet. The KAP questionnaire will be conducted 2 months after patient counselling session and the change in scores was statistically plotted.

V. RESULT

- **Distribution of patients based on haemoglobin level**

Out of 87 participants, 86.2% patients with abnormal haemoglobin level and 13.8% patients with normal haemoglobin level .Therefore majority of the patients were anemic.

ANEMIA	FREQUENCY	PERCENTAGE
Normal	12	13.8%
Abnormal	75	86.2%
Total	87	100%

Table 2: *Distribution of patients based on haemoglobin level*
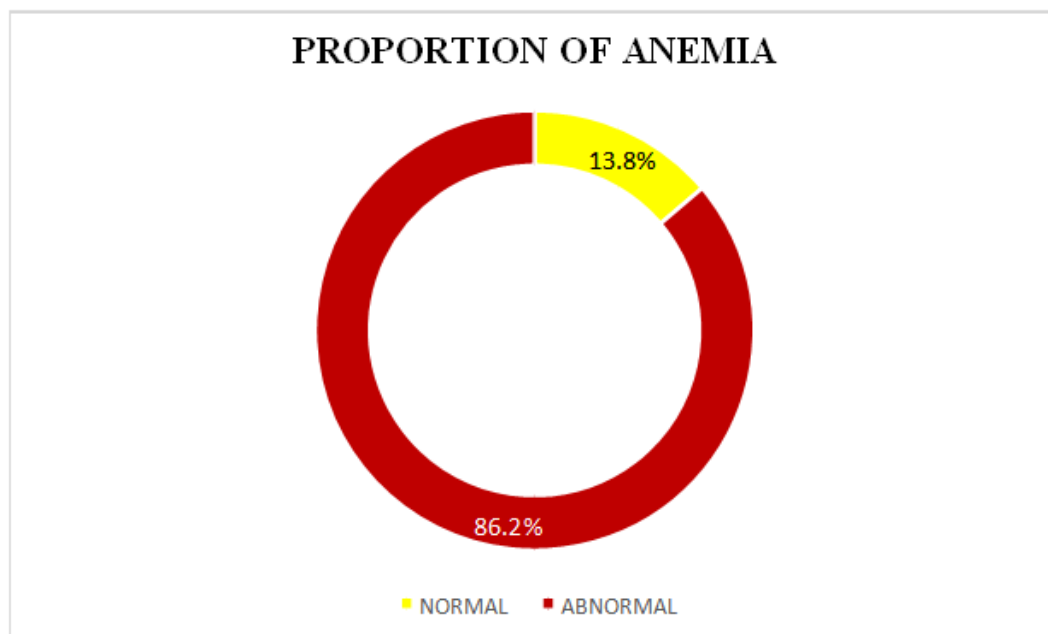
Figure 1: *Percentage distribution of based on haemoglobin level*

- **Distribution of patients based on anemia in stages**

In this study anemia is defined as haemoglobin level ≤11.5 g/dl. In stage V 32 patients were having CKD and all were found to be anemic similarly in Stage IV 28 patients were found to have CKD and all were found to be anemic, but in stage III out of 22 CKD patients 12 were anemic and in stage II out of 5 patients 3 were found to be anemic.

STAGES	FREQUENCY	PERCENTAGE
STAGE I	0	0 %
STAGE II	3	60 %
STAGE III	12	54.5 %
STAGE IV	28	100 %
STAGE V	32	100 %

Table 3: *Distribution of patients based on anemia in stages.*
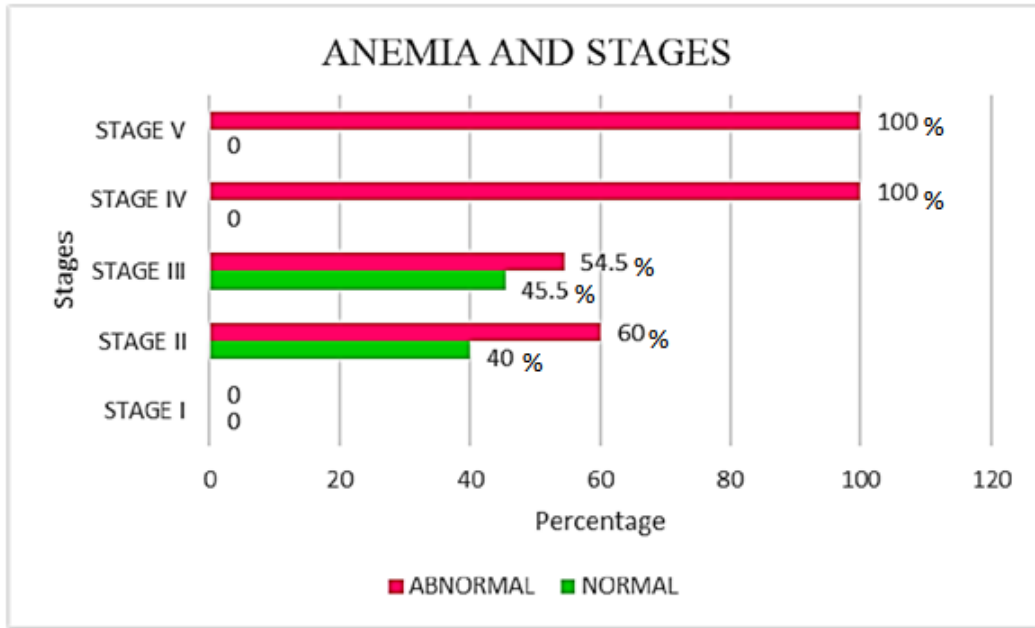
Figure 2: *Percentage distribution based on anemia in stages.*

- **Distribution of patients based on haemoglobin and stages of CKD**

Out of 87 participants, 42.7 % patients were anemic in Stage V, 37.3% patients were anemic in Stage IV, 16% patients were anemic in Stage III, 4% patients were anemic in Stage II. Therefore majority of the patients were anemic in Stage V of CKD.

STAGES	FREQUENCY	PERCENTAGE
Stage I	0	0
Stage II	3	4%
Stage III	12	16%
Stage IV	28	37.3%
Stage V	32	42.7%
Total	75	100%

Table 4: *Distribution of patients based on haemoglobin and stages of CKD*
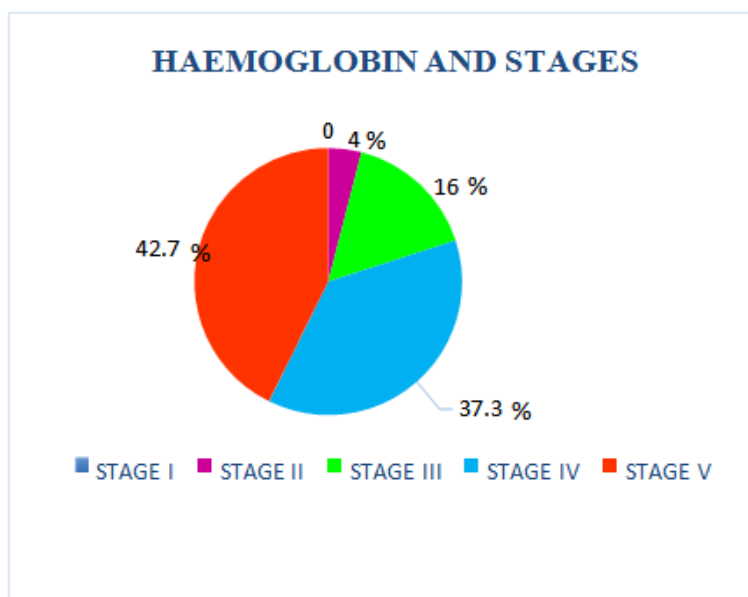

Figure 3: *Percentage distribution of based on haemoglobin and stages of CKD*

- **Distribution of patients based on stages of CKD**

Out of 87 participants, 36.8% patients were in Stage V, 32.2% patients were in Stage IV, 25.3% patients were in Stage III, 5.7% patients were in Stage II. Hence majority of the patients were in Stage V of CKD.

STAGES OF CKD	FREQUENCY	PERCENTAGE
Stage I	0	0
Stage II	5	5.7%
Stage III	22	25.3%
Stage IV	28	32.2%
Stage V	32	36.8%
Total	87	100%

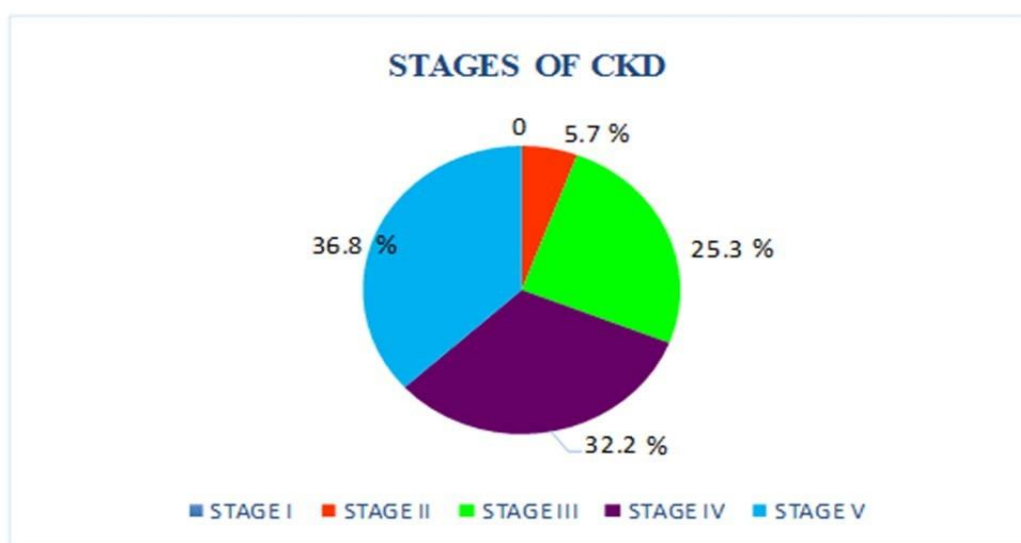***Table 5:*** *Distribution of patients based on stages of CKD*

Figure 4: *Percentage distribution of based on stages of CKD*

- **RISK FACTORS FOR CHRONIC KIDNEY DISEASE**
- **Distribution of patients based on risk factors**

While among the co-morbidities showed by the patients with chronic kidney disease, the major risk was found to be diabetes mellitus (80.5%), hypertension (79.3%), dyslipidemia (63.2%) and the others were CAD (33.3%), Recurrent UTI (21.8%), hypothyroidism (19.5), smoking (16.1%), CVD (14.9%), POVD (14.9%) and calculi (9.2%).

RISK FACTORS	FREQUENCY	PERCENTAGE
Diabetes mellitus	70	80.5%
Hypertension	69	79.3%
Dyslipidemia	55	63.2%
CAD	29	33.3%
Recurrent UTI	19	21.8%
Hypothyroidism	17	19.5%
Smoking	14	16.1%
CVD	13	14.9%
POVD	13	14.9%
Calculi	8	9.2%

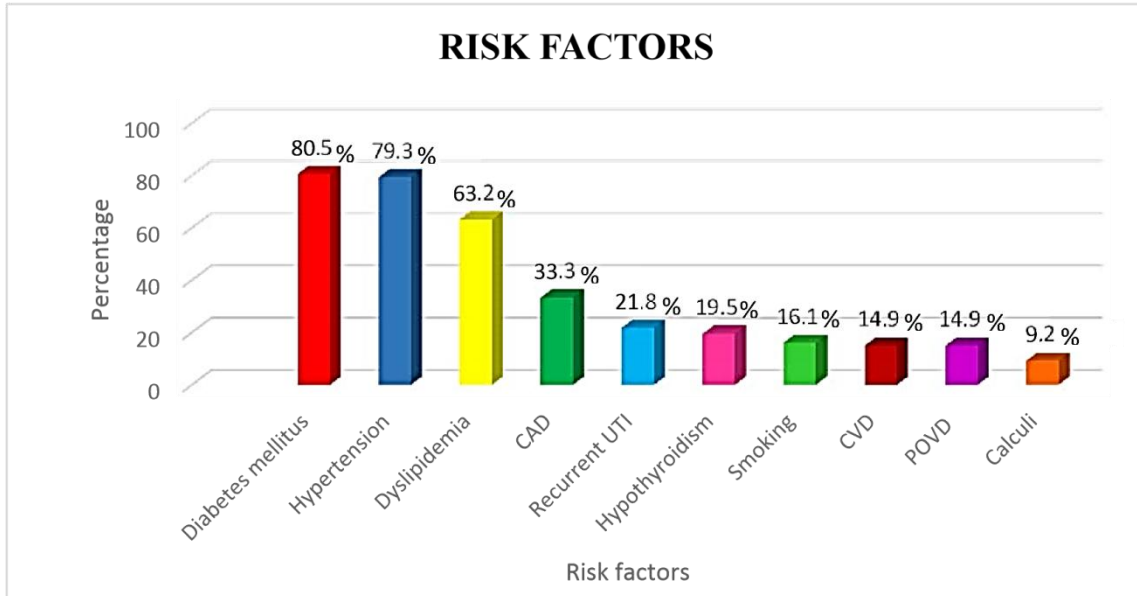***Table 6:*** *Distribution of patients based on risk factors.*

Figure 5: *Percentage distribution of based on risk factors*

- **Distribution of patients based on knowledge level before and after counselling**

Before counselling49.4% patients reported a poor level of knowledge, 43.7% reported average level of knowledge and 6.9% were in good level of knowledge. But after the counselling the knowledge level significantly improved to good (72.4%).

KNOWLEDGE LEVEL	BEFORE COUNSELLING	AFTER COUNSELLING
Poor	49.4%	4.6%
Average	43.7%	23%
Good	6.9%	72.4%
Total	100%	100%

Table 7: *Distribution of patients based on knowledge level of patients*
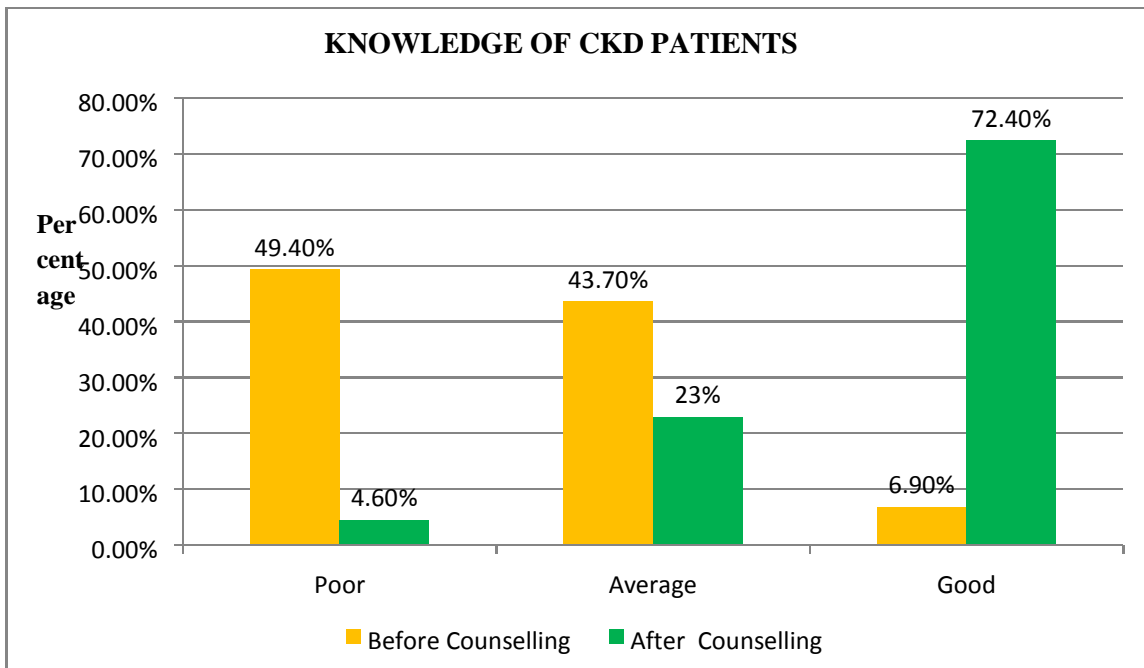

Figure 6: *Percentage based on knowledge levels of patients*

- **Distribution of patients based on attitude level before and after counselling**

Before counselling35.6% patients shown a positive attitude and 64.4% patients shown negative attitude towards CKD. But after counselling the positive attitude towards CKD has significantly improved to 57.5%.

ATTITUDE LEVEL	BEFORE COUNSELLING	AFTER COUNSELLING
Positive	35.6%	57.5%
Negative	64.4%	42.5%
Total	100%	100%

Table 8: *Distribution of patients based on attitude level of patients*
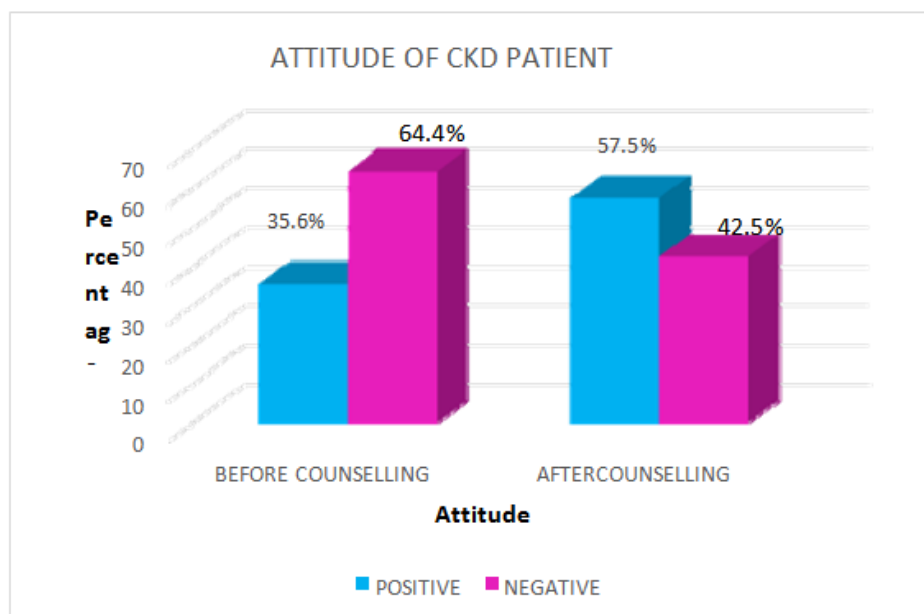

Figure 7: *Percentage based on attitude levels of patients*

- **Distribution of patients based on practice level before and after counselling**

Before counselling 24.1% patients reported a poor level of practice, 50.6% reported average level of practice and 25.3% were in good level of practice. But after the counselling the practice level significantly improved to good (43.7%).

PRACTICE LEVEL	BEFORE COUNSELLING	AFTER COUNSELLING
Poor	24.1%	8.4%
Average	50.6%	37.9%
Good	25.3%	43.7%
Total	100%	100%

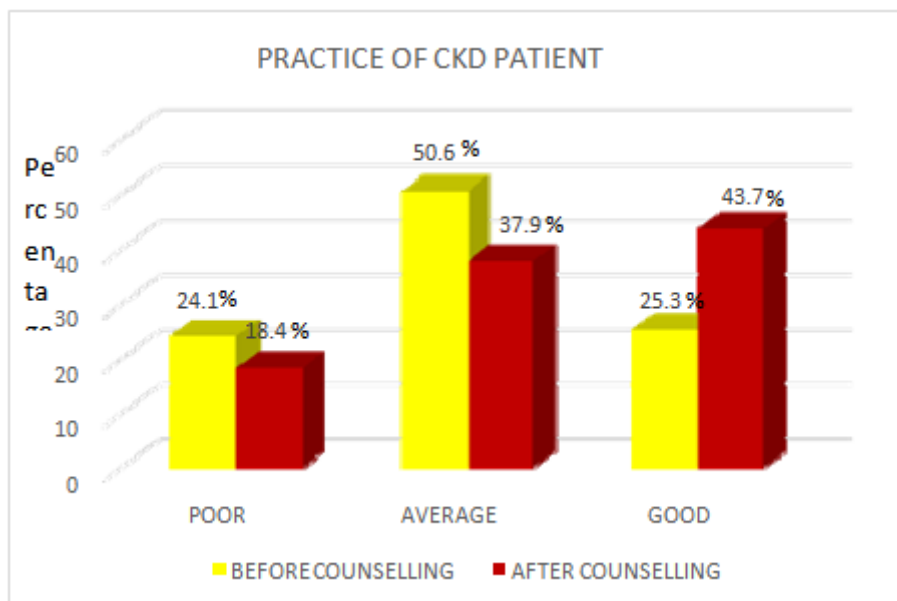***Table 9:****Distribution of patients based on practice level of patients*

Figure 8: *Percentage based on practice levels of patients*

VI. DISCUSSION

Kidney plays vital physiological functions and it acts as the major excretory organ in the human body. Renal function can be assessed by various tests and procedures that will help evaluate the kidney function. Anemia is a complication of chronic kidney disease and may contribute to adverse clinical outcomes. Early identification and treatment of anemia may improve cardiovascular morbidity and mortality. No large-scale population data are available specifically for patients with chronic kidney disease regarding proportion of anemia, subpopulations at risk, and relationships between anemia and kidney function. Here we examined the proportion of anemia, its association with clinical and laboratory values using the baseline data from the medical records of the patients. Anemia is considered when haemoglobin level was lower than 11.5g/dl. Chronic kidney disease (CKD) is a major cause of cardiovascular morbidity and mortality and is considered as a significant public health problem that places a burden on global healthcare resources. The observation is that small reductions in the decline in renal function early in the disease process can provide marked benefits later, in terms of delaying progression to renal replacement therapy, suggests that substantial benefits can be gained from the early identification and treatment of individuals at risk. In order to develop effective strategies to identify such individuals and delay or prevent disease progression, a comprehensive understanding of the complex interplay between risk factors influencing the disease process is required to be observed. A structured interview with by-stander or patient was conducted by using questionnaires to elicit information about the knowledge of Chronic Kidney Disease (CKD) by using validated KAP questionnaire. Thus the study was undertaken to address these questions in patients with chronic kidney disease, to investigate the relationship between anemia and chronic kidney disease, to assess the risk factors for CKD and to assess the knowledge of patients towards CKD.

- Proportion of anemia in chronic kidney patients

In this study the overall proportion of anemia in patients with CKD stage I-V was found out. As the kidney function declines the haemoglobin synthesis also reduced and the patient became anemic. By assessing the haemoglobin level of 87 patients from their medical records were analysed and percentage analysis were carried out. Out of 87 participants, 86.2% patients with abnormal haemoglobin level and 13.8% patients with normal haemoglobin level .Therefore majority of the patients were anemic. Out of 87 participants, 42.7 % patients were anemic in Stage V, 37.3% patients were anemic in Stage I, 16% patients were anemic in Stage III. Only 4% patients were anemic in Stage II. Therefore majority of the patients were anemic in Stage V of CKD. In this study anemia is defined as haemoglobin level ≤11.5 g/dl. In stage V 32 patients were having CKD and all were found to be anemic similarly in Stage IV 28 patients were found to have CKD and all were found to be anemic, but in stage III out of 22 CKD patients 12 were anemic and in stage II out of 5 patients 3 were found to be anemic.

- Stages of CKD

The stages in CKD were classified according to the GFR and calculated using EPI-GFR equation. In this study out of 87 participants, 36.8% patients were in Stage V, 32.2% patients were in Stage IV, 25.3% patients were in Stage III, 5.7% patients were in Stage II. Hence majority of the patients were in Stage V of CKD.

- Risk factors for chronic kidney disease

In this section the various risk factors such as HTN, DM, DLP, smoking, hypothyroidism, calculi, recurrent UTI, CAD, CVD, POVD associated with CKD were collected and tested for significance using Chi-square test for proportion. By using the proper analytical method, showed that the most significant risk factors associated with CKD patients were DM (80.5%), HTN (79.3%), and DLP (63.2%) and the risk associated with CKD is significantly very less for were CAD (33.3%), recurrent UTI (21.8%), hypothyroidism (19.5), smoking (16.1%), CVD (14.9%), POVD (14.9%) and calculi (9.2%).

- Effectiveness of counselling from KAP level of CKD patients

In this section the KAP course of patients were collected and converted to a percentage scale before and after the counselling. The effectiveness of counselling was statistically assessed by Wilcoxon Signed Ranks Test.

The knowledge, Attitude and Practice (KAP) was assessed by using suitably designed questionnaire prior to counselling. The knowledge domain was designed to test the knowledge of the etiologies, diagnosis and treatment of kidney disease as well as normal functions of the kidneys. It comprised ten questions each measured with a four point categorical response scale ('Yes', 'No', 'Do Not Know' and 'Unsure'). The attitudes domain comprised eight questions each measured on a dichotomous response scale ('Yes' and 'No'). The practice domain was designed to test hypothetical practices associated with a diagnosis of kidney disease. It comprised seven questions each measured on a four-point Likert-based scale ('Very Unlikely', 'Unlikely', 'Likely' and 'Very Likely'). A counselling was provided to each patients about disease, life style modification and diet using suitable validated Patient Information Leaflet. The KAP questionnaire will be conducted 2 months after patient counselling session and the change in scores was statistically plotted.

After proper analysis it is observed that before counselling49.4% patients reported a poor level of knowledge, 43.7% reported average level of knowledge and 6.9% were in good level of knowledge. But after the counselling the knowledge level significantly improved to good (72.4%). In case of attitude before counselling35.6% patients shown a positive attitude and 64.4% patients shown negative attitude towards CKD. But after counselling the positive attitude towards CKD has significantly improved to 57.5%. For practice section before counselling24.1% patients reported a poor level of practice, 50.6% reported average level of practice and 25.3% were in good level of practice. But after the counselling the practice level significantly improved to good (43.7%).). It shows that there is increase in the KAP score of the patients after counselling session. Thus the counselling provided was effective in improving the knowledge, attitude and practice of patients with chronic kidney disease.

VII.   SUMMARY

The present study was conducted to assess the proportion of anemia and risk factors associated with CKD. The study was conducted in 87 patients in the department of nephrology and the patients were selected satisfying the inclusion and exclusion criteria.

This study enabled us to identify the proportion of anemia, its association with clinical and laboratory values using the baseline data from the medical records of the patients. In this study anemia is defined when haemoglobin level was lower than 11.5g/dl. As the kidney function declines the haemoglobin synthesis also reduced and the patient becomes anemic. Therefore to prevent the progression of CKD, the proportion of anemia was evaluated. The observation is that small reductions in the decline in renal function early in the disease process can provide marked benefits later, in terms of delaying progression to renal replacement therapy, suggests that substantial benefits can be gained from the early identification and treatment of individuals at risk. In order to develop effective strategies to identify such individuals and delay or prevent disease progression, a comprehensive understanding of the complex interplay between risk factors influencing the disease process was observed and analysed.

This study also showed a marked improvement in health related quality of life as an impact of effective patient counselling. This is done after analyzing their knowledge, attitude, practice of the patient towards the disease which was assessed using a KAP questionnaire. Awareness of patient about diet and medication through patient counselling should be done to improve knowledge of CKD patients. Clinical pharmacist should provide education to patients to improve adherence behavior of CKD patients. There should be modest knowledge base about kidney that can serve as an important foundation upon which to build CKD education programme to expand awareness and understanding. Adults with CKD and at risk for CKD meet their health care needs by assessing a variety of sources including traditional healers and CKD management programme must recognize these important preferences in order to be successful.

VIII. CONCLUSION

This study depicts the proportion of anemia, risk factors associated with CKD and the effect of patient counselling. 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. Anemia in CKD is due to erythropoietin deficiency from reduced renal mass, iron and nutritional deficiencies, elevation of pro inflammatory mediators in CKD may affect the erythropoiesis in CKD. It was observed that common risk factors were diabetes mellitus, hypertension, and dyslipidemia. CKD is a complex, progressive condition that develops slowly in some individuals, but rapidly in others. In addition to the underlying cause of renal failure, the rate of disease progression may be observed by the presence of CKD risk factors. The risk factors may increase progression of CKD to the end stage. Knowledge, Attitude and Practice of the patients were assessed using KAP questionnaire before and after counselling using a suitable patient information leaflet. The counselling provided was effective in improving the knowledge, attitude and practice of patients with chronic kidney disease. Pharmacists are in an ideal position to provide patient education and optimize patient care. Greater understanding about the illness and a change of attitude and practice would in turn results in a better therapeutic outcome. For future research the study should be done in a large sample and for long duration of period as a multicenter study.

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