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An Observational Study on Effect of Medication Nonadherence In Chronic Kidney Disease Patients

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Abstract

Background: Medication nonadherence in Chronic Kidney Disease (CKD) patients is associated with increased mortality and hospitalizations. Thus, adherence to medication therapy is a key component of the effective management of patients with CKD.

Objectives: To study the effect and factors of medication non adherence and complications of non adherence to medication and dialysis schedule in CKD patients.

Methodology: A Prospective observational study was conducted in 274 patients. Pertinent information was collected by using morisky 8 questionnaires and categorized as high, medium and low nonadherence for treatment in CKD patients.

Results: Of 274 cases non adherence was observed in 57 % and adherence was found in 43 %. Highest non adherence was observed in 57.2 % and medium and low non adherence was observed in 23.7 % and 18.9 % respectively. Most frequently observed risk factor for CKD were found to be diabetes and hypertension. Patients with other co morbid conditions were found to be non adherent to treatment due to increased pill burden. The frequent complication of CKD were anemia and metabolic acidosis, mostly seen in non adherent patients. The common factors for non adherence were found to be high cost of medication (42.6 %) followed by complexity of medications (35.3 %).

Conclusion: Polypharmacy is unavoidable in CKD patients due to co morbidities and complications. Improving adherence in renal failure patients may help in improving the patients conditions and decrease the complications. This can be achieved by focusing on the factors driving to nonadherence. Also availability of clinical pharmacy services such as patient education and creating awareness about the health conditions will help to reduce nonadherence.

Keywords: CKD, medication adherence, Polypharmacy.

1. Introduction

Chronic renal failure is a progressive loss of kidney functions due toprogressive damage of kidney tissue. In chronic renal failure, there is a persistent and irreversible reductionin the overall renal function. Etiology such as Diabetes mellitus, hypertension, autoimmune diseases, polycystic kidneydisease, urinary tract infections, urinary stones, lower urinary tract obstructions, systemic infections and drug toxicity are all considered as initiation factors. Symptoms are generally absent in CKD stages 1 and 2. General symptoms associated with stages 1 to 4 include edema, changes in urine output, “foaming” of urine,

shortness of breath, palpitations, cramping and muscle pain, depression, anxiety, fatigue, and sexual dysfunction.[1][2]

Complications of CKD includes cardiovascular diseases, anemia, edema, hyperkalemia, metabolic acidosis, renal osteodystrophy, muscle cramps, sepsis, uremia. In advance kidney damage, kidneys lose their functions such as production of erythropoietin, resulting in anemia. It also interrupts electrolyte balance leading to fluid overload. Kidneys cannot eliminate nitrogenous waste products effectively causing uremia.[3]

Medication nonadherence can be intentional or unintentional. Intentional nonadherence is occurred when patients chose to ignore treatment recommendations by delaying, altering or missing the dosage of prescribed medicine. Reasons for non adherence were found to be high cost, complex dosing schedule, fear of adverse effects, forgetfulness, difficulty to take large number of medications, and personal characteristics which includes cognitive impairment, depression.[4][5]

Contributing factors to nonadherence includes [6]

i. Patient related factors: Age, gender, level of education, health beliefs, interpersonal communication.
ii. Socioeconomic status: Income status, employment status, social support of families, peer support.
iii. Psychological factors: Depression, stress, irrational thoughts, perceived physical health, disturbance in self-concept.
iv. Health care related factors: Availability of dialysis centres, accessibility of dialysis centres, economic resources.
v. Therapy related factors: Muscle cramps, intra dialytic hypotension, physical fatigue.
vi. Disease related factor: Gastrointestinal problems, uraemia.

2. Methodology

2.1 Research Approach: This study used a quantitative approach to study the effect and factors of medication non adherence and complications of non adherence to medication and dialysis schedule in chronic kidney disease patients

2.2 Study design: An observational study was conducted at In-patient and out-patient department in a private hospital to assess risk factors, medication adherence and complications in CKD patients.

2.3 Study site: The present study was conducted in the nephrology department of SVR hospital.

2.4 Study duration: This study was conducted for six months.

2.5 Sample size: A total of 274 patients from surrounding regions of warangal were included in the study and the patient's relevant information with regard to our study was collected. Inclusion and exclusion criteria were considered in this study

2.6 Study criteria: Patients who were admitted in In-patient department with renal disease, patients with all co-morbid conditions and past medical history, patients with complete biochemical parameters data available were considered. Source of dataare prescriptions, case records, and investigational reports and patient interviews.Demographics of patients, laboratory values which includes complete blood picture, renal function tests, serum electrolytes and results of radiology techniques, treatment given for multiple medical conditions. Data collection is only used for the academics and the details of the patients collected are maintained confidential.

2.7 Participants: About 274 patients were included in the study, Patients were admitted in the hospital with very common symptoms like pain in the lower abdomen region, pain towards kidney region, dysuria, lower back ache,

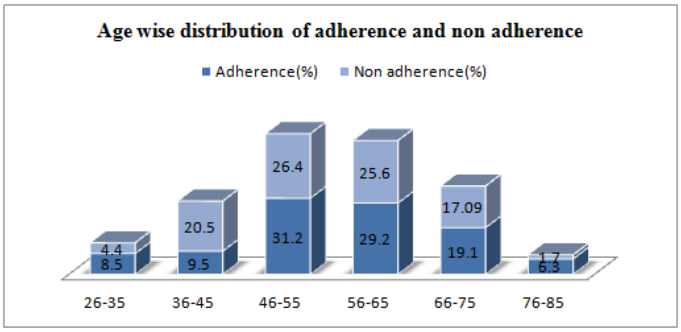
burning micturition, shortness of breath, decreased urine output, nausea, anorexia and pedal edema. The most frequently observed conditions in the nephrology department were: CKD with diabetes, hypertension, CKD on maintenance Haemodialysis. The patients were asked a set of questions regarding their health condition.

2.8 Study procedure: The study was approved by institutional ethical committee and data was collected from the patients with informed consent. Data was collected from inpatient and outpatient case sheets, laboratory results and by taking medication history interview regarding past medications, current medications and other alternative systems of medicine.Further checking of the medication adherence in patients was done by using Morisky 8 Questionnaire and pill count methods.

3. Results

3.1 Age and Gender: In this study 274 CKD patients were included in the study of which 180 patients were on medication and 94 were on medications and dialysis. Renal failure was seen more in males(61.6 %) compared to females (39.4 %) and highest prevalence of non adherence was observed in the age groups 46-55 years (31.2 %) followed by 56-65 years (29.2 %) (Figure 1)

Figure 1: Age wise distribution of adherence and non adherence



3.2 Medication adherence: Of 274 patients non adherence was observed in 57 % of the patients and adherence was found in 43 % of the patients. Among patients undergoing dialysis 54 % were non adherent to dialysis and 46 % were adherent to dialysis. In patients taking only medication, non adherence was found in 49.5 % patients and adherence was found in 50.5 % (Table 1)

Table 1: Overall treatment adherence and non adherence

Treatment	Number of patients =274	%
Non Adherence	157	57
Adherence	117	43
Dialysis	**No. of patients =94**	**%**
Non adherence	51	54
Adherence	43	46
Medication	**No. of patients 180**	**%**
Non adherence	89	49.5
Adherence	91	50.5

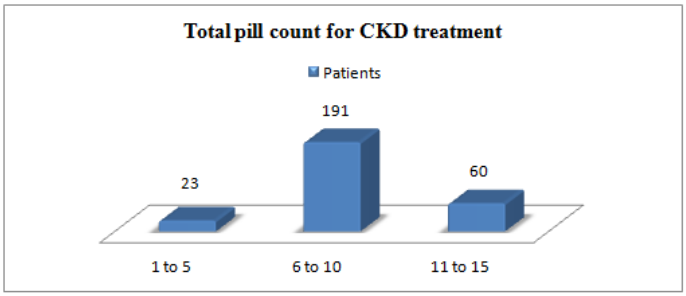
3.3 Risk factors and complications: In this study the most frequently observed risk factors for CKD were found to be diabetes with hypertension (42.3 %), diabetes alone (28.1 %) and hypertension (16.7 %). Patients with multiple co-morbid conditions has less compliance. In the CKD patients observed the frequent complications such as anemia and metabolic acidosis were observed. Complications were more in patients who were non adherent to the treatment.

3.4 Adherence scores and pill count: Of 274 patients highest non adherence was seen in 57.2 % of the patients and medium and low non adherence was seen in 23.7 % and 18.9 % respectively (Table 2). Among the observed patients 8 % for 1-5 medications, 70 % and 22 % for 6-10 and 11-15 medications respectively (Figure2).

Table 2: Level of medication adherence and pill count

Scale Score	Non Adherence	Patients	%
>2	High non adherence	102	37.2
1-2	Medium non adherence	55	20.07
0	Low non adherence	117	42.7

Figure 2: Total pill count for CKD treatment



3.5 Factors for non adherence: Of the several factors for non adherence, high cost of medication (25 %) followed by complexity of medications (21 %) are more observed and the less observed factor is fear of adverse effects (1 %) **(**Table 3**).**

Table 3: Factors for non adherence

Factors for non adherence	%
High cost of medications	25
Complexity of medications	21
Difficulty in taking large number of medications	18
Forgetfulness	16
Irregular follow up	14
Personal characteristics	5
Fear of adverse effects	1

4. Discussion

4.1 Age and gender: It is observed that the number of male CKD patients were more than female, as found in other studies, male are more susceptible to CKD due to greater prevalence of smoking and drinking compared to women.[7] Most of the patients were in the age group of 46-75 years, whereas in other studies shown 50-85 years age group of patients were mostly observed.[8] A possible explanation is decreased functioning of the organs and high risk of complications with advancing age. Among non adherence patients, most of the patients were in the age group of 45-85 years and the main factors for non adherence in this group are forgetfulness, difficulty in taking large number of pills, lack of awareness of disease and medications.

4.2 Level of non adherence: It is observed that of 274 patients, 117 patients were highly adherent to treatment and 157 patients were non adherent to treatment. Patients lack of knowledge about disease, high cost of medications, complexity of medications, difficulty in taking large number of medications, forgetfulness are the main reasons for non adherence.

4.3 Non adherence in dialysis: As similar to studies conducted by Abdul malik *et al*[9] and Saurav Ghimre *et al* 2017,[10] in present study we found out of 274 patients, 94 patients were undergoing dialysis and among them 51 patients were non adherent to hemodialysis. This is probably because of dialysis is painful and requires hospitalization, frequent dialysis schedules depending on the severity of the condition. Factors for nonadherence to hemodialysis are high cost, hospitalization, feeling discomfort, frequency of dialysis sessions and travel.

4.4 Co morbidities in CKD: Earlier studies conducted by C.S Manju *et al,* [11] and Dena K. Rifkin *et al,* [12] stated that HTN and DM are the major risk factors for CKD. Accordingly in our study, we identified that 42.3 % had hypertension and diabetes, 28 % had only Hypertension and 17 % had only diabetes. Other co morbidities observed are Autosomal dominant polycystic kidney disease (ADPKD) and cardiovascular problems. As there is increase in co morbidities in CKD, it will result in increased pill count and complex dosage regimen which results in treatment non adherence in CKD.

4.5 Complications: According to Belayneh Kefale *et al,* [13] CKD has complications like anemia, edema, hyperkalemia and cardiovascular diseases. In this study, we observed that 119 patients had complications like anemia, metabolic acidosis, fluid overload, uremia and sepsis. Among them, 85 patients were non adherent to treatment, indicating that complications were high in non adherent patients compared

to adherent patients. Treatment for anemia as it contains weekly thrice iron infusion in its treatment schedule in CKD patients, the main complication of CKD is anemia. About 66 of 119 patients were diagnosed with anemia and are prescribed with iron infusions and erythropoietin stimulating agents (ESA), which are given twice or thrice in a week.

4.6 Factors for non adherence: As per the studies, (Smitha Sontakke *et a l*[7] and Belayneh Kefale *et al*, [13]), reasons for non adherence were found to be high cost, complex dosing schedule, fear of adverse effects, forgetfulness, difficulty to take large number of medications, and personal characteristics which includes cognitive impairment, depression.

Likewise in our study, the main reasons for non adherence were observed to be high cost, complexity of dosing schedules, difficulty in taking large number of medications and forgetfulness. The other factor we identified was irregular follow up of the treatment due to lack of money, negligence and complexity of dosing schedule in case of patients on dialysis. Due to complex dosage regimen patients may skip the doses due to large pill count and some patients intentionally may skip doses. Intentional non compliances were observed due to fear of adverse effect and negligence and also they may stop taking medications when they feel better without consulting the physician, where as unintentional noncompliance is seen in forgetfulness. Cost of these medications such as iron infusions and erythropoietin stimulating agents are too high and this complex dosing schedule results in non adherence.

4.7 Total pill count: A study conducted by Belayneh Kefale *et al*, [13] stated that, as the number of prescribed drugs increased from <5 medications to ≥5 medications patients with ≥ 5 medications were found to be less likely to adhere. Another study by Sauraw Ghimre *et al*, [10] stated that daily pill burden is one of the cause for non adherence. Non adherence is found when pill burden per day is >11, followed by 6-10 and 1-5 medications per day respectively. In our study we found that patients who were on 6-10 medications per day were lessadherent when compared to patients on 1-5 medications per day.

5. Conclusion

This study assessed overall treatment adherence and associated factors in CKD patients. DM with HTN, DM and HTN were found to be major risk factors for CKD and were prescribed with 6-15 medications. Non adherence was found to be 57 % in the present study. Among which 54 % are non adherent to both dialysis and medication and 49.5 % patients are non adherent to only medication. Non adherence was mostly found in male in the age group of 45-75 years. Factors for non adherence were found to be high cost, complexity of medications, difficulty in taking large number of medications, forgetfulness, irregular follow-up, personal characteristics and fear of adverse effects. Polypharmacy is unavoidable in CKD patients due to co morbidities and complications. Improving adherence in CKD patients may help in improving the patients conditions and decrease the complications. This can be achieved by focusing on the factors driving to nonadherence. Also availability of clinical pharmacy services such as patient education and creating awareness about the health conditions will help to reduce nonadherence.

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