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Research Article

Prospective Study on Evidence Based Management of chronic Kidney Disease with Comorbidities

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A B S T R A C T

Chronic kidney disease (CKD) is a global public health problem affecting the adult population in several continents and increasing the risk of adverse outcomes. This prospective study has been conducted to understand the evidence based pharmacotherapy, Rationality of prescribed medications, Prevalence of co-occurring conditions and also to know the rate of progression of Glomerular Filtration. This research has been conducted on randomly selected inpatients (n=70) in Thumbay New Life Hospital during the months of January and February. The tools used include Informed Consent Form, Patient Counselling, Patient Medical and Laboratory Reports. Finally, the study conclude that the most common symptom of CKD is pedal edema, Most commonly occurred stage of CKD is G5, prevalence of comorbidities from High include Hypertension, Diabetes Mellitus and Coronary Artery Disease respectively. Estimated GFR has been improved in most of the patients from the duration of admission to discharge but statistical analysis shows a non-significant p value.

Keywords: Chronic Kidney Disease; Co-occurring diseases; Global problem; Prevalence; Glomerular Filtration Rate

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INTRODUCTION

Chronic Kidney Disease(CKD) is a common condition defined as abnormalities of kidney structure or function for more than 3 months with Implications for health conditions.[1] Diabetes and hypertension cause up to two-thirds of CKD.[2] CKD can be detected with routine laboratory tests, and some treatments can prevent development and slow disease progression, reduce complications of decreased GFR and risk of cardiovascular disease, and improve survival and quality of life.[3] Chronic kidney disease (CKD) is a global public health problem,[4-6] affecting 10 to 16% of the adult population in several continents[7-10] and increasing the risk of adverse outcomes. CKD was earlier considered to be a health problem only in developed countries, 4 out of 5 chronic disease deaths now occur in low- and middle-income countries. In India the projected number of deaths due to chronic diseases will rise from 3.78 million in 1990 (40.4% of all deaths) to an expected 7.63 million in 2020 (66.7% of all deaths).[11] In another hospital-based study, in which data was collected from 48 hospitals representing the whole of India, the prevalence of CKD stage 3 and beyond was found to be approximately 0.8%.[12] CKD is a common condition affecting up to 10% of the population in western societies and is more common in some ethnic minority populations and in females. The incidence increases exponentially with age such that some degree of CKD is almost inevitable in persons over 80 years of age. Social deprivation is also associated with a higher prevalence of CKD.[13] A decreasing GFR is associated with CVD independently of other risk factors.[14] in the Die Deutsche Diabetes Dialyse studie (4D) trial in a cohort of 1200 patients with diabetes on haemodialysis, atorvastatin had no positive effect on the primary composite endpoint of CVD.[15]

Classification of CKD based on Glomerular Filtration Rate (GFR)[1] can be seen in Table 1

Table: 1 CKD stages based on eGFR

GFR Category	GFR (ml/min/1.73m^2)	Terms
G1	>90	Normal or High
G2	60-89	Mildly decreased
G3a	45-59	Mildly to Moderately decreased
G3b	30-44	Moderately to severely decreased
G4	15-29	Severely Decreased
G5	<15	Kidney Failure

Etiology

Volume depletion, Glomerulonephritis, Pyelonephritis, Diabetes, Hypertension, Renal vascular disease, Heart failure, Liver failure, and Polycystic Kidney.[13]

CKD comorbidities

Hypertension

Hypertension is most commonly associated with CKD and it develops more than 75% of patients with Chronic Kidney Diseases.[16] The mechanisms of hypertension in CKD include volume overload, sympathetic over activity, salt retention, endothelial dysfunction, and alterations in hormonal systems that regulate blood pressure.[17] Recommendations for BP control has been changed to <130\<80 mm Hg according to the 2017 ACC\AHA guidelines as more evidence becomes available. In certain CKD populations(aged or with multiple comorbidities), aggressive BP control could lead to negative outcomes such as acute deterioration in kidney function, increased risk for cardiovascular events and orthostatic hypotension.[18]

Diabetes

Diabetic kidney disease, or CKD attributed to diabetes, occurs in 20– 40% of patients with diabetes.[19-22] Diabetic kidney disease typically develops after diabetes duration of 10 years in type 1 diabetes, but may be present at diagnosisoftype2diabetes.Diabetickidneydisease can progress to end-stage renal disease (ESRD) requiring dialysis or kidney transplantation and is the leading cause of ESRD in the United States.[23] In addition, among people with type 1 or 2diabetes,the presence of CKD markedly increases cardiovascular risk.[24]

Dyslipidaemia

dyslipidaemias cover a broad spectrum of lipid abnormalities, some of which are of great importance in CVD prevention. Dyslipidaemias may be related to other diseases (secondary dyslipidaemias) or to the interaction between genetic predisposition and environmental factors. Elevation of total cholesterol (TC) and low-density lipoprotein-cholesterol (LDL-C) has received most attention, particularly because it can be modified by lifestyle changes and drug therapies.The lipid profile shows both quantitative and qualitative abnormalities that worsen with declining GFR, being most pronounced in subjects with end-stage renal disease (ESRD). Dyslipidaemia comprises typically elevations of TG and lowering of HDL-C, whereas the changes of TC and LDL-C are less marked in stage 1–2 CKD. most patients with stage 3–5 CKD have mixed dyslipidaemia and the lipid profile is highly atherogenic with adverse changes in all lipoproteins.[25]

Management

CKD with Hypertension

ACE inhibitors and angiotensin II receptor antagonists (blockers) (ARBs) have both cardioprotective and renoprotective properties and are therefore of particular value in patients with CKD[26]

although ACE inhibitors may be used as first-line agents in those with hypertension and non-proteinuric CKD, CCBs and thiazide or thiazide-like diuretics should also be considered as alternative first-line choices in this population[27]

Diuretic therapy can reduce volume expansion and has been shown to improve left ventricular mass index and arterial stiffness in those with CKD Thus, diuretics are frequently used as part of combination drug therapy in CKD and offer antihypertensive and cardioprotective effects Recently updated ESC/ESH guidelines which advocate combination therapy with an ACE inhibitor and CCB as first-line therapy in proteinuric patients[27]

CKD with Diabetes

Metformin in patients with eGFR between 30-45 mL/min/1.73 m^2 can be used and ittt is contraindicated in patients with eGFR < 30 mL/min/1.73 m^{2}due to increased risk of lactic acidosis. Assess risk vs. benefit of continuing metformin if eGFR drops below 45 mL/min/1.73 m^2.

CKD with Dyslipidaemia

Manaegement of Chronic Kidney Disease in patients with Dyslipidaemia is shown in table 2

Table: 2 Management of dyslipidaemia in CKD

CKD Patient Population	Treatment
Age ≥ 50 years with eGFR < 60 mL/min/1.73 m2 and no previous kidney transplant (G3a-G5)	Statin or statin + ezetimibe[30]
Age ≥ 50 years with eGFR ≥ 60 mL/min/1.73 m2 (G1-G2)	Statin
Age 18-49 with eGFR ≥ 60 mL/min/1.73 m2 (G1-G2) and either: known coronary disease (myocardial infarction or coronary revascularization), diabetes mellitus, prior ischemic stroke, or estimated 10-year incidence of coronary death or non-fatal myocardial infarction > 10%[30]	Statin

Objectives

- To screen and diagnose patients with CKD
- To decrease progression of renal deterioration
- To assess the rationality of drugs
- To evaluate the prevalence of comorbidities

MATERIALS AND METHODS

Study Design

This is the cross-sectional and observational study conducted over a period of two months at general ward of Thumbay New Life Hospital, Chaderghat, Hyderabad, Telangana, India.

The patients admitted during the period of January 2020 and February 2020 were eligible for enrollment.

Collection of Data

Using a suitably designed data collection form, the details were collected during patient counselling and also from medical records including patient demographics, prescription chart, Lab data, doctor's and nursing notes.

Inclusion Criteria

Patients above 20 years of age.

CKD patients with any other Co-occuring conditions.

Patients willing to participate in the study.

Patients willing to sign the Informed Consent Form.

Exclusion Criteria

Pregnant women

Nursing mothers

Patients below 20years of age

Patients who are not willing to sign the Informed Consent Form.

Duration of the Study

The study is conducted for a period of two months.

Place of Study

Thumbay New Life Hospital, Chaderghat, Hyderabad, Telangana, India.

RESULTS

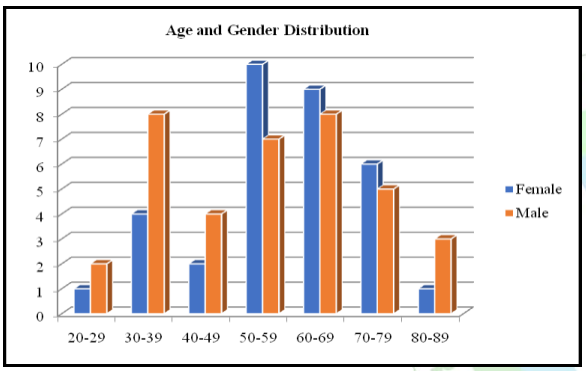

Figure: 1 Age and gender distribution

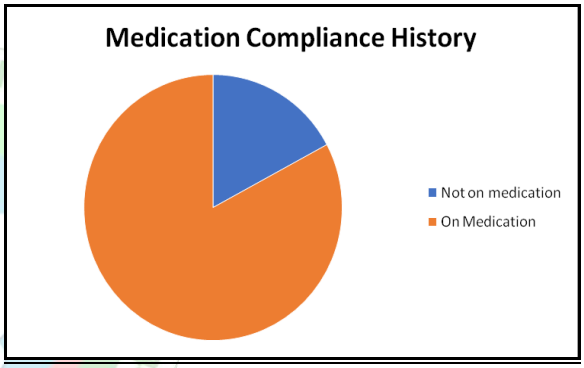

Figure: 4 Family History Medication Compliance History

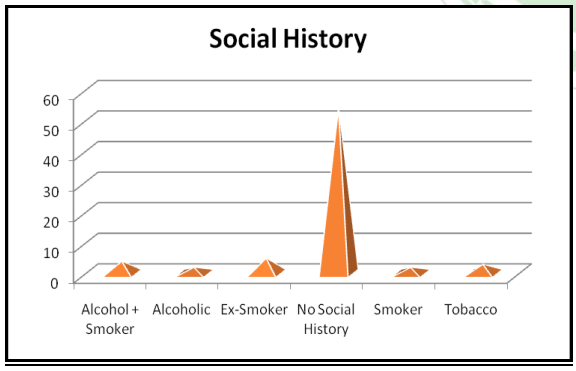

Figure: 2 Social history of CKD patients

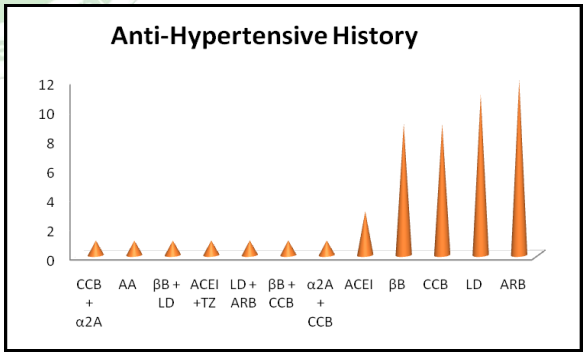

Figure: 5 Anti-Hypertensive History

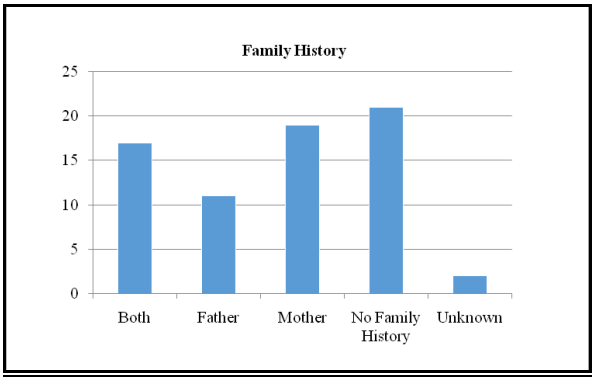

Figure: 3 Family History

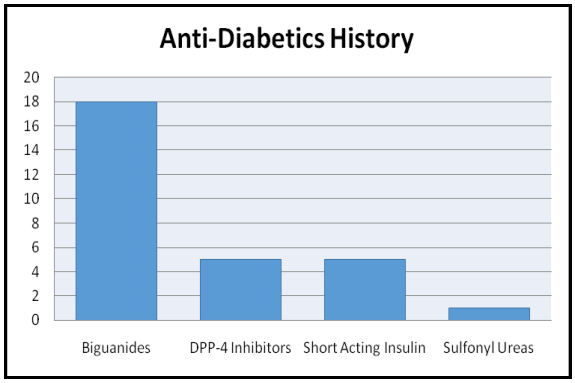

Figure: 6 Anti-Diabetic History

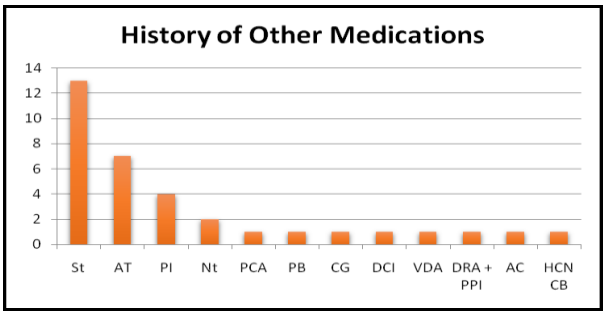

Figure: 7 Other Medications History

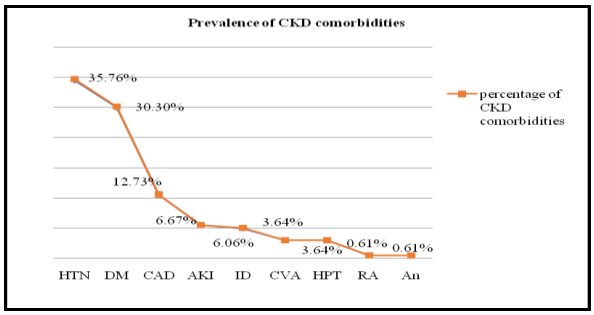

Figure: 12 Percentage Comorbidities

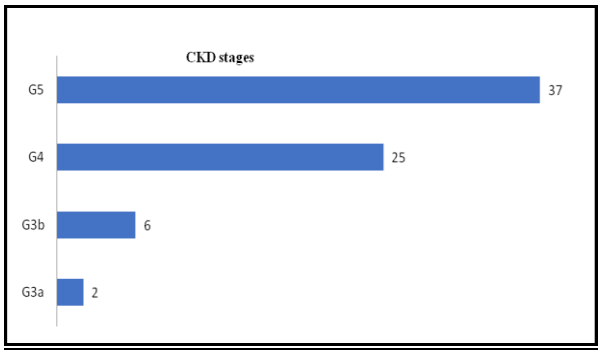

Figure: 8 Stages of CKD

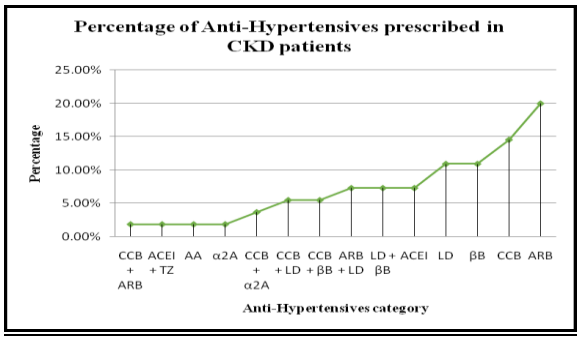

Figure: 13 Anti-Hypertensive prescribed to patients with CKD

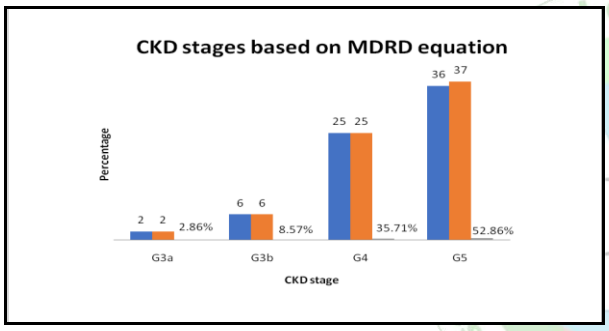

Figure: 9 Stages based on MDRD equation

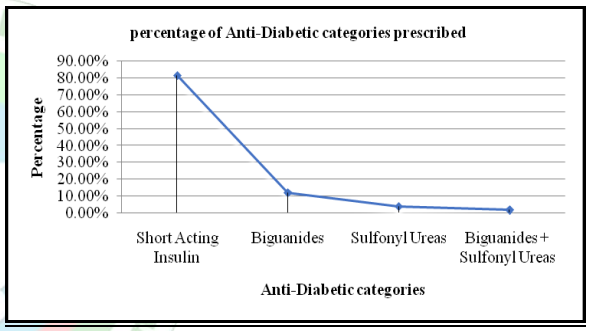

Figure: 14 Anti-Diabetic categories prescribed to patients with CKD

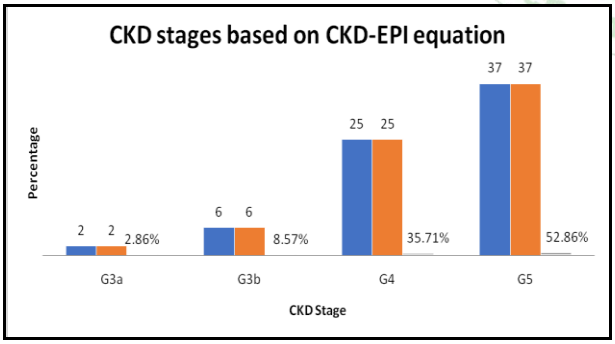

Figure: 10 Stages based on CKD-EPI creatinine equation

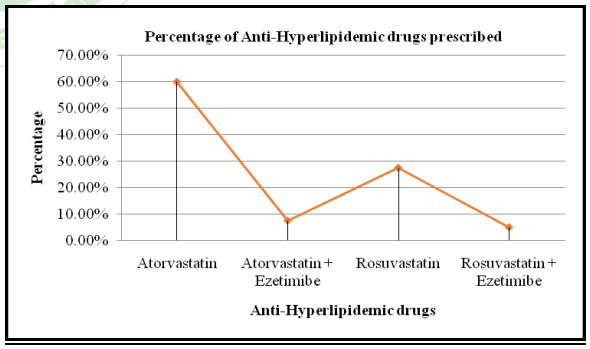

Figure: 15 Medications prescribed for dyslipidemic patients with CKD

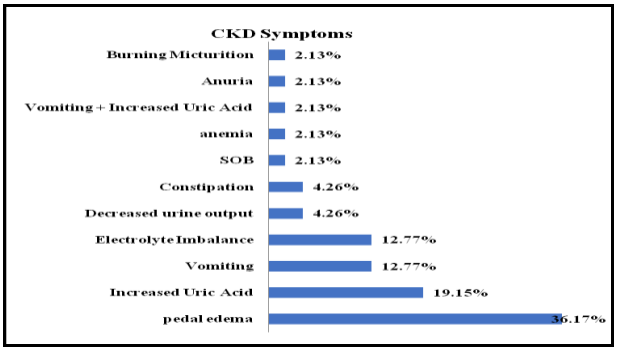

Figure: 11 Percentage of CKD symptoms

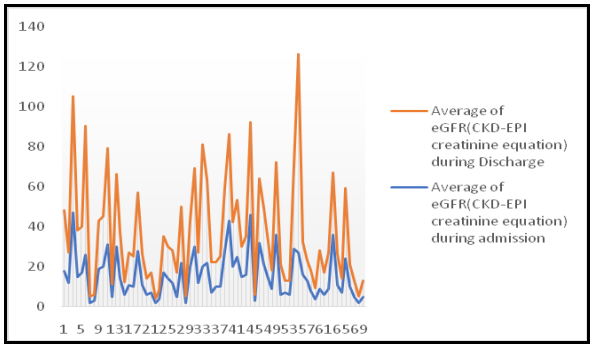

Figure: 16 eGFR during admission and discharge using CKD-EPI equation

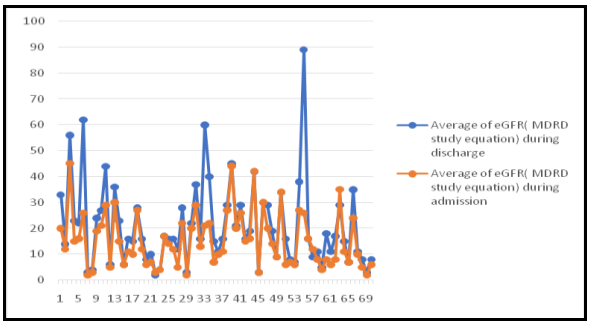

Figure: 17 eGFR during admission and discharge using MDRD equation

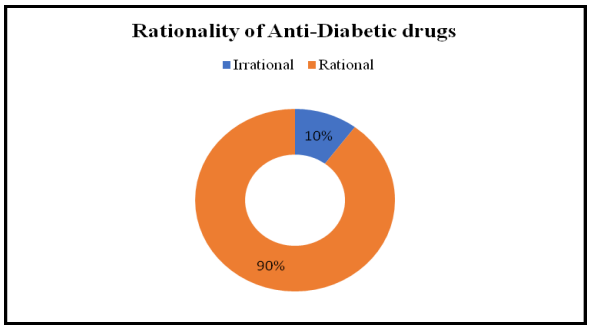

Figure: 19 Rationality of Anti-diabetics in CKD Patient

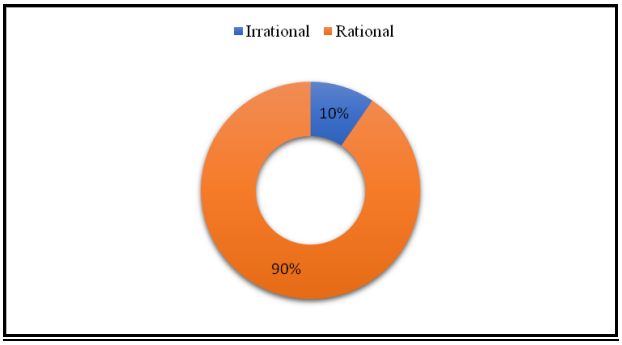

Figure: 18 Rationality of Anti-Hypertensives in CKD Patients

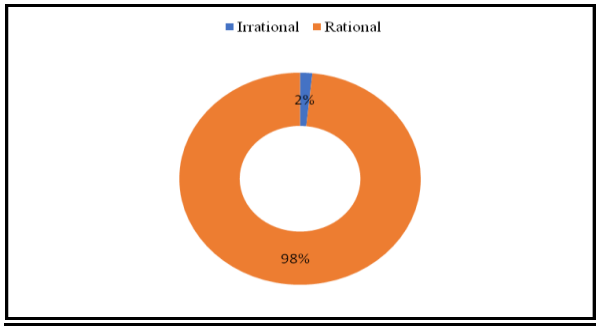

Figure: 20 Rationality of Anti-Hyperlipidemics in CKD Patients

CONCLUSION

The patients have been managed therapeutically based on evidence and physicians were adhered almost 90% to the standard guidelines. Estimated Glomerular Filtration Rate has been improved for most of the Patients during their admission and discharge. However, Estimated Glomerular Filtration Ratecan't be improved to the highest within 6 to 7 days of hospitalisation hence the statistical results were insignificant.

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