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# A STUDY ON DRUG UTILIZATION REVIEW OF DIABETIC AND NON-DIABETIC CHRONIC KIDNEY DISEASE PATIENTS

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## ABSTRACT
CKD (chronic kidney disease) is a general term for heterogenous disorders affecting kidney structure and its function. It is defined as either kidney damage or a decreased glomerular filtration rate of less than 60ml/min/73m$^2$ for 3 or more months. This is a prospective cross- sectional study with the aim to describe the drug prescribed and compare the drug utilization pattern in diabetic and nondiabetic patients having chronic kidney disease admitted in the government tertiary care teaching hospital mandya. The present study has been conducted on male and female patients who were satisfying the inclusion criteria. A suitably designed case record form was prepared and used to record all the necessary and relevant data from the medical records of patients. A total of 100 patients were analysed in our study out of that, 59% patients were having CKD with DM and 41% patients were not having DM. from the study we found that patient with age group 51-60 and 61-70 years are more prone to renal failure. The prescription of drugs for CKD patients having DM + others were OHA (12%), and insulin (15%), anti-hypertensive drugs (40%), lipid lowering agents (9%), Haemopoietic agent (7.3%) and Vitamins (10%). The prescription of drugs for CKD with non diabetic patients also same as diabetic with others except OHA and insulin. Most of the CKD patients are suffered from DM (59%) Than the HTN (41%) So we can improve the patient quality of life by monitoring and controlling the risk factors like HTN and DM that can reduce the risk of renal failure condition.

**KEYWORDS:** CKD patients, DM, HTN, OHA, Anti hypertensive drugs.

## INTRODUCTION
Chronic kidney or renal disease is a gradual damage or loss of kidney function over time. In chronic kidney disease excess fluids, electrolytes remain in blood and wastes build up in the body. Symptoms include being unwell and reduced appetite. Chronic kidney disease is a long- term condition where the kidneys do not work effectively. Chronic Kidney disease does not usually cause symptoms until it reaches an advanced stage. It is usually detected at earlier stages by blood and urine tests.[1]

Diabetes mellitus is a growing epidemic and is the most common cause of chronic kidney disease (CKD) and kidney failure. Diabetic nephropathy affects approximately 20–40% of individuals who have diabetes, making it one of the most common complications related to diabetes. Screening for diabetic nephropathy along with early intervention is fundamental to delaying its progression in conjunction with providing proper glycaemic control. Given the growing population that is now affected by diabetes and thus, nephropathy, knowledge regarding the safe use of various anti-hyperglycaemic agents in those with nephropathy is of importance. In addition, attention to modification of cardiovascular disease (CVD) risk factors is essential. Altogether, knowledge regarding the prevention and management of diabetic nephropathy, along with other aspects of diabetes care, is part of the comprehensive care of any patient with diabetes.[2]

Hypertension is common in patients with chronic kidney disease (CKD). The prevalence ranges from 60% to 90% depending on the stage of CKD and its cause. The mechanisms of hypertension in CKD include volume overload, sympathetic overactivity, salt retention, endothelial dysfunction, and alterations in hormonal systems that regulate blood pressure (BP). Hypertension remains a leading attributed cause of end-stage kidney disease (ESKD) in the United States. Uncontrolled hypertension is also associated with higher risk for cardiovascular (CV) morbidity and mortality.[3]

## METHODOLOGY

This was cross sectional descriptive study and this research work was carried out at patient admitted in general medicine department. The study was conducted in Mandya Institute of medical science and Teaching hospital, Mandya. It is a 500-bedded tertiary care teaching hospital provide specialized health services to all the strata of people in and around mandya. A specially designed patient case record form was administered for the collection of demographic social-economic, past medication history and prescribing pattern. A total of100 patients case history was included. The study was initiating after getting Ethical approval from MIMS.

**Table 1: Male and female patient admitted to MIMS hospital.**

| GENDER | NUMBER OF PATIENTS | PERCENTAGE |
|---|---|---|
| **Male** | 54 | 54% |
| **Female** | 46 | 46% |

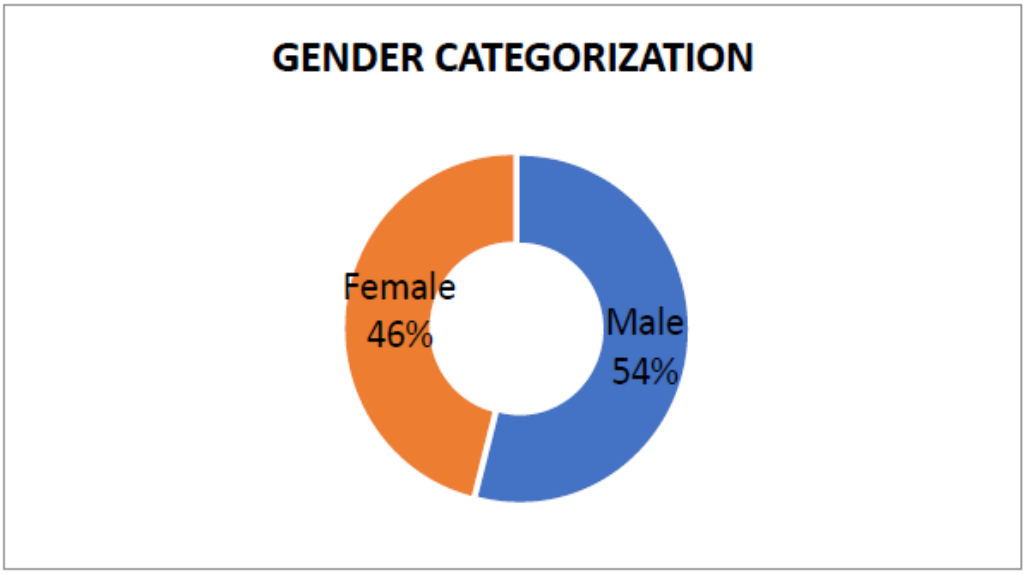


**Figure 1: Male and female patient admitted to MIMS hospital.**

## RESULTS

This study was conducted in General medicine department of MIMS, Mandya. A total of 100 patients were enrolled in the study based on study criteria. The required details from the patient case sheet were recorded in a suitably designed case profile form. The prescription data of 100 patients were analysed in the current study, by comparing the diseases of CKD with Diabetes Mellitus and CKD without Diabetes Mellitus.

### PATIENT DISTRIBUTION BASED ON GENDER

A total of 100 patients' data was collected from in-patient department of General medicine from MIMS hospital, during the period of six months. Among the whole 100, 54(54%) were males and 46(46%) were females.

### PATIENT DISTRIBUTION BASED ON AGE

The prescription data of 100 patients were analysed in the current study, out of which 6% were between 31-40 years, 16% were between 41-50 years, 22% were between 51-60 years, 34% were between 61-70 years, 13% were between 71-80 years and 9% were between 81-90 years. The maximum age of patient in the study population was between 61-70 years and minimum age was between 31-40 years.

**Table 2: Patient distribution based on age.**

| SL No: | Age groups (years) | Number of patients | Percentage |
|---|---|---|---|
| 1 | 31-40 | 6 | 6% |
| 2 | 41-50 | 16 | 16% |
| 3 | 51-60 | 22 | 22% |
| 4 | 61-70 | 34 | 34% |
| 5 | 71-80 | 13 | 13% |
| 6 | 81-90 | 9 | 9% |

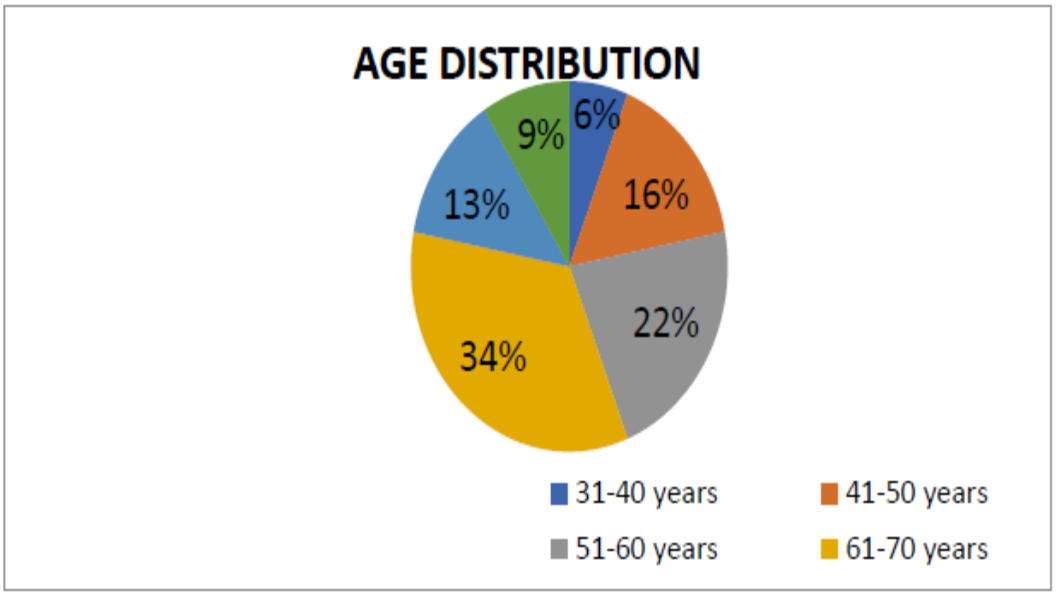


**Figure 2: Patient distribution based on age.**

All patients were divided into 6 groups based on their age. The majority of the patients who are admitted with the diseases (CKD) comes under the age between 61-70 years.

**ASSESSMENT OF SOCIAL HISTORY OF PATIENTS**

Smoking and alcoholism are the major social histories contributing to kidney failure. In this study, among 100 patients, 42% of patients were alcoholic and 30% were smokers.

**Table 3: Represents social history of patints admitted in MIMS hospital.**

| SOCIAL HISTORY | NUMBER OF PATIENTS | PERCENTAGE |
|---|---|---|
| SMOKING | 30 | 30% |
| ALCOHOLIC | 42 | 42% |
| NIL | 28 | 28% |

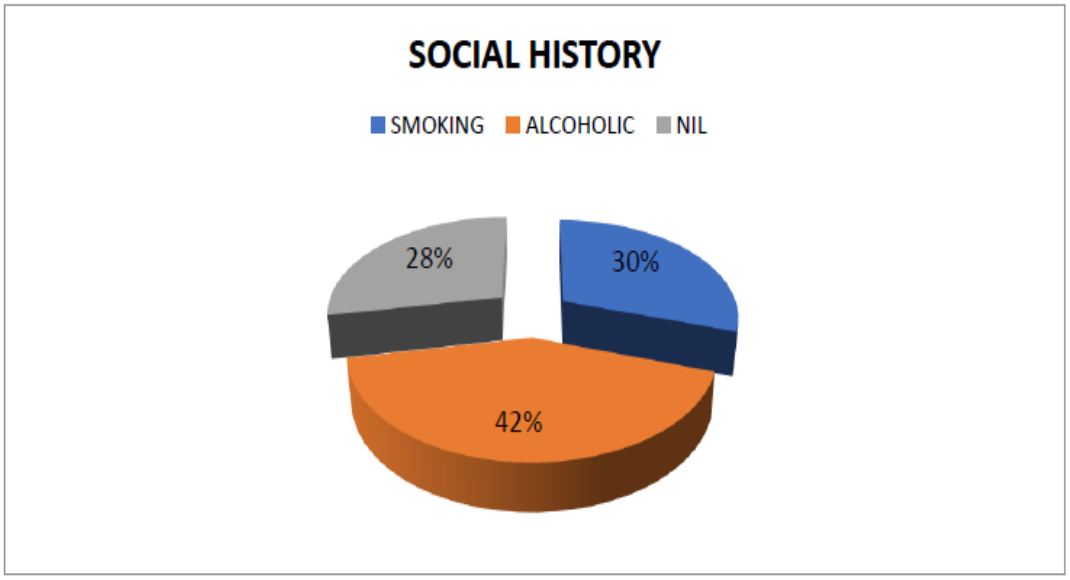


**Figure 3: Represents social history of patients admitted in MIMS hospital.**

**COMPARISON OF PATIENT DISTRIBUTION BETWEEN CKD WITH DM AND CKD WITHOUT DM**

The prescription data of 100 patients were analysed in the current study, out of which 59 patients having CKD with DM along with other disease. Out of 59 patients 31(52,54%) were males and 28(47.45%) were females. This study showed that the prevalence of CKD is more in

males than in females. And 41 patients are not having DM but having CKD with other disease. out of 41 patients 23(56%) were males and 18(43.9%) were females. This study showed that the prevalence of CKD is more in males than in females.

**Table 4: Comparison of patient distribution between CKD with DM and CKD without DM.**

| | Male | Male (%) | Female | Female (%) |
|---|---|---|---|---|
| **CKD with DM** | 31 | 52.54% | 28 | 47.45% |
| **CKD without DM** | 23 | 56% | 18 | 43.9% |

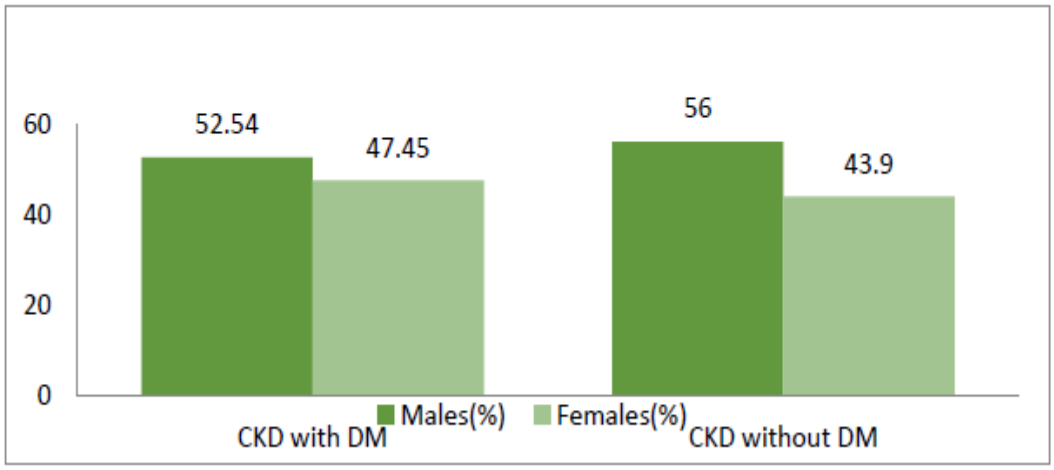


**Figure 4: comparison of patient distribution between CKD with DM and CKD without DM.**

**ASSESSMENT OF DRUG UTILIZATION PATTERN**

Most of the CKD patients are having DM, HTN, Anaemia and other comorbidities, that are treated with multi drug therapy. 82% of the patients were taking multi drug therapy and 18% of the patients were taking monotherapy.

**Table 5: Represents the treatment pattern.**

| TREATMENT PATTERN | NUMBER OF PATIENTS | PERCENTAGE |
|---|---|---|
| MULTI DRUG THERAPY | 82 | 82% |
| MONO DRUG THERAPY | 18 | 18% |

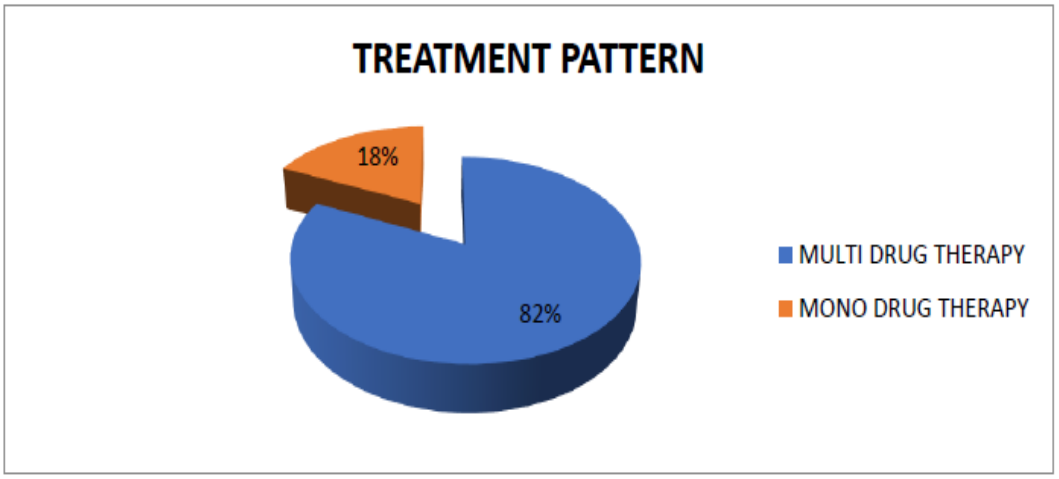


**Figure 5: Represents the treatment pattern.**

**PRESCRIPTION ANALYSIS**

Totally 209 drugs were prescribed in this study. Most common risk and comorbid condition associated with CKD are Diabetes mellitus, Hypertension, and Anaemia etc. In our study Diabetes mellitus (59%) is the most common comorbid condition associated with CKD patients followed by Hypertension. The presence of comorbidities has a twofold impact first, it increases the cost of treatment and secondly, it poses a challenge for the treatment of CKD patients. Because of multiple medications, CKD patients are at higher risk of developing drug related problems.

**Table 6: Details of prescription.**

| DETAILES OF PRESCRIPTION | NUMBER OF PATIENTS |
|---|---|
| MALE | 54 |
| FEMALE | 46 |
| PRESCRIPTION ANALYSED | 100 |
| TOTAL NUMBER OF DRUG PRESCRIBED | 209 |

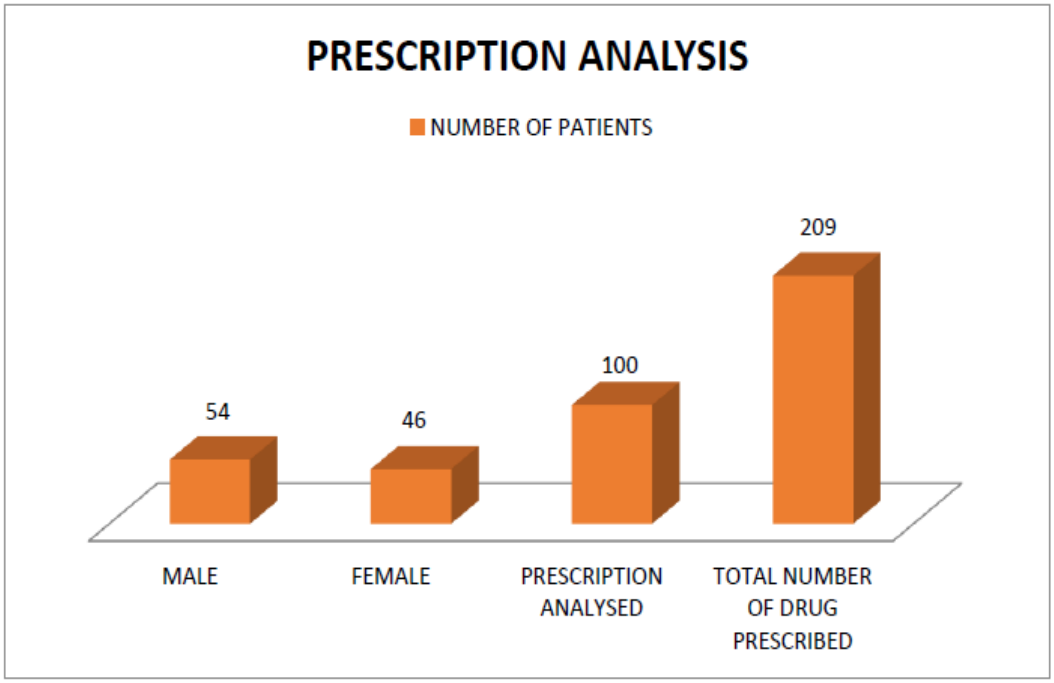


**Figure 6: Details of prescription.**

All patients were divided into 4 groups based on details of prescription. The total number of drugs prescribed was 209.

**OBSERVED DRUG UTILIZATION IN CKD WITH DIABETIC PATIENTS**

Out of 100 patients enrolled in the study based on study criteria, 59 CKD patients were found to be suffering from Diabetes mellitus. Along with DM the other comorbidities also seen that are categorised as follows,

**Table 7: Distribution of patients based on disease admitted in MIMS hospital.**

| DISEASE CATEGORIZATION | NUMBER OF PATIENTS | PERCENTAGE |
|---|---|---|
| DM | 3 | 5% |
| DM+HTN | 23 | 39% |
| DM+HTN+ANEMIA | 7 | 11.8% |
| DM+HYPERKALEMIA | 7 | 11.8% |
| DM+IHD | 6 | 10.16% |
| DM+OTHERS | 13 | 22% |

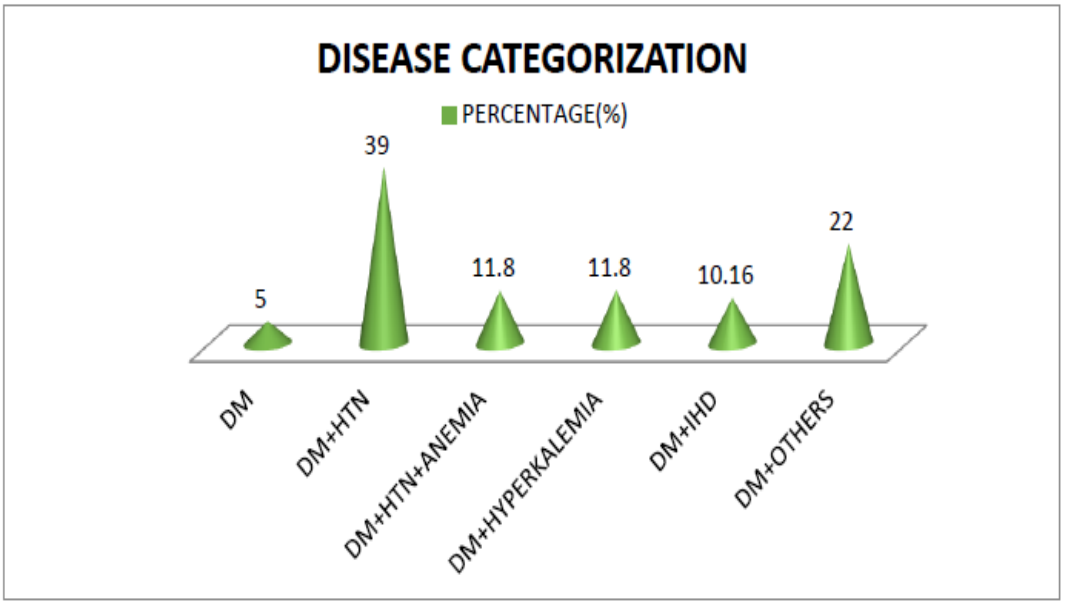


**Figure 7: Distribution of patients based on disease admitted in MIMS hospital.**

The prescription data of 100 patients were analysed in the current study, out of which 59(59%) patients were found to be having DM and DM with other comorbidities. Out of 59 patients 3(5%) were DM, 23(39%) were DM+HTN, 7(12%) were DM+HTN+ANEMIA, 7(12%) were DM+HYPERKALEMIA, 6(10%) were DM+IHD, 13(22%) were DM+OTHERS.

**PRESCRIPTION PATTERN OF DRUGS IN DIABETIC PATIENTS**

Totally 209 drugs were prescribed in this study, out of which 116 drugs were prescribed for DM and DM with other co-morbidities. Diabetic drugs used in the study population were identified and categorized. It was found that OHA was the most commonly prescribed drug and followed by insulin.

**Table 8: Drug utilization pattern in diabetic patients admitted in MIMS hospital.**

| DRUG UTILIZATION PATTERN IN DIABETIC PATIENT | | |
|---|---|---|
| **DRUG CATEGORIZATION** | **NO. OF DRUGS** | **PERCENTAGE** |
| OHA | 3 | 60% |
| INSULIN | 2 | 40% |

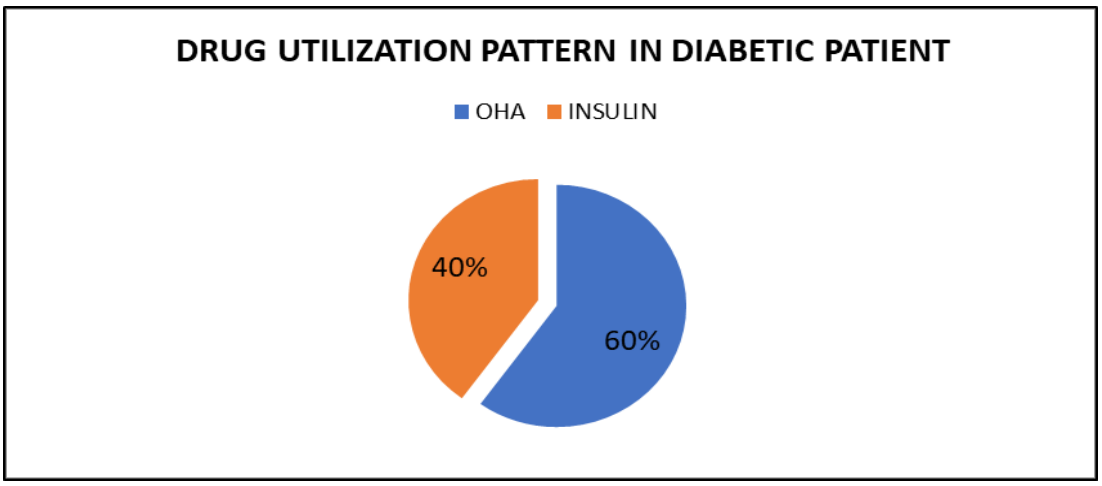


**Figure 8: Drug utilization pattern in diabetic patients admitted in MIMS hospital.**

**PRESCRIPTION PATTERN OF DRUGS USED IN DIABETIC MELLITUS AND HYPERTENSION PATIENTS**

Antidiabetic and Antihypertensive drugs used in the study population were identified and categorized. It was found that calcium channel blockers 21.27%, Diuretics 17.02%, ACE- inhibitors 7.44%, Beta-blockers 7.44%, Angiotensin receptor blocker 5.3%, OHA 10.63%, Insulin 19.14%, and others 11.7%. Most commonly prescribed drug in hypertensive patients was CCB and diabetic patients was Insulin.

**Table 9: Drug utilization pattern in Diabetes and hypertension patients admitted in MIMS hospital.**

| DRUG UTILIZATION PATTERN IN DIABETIC AND HYPERTENSION PATIENTS | | |
|---|---|---|
| **DRUG CATEGORIZATION** | **NO. OF DRUGS** | **PERCENTAGE** |
| CCB | 20 | 21.27% |
| ACE-INHIBITORS | 7 | 7.44% |
| DIURETICS | 16 | 17.02% |
| BETA-BLOCKERS | 7 | 7.44% |
| ANGIOTENSIN RECEPTOR BLOCKER | 5 | 5.3% |
| OHA | 10 | 10.63% |
| INSULIN | 18 | 19.14% |
| OTHERS | 11 | 11.7% |

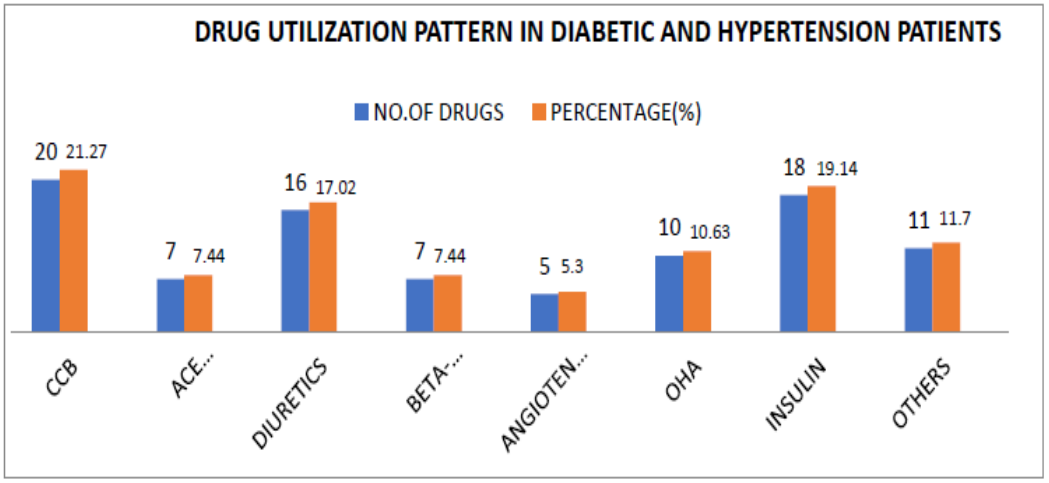


**Figure 9: Drug utilization pattern in diabetic and hypertension patients admitted in MIMS hospital.**

**PRESCRIPTION PATTERN OF DRUGS IN DIABETES, HYPERTENSION, AND ANAEMIC PATIENTS**

Antidiabetic, antihypertensive and anti-anaemic drugs used in the study population were identified and categorised. It was found that calcium channel blockers 18.07%, Diuretics 12.04%, Angiotensin receptor antagonist 2.4%, Beta blockers 3.6%, Sulfonyl urea 2.4%, Insulin 9.63%, Erythropoietin 12.04%, Vitamin supplements 8.4%, NSAID's 9.63%, PPI 9.6% and others 12.04%. Most commonly prescribed drug in hypertensive patients was CCB, diabetic patients was Insulin and Anaemic patients was Erythropoietin.

**Table 10: Drug utilization pattern in Diabetic, HTN and anaemic patients admitted in MIMS hospital.**

| DRUG UTILIZATION PATTERN IN DIABETIC, HYPERTENSSION AND ANAEMIC PATIENTS | | |
|---|---|---|
| **DRUG CATEGORIZATION** | **NO. OF DRUGS** | **PERCENTAGE** |
| CCB | 15 | 18.07% |
| DIURETICS | 10 | 12.04% |
| ANGIOTENSIN RECEPTOR ANTAGONIST | 2 | 2.4% |
| BETA-BLOCKER | 3 | 3.6% |
| SULFONYL UREA | 2 | 2.4% |
| INSULIN | 8 | 9.63% |
| ERYTHROPOIETIN | 10 | 12.04% |
| VITAMIN SUPPLIMENTS | 7 | 8.4% |
| NSAID's | 8 | 9.63% |
| PPI | 8 | 9.63% |
| OTHERS | 10 | 12.04% |

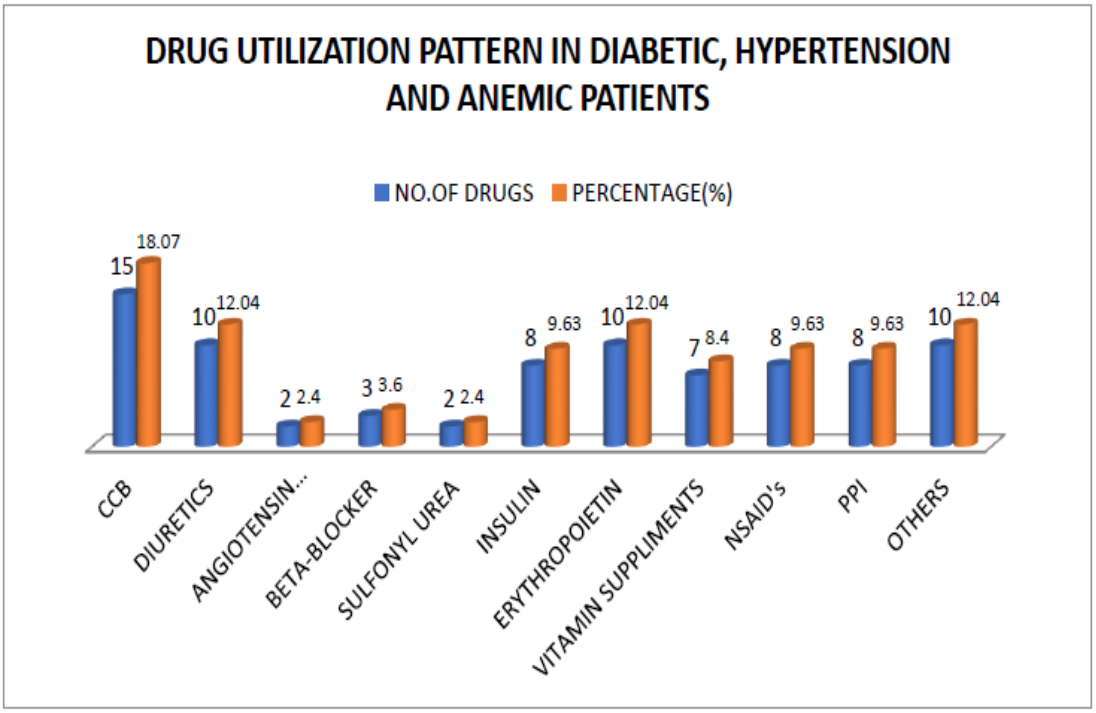


**Figure 10: Drug utilization pattern in Diabetic, HTN and anaemic patients admitted in MIMS hospital.**

**PRESCRIPTION PATTERN OF DRUGS IN DIABETES AND HYPERKALEMIC PATIENTS**

Antidiabetic and anti-hyperkaliaemic drugs used in the study population were identified and categorized. It was found that OHA, Insulin, calcium and its supplements, and glucose. Most commonly prescribed drug in Diabetic patients was Insulin and hyperkaliaemic patients was calcium.

**Table 11: Drug utilization pattern in Diabetes and hyperkaliaemic patients admitted in MIMS hospital.**

| DRUG UTILIZATION PATTERN IN DIABETES AND HYPERKALEMIC PATIENTS | | |
|---|---|---|
| **DRUG CATEGORIZATION** | **NO. OF DRUGS** | **PERCENTAGE** |
| OHA | 4 | 14.2% |
| INSULIN | 9 | 32.1% |
| CALCIUM AND ITS SUPPLIMENTS | 8 | 28.5% |
| GLUCOSE | 7 | 25% |

**DISTRIBUTION OF OTHER DRUGS**

Rather than antihypertensive and antidiabetic drugs, some drugs like H2-receptor antagonist 13.2%, Bronchodilators 14.5%, Electrolytes 21.7%, antibiotics 30.12%, Analgesics 12%, and others 8.4% were used.

**Table 12: Other drugs prescribed to patients admitted in MIMS hospital.**

| DRUGS | NO. OF PATIENTS | PERCENTAGE |
|---|---|---|
| H2-RECEPTORS ANTAGONIST | 11 | 13.2% |
| BRONCHODILATORS | 12 | 14.5% |
| ELECTROLYTES | 18 | 21.7% |
| ANTIBIOTICS | 25 | 30.12% |
| ANALGESICS | 10 | 12% |
| OTHERS | 7 | 8.4% |

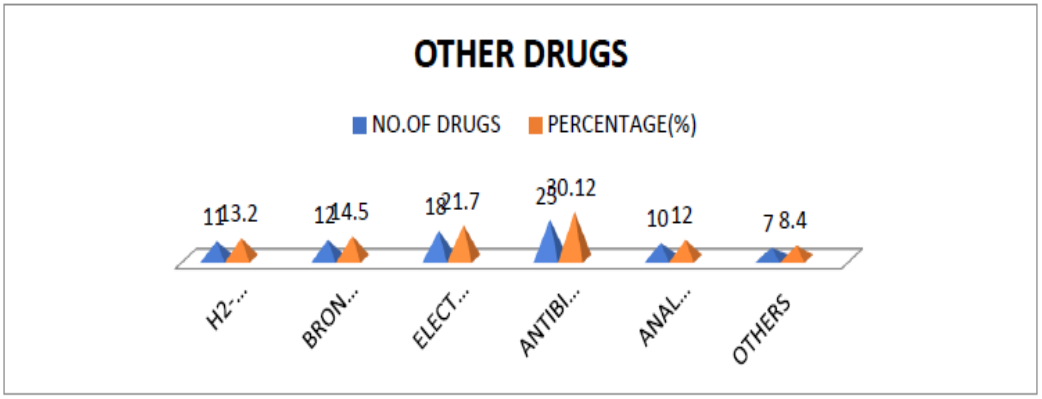


**Figure 11: Other drugs prescribed to patients admitted in MIMS hospital.**

**OBSERVED DRUG UTILIZATION IN CKD WITH NON-DIABETIC PATIENTS**

Out of 100 patients enrolled in the study based on study criteria, 41 CKD patients were found to be not having diabetes mellitus.

Except DM the CKD patients also having other comorbidities. That are categorised as follows,

**Table 13: Distribution of patients based on disease admitted in MIMS hospital.**

| DISEASE CATEGORIZATION | NUMBER OF PATIENTS | PERCENTAGE |
|---|---|---|
| HTN | 21 | 51.2% |
| HTN+ANEMIA | 8 | 19.5% |
| HTN+IHD | 7 | 17% |
| HTN+OTHERS | 5 | 12.1% |

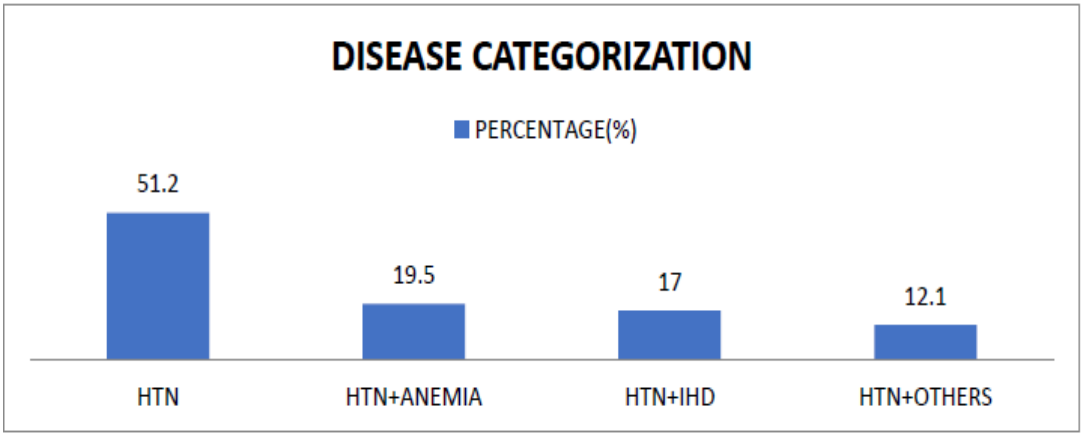


**Figure 12: Distribution of patients based on disease admitted in MIMS hospital.**

The prescription data of 100 patients were analysed in the current study, out of which 41(41%) patients were found to be not having DM but having other comorbidities. Out of 41 patients 21(51.2%) were HTN, 8(19.5%) were HTN+ANEMIA, 7(17%) were HTN+IHD and 5(12.2%) were HTN+OTHERS.

**PERCENTAGE OF DIFFERENT DRUGS USED IN CKD PATIENTS**

The most commonly prescribed drugs were calcium channel blockers 31.1%, diuretics 9.5%, proton pump inhibitors 9.5%, beta blockers 4.3%, insulin 9.5%, OHA 7.1%, multivitamins 5.7%, haematopoietic agents 3.3%, lipid lowering agents 1.9% and others.

**Table 14: different drugs used in CKD patients.**

| DRUGS | NO. OF DRUGS | PERCENTAGE |
|---|---|---|
| CCB | 65 | 31.1% |
| DIURETICS | 20 | 9.5% |
| BETA BLOCKERS | 9 | 4.3% |
| ACE-INHIBITORS | 4 | 1.9% |
| ANGIOTENSIN RECEPTOR BLOCKERS | 2 | 1% |
| H2-RECEPTOR ANTAGONIST | 5 | 2.4% |
| PPI | 20 | 9.5% |
| OHA | 15 | 7.1% |
| INSULIN | 20 | 9.5% |
| NSAID's | 8 | 3.8% |
| CALCIUM AND IT's SUPLEMENTS | 3 | 1.4% |
| MULTIVITAMINS | 12 | 5.7% |
| HAEMATOPOEITIC AGENTS | 7 | 3.3% |
| LIPID LOWERING AGENTS | 4 | 1.9% |
| NITRATES | 2 | 1% |
| OTHERS | 13 | 6.2% |

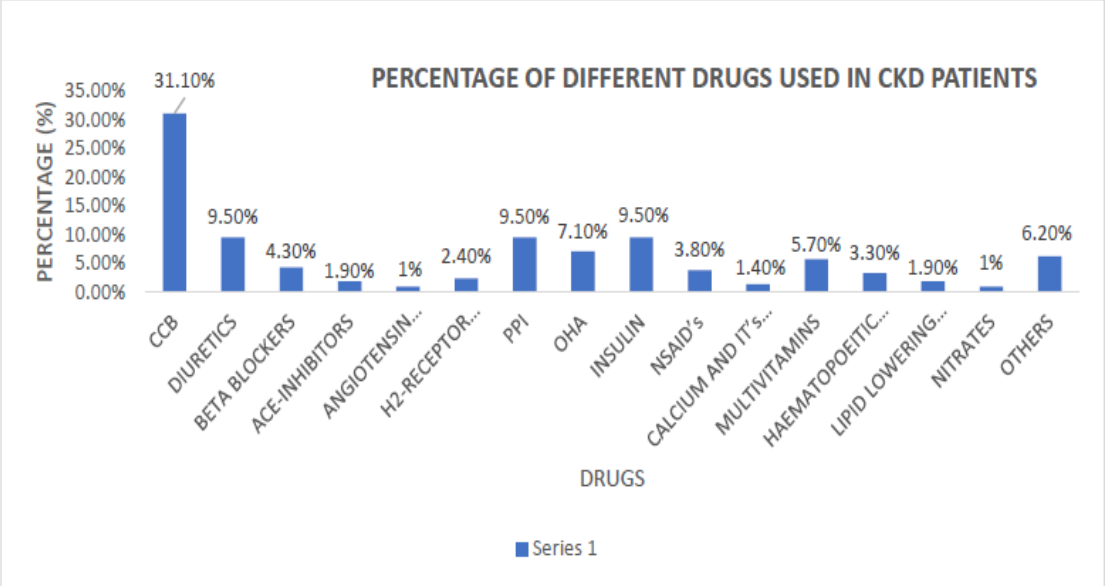


**Figure 13: Percentage of drug used in CKD patients admitted in MIMS hospital.**

## DISCUSSION

The study carried out was aimed to asses the drugs commonly prescribed for chronic kidney disease patients with diabetes mellitus and without diabetes mellitus. The study was based on gender, age, social history, drug utilization pattern and prescription analysis in CKD patients with DM and without DM.

In our study we found that the more susceptible gender of patients prone to CKD was Males (54%) compare to females (46%) which was similar to study conducted by DR. Zakia Hussain et al.,[4] and Sowmya santra et al.[5]

The greater prevalence of CKD in our study was found between the age group of 61-70yrs and 51-60yrs which was similar to this study conducted by Tushara C. et al.,[6] Alcoholism(42%) and smoking (30%) were the major social histories contributing to kidney failure in our study which was similar to findings reported by Ashika Ranjani et al.[7]

Based on the study conducted by Jo Anne Manski-Nankervis et al.,[8] more number of Male patients (52%) were found to have CKD with DM. The most common comorbidities associated with CKD in our study were Hypertension, DM, Anaemia and IHD which is similar to Monika K et al.[9]

The prescription data of 100 patients were analysed in the current study. Out of which Prescription of drugs for DM+others patients were OHA (12%), and insulin (15%), antihypertensive drugs (40%), lipid lowering agents (9%), haemopoitic agents (7.3%) and vitamins (10%) etc... The prescription of drugs for non-diabetic patients also same as diabetic with others except OHA and insulin.

## CONCLUSION

Prospective observational study was conducted by assess the drug utilization pattern for patients having a CKD with DM and without DM in a tertiary care teaching hospital (MIMS). In our study we observed that the incidence of chronic kidney diseases was more common in males when compare to females. Majority of the patients were from the age group of 61-70 years. The demographic data shows that the prevalence of CKD with DM was more in males than in females and half of the patients were alcoholics. The study shows that in the diabetes patients developing a CKD is more than the non-diabetic patients.

The required details were collected from the patient's case sheets were recorded in a suitably designed patient profile form. Out of 100 patients 59 patients were suffered from diabetic with others and 41 patients were hypertension with others except DM. The study shows that the prescription of drugs for the CKD patients having DM were OHA and insulin and the CKD patients having DM with others were CCB, diuretics, beta-blockers, ACE-inhibitors, angiotensin receptor blockers, H2-receptor antagonist, PPI, NSAID's, calcium and its supplements, multivitamins, haemopoietic agents, nitrates, lipid lowering agents and others.

The prescription of drugs was same for CKD patients were not having DM, except OHA and insulin. This study revealed that multi drug therapy was more preferred than mono therapy for both CKD with DM and without DM condition.

## REFERENCES


1. Journal of Kidney. Chronic Kidney Disease. https://www.longdom.org/scholarly/chronic-kidney-disease-journals-articles-ppts- list-3379.html
2. Allison J. Hahr and Mark E. Molitch. Management of diabetes mellitus in patients with chronic kidney disease. Clinical diabetes and Endocrinology, 2015; 1(2): 1-9.
3. https://www.ajkd.org/article/S0272-6386(19)30094-0/fulltex
4. 14. Bajait CS, Pimpalkhute SA, Sontakke SD, Jaiswal KM, and Dawri AV. Prescribing pattern of medicines in chronic Kidney disease with emphasis on Phosphate binders. Indian J Pharmacol, 2014; 46(1): 35-39.
5. Soumya Santra, Divya Agrawal, Sanjay Kumar and Sudhanshu Sekhar Mishra. A study on the Drug utilization pattern in patients with chronic kidney disease with Emphasis on Antibiotics. J. Nephrol. Androl, 2015; 2(3): 85-89.
6. Thushara. C, Sreeja. P, Radhakrishnan. Drug utilization pattern of anti-diabetic drugs among type 2 diabetes mellitus patients – A prospective study. IJAMSCR, 2017; 5(2): 663-669.
7. Ashika Ranjani. M, Sahithi Goud. B, Amatul Wadood Sumayya, Syeda Nabila Firdous, Amatul Ali Sameera. Drug utilization of antihypertensives in CKD patients: A Randomized prospective study at a tertiary care teaching hospital. Endocrinol Metab (Seoul), 2019; 7(3): 41-72.
8. Jo-Anne Manski-Nankervis, Sharmala Thuraisingam, Alicia Jenkins. Prescribing of Diabetes medications to people with type 2 diabetes and Chronic kidney disease: A National cross-sectional study. Diabetes care, 2019; 20(29): 1-11.
9. Monika K. A., K. S. Charitha, M. Ramana Reddy, K. Vaishnavi, Ramakrishna prudhivi and Jyothi. A study on Drug utilization review and potential Drug-Drug interaction in chronic kidney disease patients. Global Journals, 2018; 18(4): 1-10.