



IMPACT OF PATIENT EDUCATION ON MEDICATION ADHERENCE AND THE FACTORS RELATED TO MEDICATION NON-ADHERENCE AMONG HEMODILAYSIS PATIENTS

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ABSTRACT

Aim: To evaluate the impact of patient education on medication adherence and to identify the factors related to medication non-adherence among hemodialysis patients. **Materials and methods:** A six-month study was conducted in a Tertiary Care Hospital, Kerala, India examined the adverse effects of haemodialysis in 54 patients with chronic kidney disease (CKD). The medication adherence was assessed by Morisky- 8 medication adherence scale (MMAS-8). Demographic details and other details such as patient centered factors, therapy related factors, social and economic factors that affect medication adherence were collected. **Result:** Before patient counselling most of the patients (96.29%) might be struggling with medication adherence. After patient counselling there was an improvement in medication adherence among the patients when compared to the baseline scores, with more patients moving to moderate and high adherence categories. Cost of the medication, side effects of medications, medication belief etc. that affect medication non-adherence among hemodialysis patients were identified. **Conclusion:** Medication adherence, evaluated using the Morisky medication adherence scale -8, improved significantly over time following patient education. This suggests that patient education plays a crucial role in improving medication adherence, which is vital for the effective management of the condition. **Clinical significance:** The QoL for hemodialysis patients is closely linked to their self-efficacy and adherence to therapy. A higher quality of life can lead to better health outcomes, including improved laboratory values, emotional functioning, and reduced rates of hospitalization and mortality.

KEYWORDS: CKD, Hemodialysis, Medication adherence, MMAS-8 scale, Patient education.

INTRODUCTION

Adherence is defined by the World Health Organization as "the degree to which the patient follows medical instructions."^[1] Medication adherence is defined as the extent of patients taking medications as prescribed by doctors. It is the major factor that determines the therapeutic outcomes in the patient. Nonadherence is quite a common problem in most of the patients which is dangerous and can increase treatment expenses. Medication non-adherence includes the following behavior's, per a joint Adult Medication document from The American Society on Aging and the American Society of Consultant Pharmacists Foundation: purposefully or unintentionally failing to fill or refill a prescription; missing one or more doses; taking more medication than prescribed; stopping medication; taking a dose at the wrong time; taking medication of others;

taking a dose in conjunction with the incorrect foods and medications; taking expired and/or damaged medications; taking improperly stored medications; and, finally, using medicated devices, such as inhalers.^[2]

Poor medication adherence to prescribed medications and other aspects of the treatment regimen can generally have a negative impact on the course of treatment for many chronic conditions. This can result in needless or additional tests, dosage adjustments, treatment plan modifications, visits to the emergency room, or hospitalization, all of which raise the overall cost of medical care. Most people are ignorant of their own medical conditions and the use of their drugs. Medication non-adherence in renal patients is caused by ignorance of the risks associated with renal failure and the significance of medication adherence. To enhance the

quality of life and lower the death rate of patients with chronic kidney disease (CKD), health care providers must inform patients on the severity of their condition, the use and significance of their prescribed medications, the benefits of hemodialysis, and dietary restrictions. Low socioeconomic status may also contribute to non-adherence.^[3]

Although dialysis can save lives, it can only effectively replace around 10% of the body's natural renal function. In addition to numerous food restrictions, the typical dialysis patient takes six to ten medications per day. Patients are severely burdened by these intricate treatment plans, and they are typically dependent on medical professionals for many elements of their care. For hemodialysis patients to receive appropriate care, medication adherence is essential. Consistently adhering to prescribed pharmaceutical regimens might be difficult because of things like complicated medication schedules, a high pill burden, adverse effects, and coexisting conditions. Educating patients, condensing prescription schedules, involving family members or carers, using reminder systems, and removing obstacles like cost and transportation are some ways to increase adherence. To improve patient outcomes and quality of life, healthcare providers are essential in helping patients stick to their prescription schedules.^[4]

FACTORS AFFECTING MEDICATION NON-ADHERENCE

Mediation non-adherence in chronic patients, including those receiving HD, has been linked to several variables.^[5] The patient-centered, therapy-related, social and economic, health-care system, and disease-related categories were used to group these variables.

Patient-centered factors encompass demographic variables such as age, ethnicity, gender, education, and marital status; psychosocial variables such as beliefs, motivation, and attitude; the relationship between the patient and prescriber; health literacy; patient knowledge; physical difficulties; tobacco or alcohol consumption; forgetfulness; and a history of good compliance.

Therapy-related characteristics include dosage form, complexity of treatment, length of treatment, adverse effects of medication, level of behavioral modification needed, medication taste, and storage needs. Lack of accessibility, lengthy waiting times, trouble filling prescriptions, and unpleasant clinic visits are some of the problems with the health care system. Social and economic aspects include social support, income and cost, and the inability to take time off from work. Lastly, the symptoms of the disease and severity are factors associated with the disease.^[6]

MATERIALS AND METHODS

Sampling size determination

Hemodialysis patient in nephrology department.

Sample size for a given mean is:

$$N = \frac{(Z_{1-\frac{\alpha}{2}})^2 \sigma^2}{E^2}$$

σ is the standard deviation and

E is the margin of error

Data from a previous study found a standard deviation of 18.0

Here = 18.0

z = 1.96 (95% confidence level)

E = 5

$$N = \frac{z^2 \sigma^2}{E^2} = \frac{1.96^2 \times 18.0^2}{5^2}$$

= 49.8

Anticipating loss to follow up and missing of data, the minimum sample size was rounded to be **60**.

A prospective study was conducted over a period of six months in dialysis OPD in a tertiary care hospital in Kerala, India after IRB approval. A total of 60 patients were in the haemodialysis department during the study period. Out of these, 54 patients who met the inclusion criteria were analysed. The inclusion criteria were the patients of dialysis OPD of 18 years or older and both the genders who were diagnosed with chronic kidney disease in nephrology department. The Patient who are not willing to participate in the study, pregnant women and children, the inpatients who were undergoing hemodialysis, critically ill patients were excluded from the study. Patients came to the OPD of a tertiary care hospital, SH medical Centre Kottayam over 6-month period (prospective) was identified from dialysis department. The medication adherence was assessed by Morisky- 8 medication adherence scale (MMAS-8). Demographic details and other details such as patient centered factors, therapy related factors, social and economic factors that affect medication adherence were collected.

RESULT AND DISCUSSION

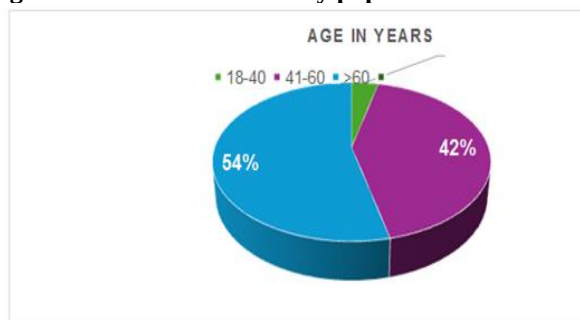
A total of 54 patients met with the inclusion criteria were included in the study.

Age wise distribution

N=54

Age in years	Frequency(n)	Percentage (%)
18-40	2	3.70
41-60	23	42.59
>60	29	53.70

Age wise distribution of study population

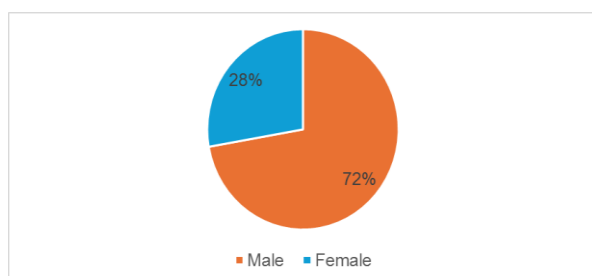


Inference: This chart shows the distribution of hemodialysis patients across these age brackets. It highlights the prevalence of hemodialysis in older age groups, with the highest percentage observed in the age >60 (53.70%). This is due to the age-related decline in kidney function, prevalence of chronic diseases and longevity.

Gender wise distribution

N=54

Sex	Frequency(n)	Percentage (%)
Male	39	72.2
Female	15	27.8



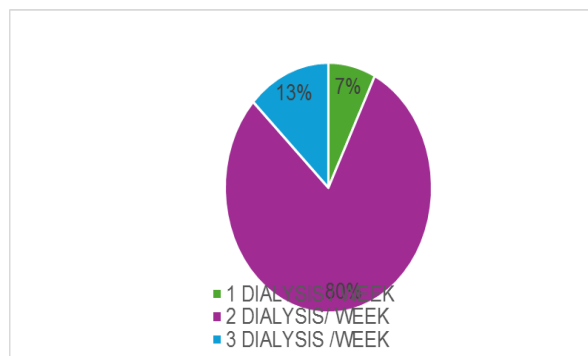
Gender wise distribution of the study population

Inference: The data highlights the prevalence of hemodialysis in older age groups, with a higher percentage observed in males (72.2%). Men may be at increased risk of reaching kidney failure sooner than women because of differences in hormone level. Higher testosterone levels in men may cause a loss in kidney function. On the other hand, men's kidneys may not be protected by estrogen, which is higher in women until menopause. Men may have unhealthier lifestyle thereby leading to a higher risk for kidney failure.

Frequency of hemodialysis / week

N = 54

Frequency / week	Number (n)	Percentage (%)
1 DIALYSIS / WEEK	4	7.40
2 DIALYSIS/ WEEK	43	79.62
3 DIALYSIS /WEEK	7	12.96



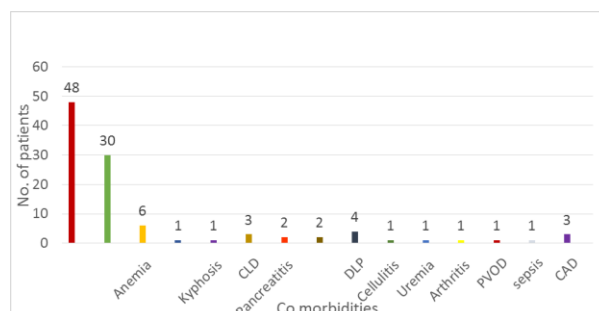
Frequency of hemodialysis/ week in the study population

Inference: Most patients (79.62%) undergo hemodialysis twice a week, while a smaller proportion receive it once or three times weekly. This data is essential for managing treatment schedules and optimizing patient care.

Comorbidities of patients

N=54

Comorbidities	Number of patients (n)	Percentage (%)
Hypertension	48	88.8
Diabetes	30	55.5
Anemia	6	11.11
Cardiomegaly	1	1.85
Kyphosis	1	1.85
CLD	3	5.55
Pancreatitis	2	3.70
Hypothyroidism	2	3.70
DLP	4	7.40
Cellulitis	1	1.85
Uremia	1	1.85
Arthritis	1	1.85
PVOD	1	1.85
Sepsis	1	1.85
CAD	3	5.55



Comorbidities of patients in the study population

Inference: In this study, 88.89% of patients had hypertension as a co-morbidity, likely due to damaged kidneys not filtering blood effectively, leading to fluid retention and increased blood pressure. Additionally, kidneys affected by CKD may produce more renin, a hormone that raises blood pressure. Diabetes affected 55.56% of patients, as high blood sugar levels can damage the blood vessels in the kidneys, affecting their

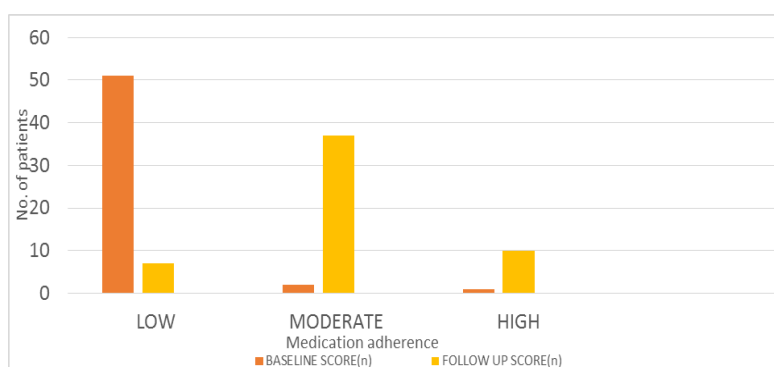
ability to filter waste, which can lead to CKD. Anemia was experienced by 11.11% of patients, as CKD can result in reduced production of erythropoietin (EPO), a hormone that stimulates the bone marrow to make red blood cells. Other conditions like cardiomegaly, kyphosis, chronic liver disease (CLD), pancreatitis,

hypothyroidism, and dyslipidemia (DLP) were present but in smaller numbers. Single cases of cellulitis, uremia, arthritis, peripheral vascular occlusive disease (PVOD), and sepsis were also reported. This highlights the complex and multifaceted health challenges faced by patients undergoing hemodialysis.

Assessment of medication adherence using morisky medication adherence scale 8 (before and after patient counselling)

N=54

Medication Adherence	Baseline score(n)	Percentage (%)	Follow-up score(n)	Percentage (%)
LOW	51	96.29	7	12.96
MODERATE	2	3.70	37	68.51
HIGH	1	1.85	10	18.51



Assessment of medication adherence using MMAS 8 scale before and after patient counselling in the study population

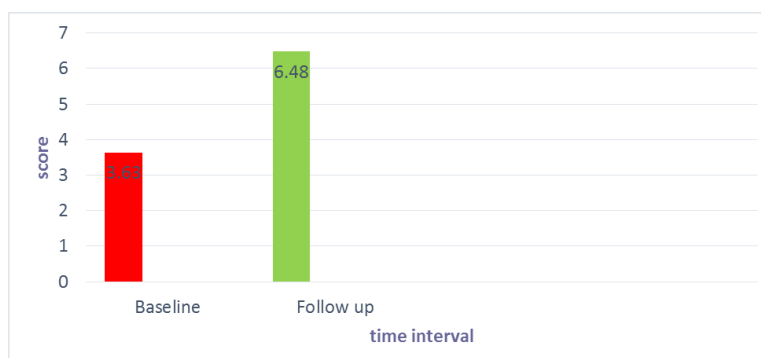
Inference: This data suggests that before patient counselling most of the patients (96.29%) might be struggling with medication adherence, which is a common challenge in chronic conditions like those requiring hemodialysis. After patient counselling there was an improvement in medication adherence among the

patients when compared to the baseline scores, with more patients moving to moderate and high adherence categories. It's important to continue supporting these patients to maintain or improve their adherence levels for better health outcomes.

Comparison of medication adherence score before and after pharmacist intervention among hemodialysis patients.

N=54

Time	Mean	Standard deviation	Mean difference	t value (Paired t test)	p value
Baseline	3.63	1.19	2.85	15.195	<0.001***
Follow up	6.48	0.95			



Comparison of medication adherence score before and after pharmacist intervention among hemodialysis patients in the study population

Inference: Initially, the mean score was 3.63, indicating a lower level of medication adherence among patients. However, after follow-up, the mean score significantly increased to 6.48, demonstrating an improvement in medication adherence over time.

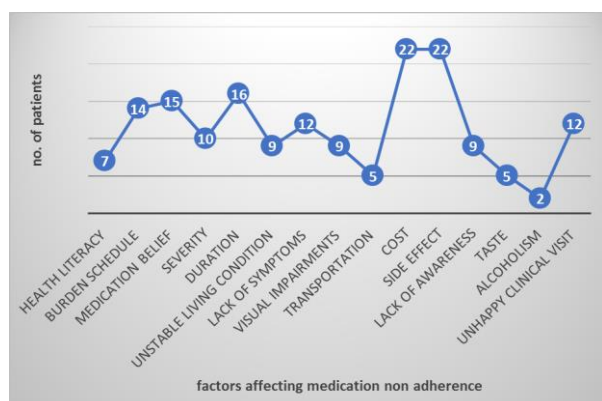
This improvement is a positive outcome for their treatment and overall health management. Patient

education about medications, awareness of side effects, proper administration, addressing misconceptions, and encouraging open communication between patients and healthcare providers contributed to this improvement. Understanding these contributing factors is crucial for healthcare providers to sustain and further enhance medication adherence.

Factors Related to Medication Non- Adherence

N=54.

Sl.No	Medication nonadherence	Frequency (n)	Percentage (%)
1	Health literacy	7	13.0
2	Burden schedule	14	25.9
3	Medication belief	15	27.8
4	Severity of disease	10	18.5
5	Duration of dialysis	16	29.6
6	Unstable living condition	9	16.7
7	Lack of symptoms	12	22.2
8	Visual impairments	9	16.7
9	Lack of Transportation facilities	5	9.3
10	Cost of medication	22	40.7
11	Side effect of medication	22	40.7
12	Lack of awareness	9	16.7
13	Taste of medication	5	9.3
14	Alcoholism	2	3.7
15	Unhappy clinical visit	12	22.2



Factors affecting medication nonadherence in the study population.

INFERENCE

The graph shows various factors that affect medication non-adherence among hemodialysis patients, with the frequency of each factor indicated. Cost & Side Effects: Both these factors have the highest frequency at 40.7% and were identified as the most common barriers to medication non- adherence. This implies that financial constraints and adverse drug reactions significantly impact patients' ability to consistently follow their medication regimen. Duration of dialysis: With a frequency of 16, this indicates that the length of time a patient has been dealing with their condition affects their adherence. Longer durations may lead to 'treatment fatigue' or a sense of hopelessness, affecting adherence. Other Factors: The graph also lists other factors like

Health Literacy, Burden Schedule, Medication Belief, Lack of Awareness, Taste, Alcoholism, and Unhappy Clinical Visit, though with lower frequencies, indicating they are less common but still noteworthy reasons for non-adherence. Statistically, the graph highlights the need for targeted interventions addressing cost and side effects to improve medication adherence among hemodialysis patients. Additionally, support for managing long-term treatment and overcoming logistical challenges could also be beneficial.

CONCLUSION

This study offers valuable insights into the multifaceted challenges faced by hemodialysis patients. The study population was predominantly male, with most patients being over 60 years old. Most patients underwent hemodialysis twice a week, and the duration of hemodialysis increased over the first three years, with a significant drop in the fourth year. The study highlighted the prevalence of comorbidities such as hypertension, diabetes, and anemia among these patients. It also sheds light on the common social habits of alcoholism and smoking among this population. Medication adherence, evaluated using the Morisky medication adherence scale -8, improved significantly over time following patient education. This suggests that patient education plays a crucial role in improving medication adherence, which is vital for the effective management of the condition. Cost of the medication, side effects, burden schedules, medication belief were the most common factors for medication nonadherence.

LIMITATIONS

The current study was conducted over a limited period of 6 months. When answering a questionnaire respondents may misinterpret the meaning of questions, leading to answers that don't accurately reflect their thoughts or experiences. Some individuals may choose not to respond to the questionnaires, leading to lower response rates. This can impact the representativeness of the data.

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CONFLICT OF INTEREST

The authors declare no conflict of interest in conducting this study, the design, data collection, analysis, interpretation, reporting its findings or publication of this research.

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