

# Treatment Adherence Among Patients Undergoing Hemodialysis In Teaching Hospitals, Nepal

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## Abstract

**Background:** Chronic Kidney Disease (CKD) Is An Important Public Health Problem With High Prevalence, Morbidity, And Mortality. The Increasing Number Of Patients In Advanced CKD Stage V (End Stage Renal Disease), Necessitates Management On Dialysis For Better Outcomes, Thus Making Adherence To Prescribed Treatment Essential. For Many Patients With ESRD, Non-Adherence To The Prescribed Diet, Fluid, Drug, And Non- Adherence To The Treatment Regimen Can Lead To Adverse Outcome. This Study Aims To Assess The Treatment Adherence Among Chronic Kidney Disease Patients Undergoing Hemodialysis.

**Materials And Methods:** A Descriptive Cross-Sectional Study Was Conducted In Two Teaching Hospitals Of Chitwan, Nepal Among 140 Patients Undergoing Hemodialysis During The Study Period Of Five Months From 1<sup>st</sup> September 2021 -30<sup>th</sup> January, 2022 Via Enumerative Sampling Technique. Face To Face Interview Schedule Was Used To Collect Data. Data Were Analyzed Using Statistical Package For Social Sciences Version 20.0.

**Results:** Out Of Total 140 Respondents Undergoing Maintenance Hemodialysis, Majority Of The Respondents (68.6%) Were Of Age Group 31-60 Years. More Than Half Of The Respondent (51.4%) Were Female. Majority (66.4%) Of The Respondents Had One Or More Co-Morbid Illness. Among Them, 91.4% Were Hypertensive, 7.5% Were Diabetics And 5.4% Were Hypertensive And Diabetics Both. Nearly Half Of The Respondents (41.4%) Were Undergoing Hemodialysis For More Than 3 Years. Out Of 140 Respondents, 50.7% Of The Respondents Had Good Adherence, 43.6% Had Moderate Adherence And 5.7% Of Them Had Poor Adherence To Treatment Regimen. Level Of Adherence Was Found To Be Significantly Associated With Types Of Family ( $P=0.036$ ) And Educational Status Of The Respondents ( $P= 0.046$ ).

**Conclusion:** Significant Numbers Of Respondents Had Good And Moderate Level Of Adherence. Very Few Of Them Had Poor Adherence Level. Poor Adherence To Hemodialysis Regimen Can Be A Major Threat Towards Achieving Better Patient Outcomes. Therefore Education And Counseling To The Patients Are Important Which In Turn Can Affect Patients' Adherence To Treatment Regimen.

**Keywords:** Hemodialysis, Patients, Treatment Adherence

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## I. INTRODUCTION

Chronic Kidney Disease (CKD) is a global health problem, with escalating prevalence, incidence, economic burden, and unsatisfactory outcomes. Glomerular filtration rate (GFR), when falls below 15ml/min/1.73m<sup>2</sup> denotes the fifth stage of CKD and is often called an end-stage renal disease (ESRD)<sup>1</sup>. ESRD necessitates the need for Renal Replacement Therapy (RRT), majorly in three forms namely hemodialysis, Peritoneal Dialysis and kidney transplantation<sup>2</sup>.

The prevalence of End Stage Renal Diseases (ESRD) is increasing at an alarming rate with more than 2 million suffering from the disease worldwide and more than 1.4 million receiving Renal Replacement Therapy<sup>2</sup>. A study revealed an annual incident growth rate of 8% for ESRD and this is expected to be higher in low and middle-income countries. The situation is being fuelled by increasing comorbid of diabetes mellitus, hypertension and HIV /AIDS both occurring in developing and developed nations<sup>3</sup>.

It is estimated that the number of new cases who need dialysis is about 100 – 150 per million populations per year in developing countries. The population of End Stage Renal Disease (ESRD) patients requiring dialysis in Asia is expanding at a rate higher than elsewhere in the world. In Nepal, the prevalence of CKD is 6.0%<sup>4</sup>.

In India, renal replacement therapy (RRT) is required for 200,000 new patients every year and < 10% of patients receives RRT. The patients should be committed to the treatment for their underlying disease. Many of these patients face challenges with regard to their treatment adherence<sup>5</sup>.

Patients undergoing hemodialysis are required to follow a scheduled medical treatment. Adherence to medication, regular attendance to hemodialysis, food and fluid management are the critical elements of the treatment, and mortality rate is increased among non-adherent patients. The patient has to visit the hospital weekly three times to receive hemodialysis for minimum 3 hours to 4 hours as a part of the treatment regimen<sup>6</sup>.

Patients who are on hemodialysis require about 10-12 regular medications including phosphate binders, vitamin preparations, calcium supplements, medications for hypertension, diabetes, and other comorbidities such as dyslipidemia, cardiovascular diseases, apart from the iron preparations and erythropoietin stimulating agents. This pill burden can lead to the multiplicity of the medication regimens and cost burden that can induce a high risk of adverse drug events, followed by non-adherence<sup>7</sup>.

Poor adherence to complex multimodal therapies is a widely recognized problem in the daily care of hemodialysis patients, which contribute to excess morbidity and mortality of this population<sup>8</sup>. This argument comes in the time where the incidence of chronic renal diseases is reported to be rising globally by about 6% annually, and the incidence of dialysis patients is increasing by around 7% worldwide<sup>9</sup>.

Skipping treatment and poor dietary adherence are strongly associated with greater risk for mortalities among dialysis patients in general and end-stage renal disease (ESRD) in specific; as patients with ESRD require lifetime commitment to their treatments including renal replacement therapy (RRT) and the medical treatments for their underlying disease for survival, and are faced with a lot of challenges related to their adherence to treatment<sup>10</sup>.

Adherence of hemodialysis patients to medical instructions is considered crucial for a longer life expectancy and better quality of life. Despite of its importance, there is remarkable paucity in researches which deal with adherence of patients under hemodialysis<sup>11</sup>.

## II. METHODS

A descriptive cross-sectional study was conducted in Dialysis Unit of Chitwan Medical College Teaching Hospital and College of Medical Sciences Teaching Hospital, Chitwan, Nepal. Data was collected during the period of five months from 1<sup>st</sup> September 2021- 30<sup>th</sup> January 2022. All the patients undergoing hemodialysis who met the inclusion criteria at Chitwan Medical College Teaching Hospital and College of Medical Sciences Teaching Hospital during the study period were enrolled in this study via enumerative sampling technique that included 140 patients.

**Study Design:** Descriptive cross-sectional study

**Study Location:** This study was carried out in two Medical Colleges of Chitwan, Nepal. Hemodialysis unit of Chitwan Medical College Teaching Hospital, and College of Medical Sciences Teaching Hospital were the study settings.

**Study Duration:** 1<sup>st</sup> September 2021- 30<sup>th</sup> January 2022

**Sample Size:** 140

**Sample size calculation:** Enumerative sampling technique was used to collect data. Seventy six respondents were from Chitwan Medical College Teaching Hospital and sixty four respondents were from College of Medical Sciences Teaching Hospital, Chitwan, Nepal.

**Inclusion Criteria:** Patient under maintenance hemodialysis (HD) for more than three months; over 18 years of age; willing to participate in the study.

**Subjects and Selection Method:** All the respondents who were undergoing maintenance hemodialysis in hemodialysis unit of two Medical Colleges of Chitwan, Nepal were selected for study. The respondents meeting the inclusion criteria were interviewed. Data was collected by using face to face interview schedule adopting End Stage Renal Disease Adherence Questionnaire (ESRD-AQ).

Research instrument consisted of three parts:

Part I: It consisted of socio-demographic information of respondents

Part II: It consisted of disease related information of the respondents

Part III: It consisted of ESRD-AQ questionnaire. The ESRD-AQ is a self-administered questionnaire consisting of 46 items. It addresses all components of adherence behaviors of patients with ESRD, and it is found to be valid and reliable. The questionnaire measures treatment adherence behaviors in four dimensions: HD attendance, medication use, fluid restrictions and diet recommendations. It is divided into five sections; the first section includes general information about patients' ESRD and RRT related history (5 items), and the remaining four sections ask about treatment adherence to HD treatment (14 items), medications (9 items), fluid restrictions (10 items), and diet restrictions recommendations (8 items). Responses to these items (14, 17, 18, 26, 31, and 46) directly measure adherence behavior Responses to the ESRD-AQ utilize a combination of Likert scales and multiple choice items, as well as "yes/no" answer format. The direct adherence behavior was scored by summing the responses to questions 14, 17, 18, 26, 31 and 46. The weighting system for scores was determined based on the degree of importance relevant to clinical outcome of each dimension. And total score is calculated by summing all item score. The most adherent patients gain a higher score, as opposed to the least

adherent patient. The total score was divided into 3 categories. A total score for adherence behavior of less than 700 categorized as poor adherence while score of 700–999 indicated moderate adherence and 1000–1200 indicated a good adherence <sup>7</sup>.

Prior to data collection, ethical clearance was obtained from Chitwan Medical College Institutional Review Committee (CMC- IRC) and IRC of College of Medical sciences Teaching Hospital. Permission for data collection was taken from the authorities of Chitwan Medical College Teaching Hospital, and College of Medical sciences Teaching Hospital, Chitwan. Verbal informed consent was taken from each respondent prior to data collection after explaining the purpose of the study. Pretesting was done on 10% of the total sample among chronic kidney disease patient undergoing hemodialysis.

### **Statistical Analysis**

Data was analyzed using SPSS version 20. Mean  $\pm$  standard deviation were used to describe data after assessing the normality of data. Fisher exact test was used to find the association between dependent and independent variable. The level  $p < 0.05$  was considered as significance.

## **III. RESULT**

**Table 1. Respondents' Socio-demographic Characteristics**  
n=140

| <b>Variables</b>  | <b>Frequency (Percentage)</b> |
|---|-------------------------------|
| <b>Age (in years )</b>                                    |                               |
| $\leq 30$   | 13 (9.3)                      |
| 31-60   | 96 (68.6)                     |
| $>60$   | 31 (22.1)                     |
| Mean $\pm$ SD: 47.75 $\pm$ 14.10, Maximum= 85, Minimum=20 |                               |
| <b>Sex</b>  |                               |
| Female  | 72 (51.4)                     |
| Male  | 68 (48.6)                     |
| <b>Ethnicity</b>  |                               |
| Brahmin/Chhetri   | 67 (47.9)                     |
| Janajati  | 73 (52.1)                     |
| <b>Marital Status</b>                                     |                               |
| Married   | 69 (90.8)                     |
| Unmarried   | 7 (9.2)                       |
| <b>Type of Family</b>                                     |                               |
| Nuclear   | 78 (55.7)                     |
| Joint   | 62 (44.3)                     |
| <b>Residence</b>  |                               |
| Urban   | 93 (66.4)                     |
| Rural   | 47 (33.6)                     |
| <b>Educational Status</b>                                 |                               |
| Illiterate  | 60 (42.9)                     |
| Literate  | 80 (57.1)                     |
| <b>Level of education (n=80)</b>                          |                               |
| Can read and write only                                   | 25 (31.25)                    |
| Basic Level   | 31 (38.75)                    |
| Secondary and above                                       | 24 (30.0)                     |
| <b>Sufficient income for Treatment</b>                    |                               |
| No  | 73 (52.1)                     |
| Yes   | 67 (47.9)                     |

Regarding socio-demographic information of the respondents, Majority (68.6%) of the respondents belongs to age group 31-60 years. More than half (51.4%) were female. Most of the respondents (90.8%) were married and 77.9 % living with spouse. More than half (55.7%) lives in nuclear family. Majority (66.4%) were from urban area. Regarding educational status, 57.1% were literate.

**Table 2: Respondents' Disease related Characteristics and General Information**

n=140

| Variables  | Frequency | Percentage |
|--|-----------|------------|
| <b>Family history of CKD</b>                     |           |            |
| No   | 132       | 94.3       |
| Yes  | 8         | 5.7        |
| <b>Co-morbid condition</b>                       |           |            |
| Yes  | 93        | 66.4       |
| No   | 47        | 33.6       |
| <b>*Co-morbid illness ( n=93)</b>                |           |            |
| Hypertension                                     | 85        | 91.4       |
| Diabetes Mellitus                                | 7         | 7.5        |
| Hypertension and Diabetes both                   | 5         | 5.4        |
| SLE  | 1         | 1.1        |
| <b>Duration of Hemodialysis</b>                  |           |            |
| ≤ 3 years  | 82        | 58.6       |
| >3 year  | 58        | 41.4       |
| Mean ±SD: 3.32±2.11 , Minimum= 1, Maximum= 12    |           |            |
| <b>Kidney transplant</b>                         |           |            |
| No   | 139       | 99.3       |
| Yes  | 1         | 0.7        |
| <b>Means of transportation used for dialysis</b> |           |            |
| Bus  | 76        | 54.3       |
| Personal transportation                          | 44        | 31.4       |
| Medical transportation van (ambulance)           | 12        | 8.6        |
| Taxi   | 8         | 5.7        |
| <b>Accompanying member for dialysis</b>          |           |            |
| Myself   | 36        | 25.7       |
| Parent   | 22        | 15.7       |
| Spouse   | 54        | 38.6       |
| Child  | 26        | 18.6       |
| Friend   | 2         | 1.4        |

**\*Multiple Response**

Table 2 shows that only 5.7% of the respondents had family history of CKD. Among the respondents, 91.4% are hypertensive, 7.5% are diabetics and only one respondents suffered from Systemic lupus erythematosus. Regarding duration of hemodialysis, more than half (58.6%) of the respondents were under hemodialysis since 3 years or less. Only one respondent had kidney transplant done. Majority of the respondents (54.3%) used public vehicle for reaching dialysis center. Very few (8.6%) of them used ambulance. Less than half (38.6%) of the respondents came with their spouse for dialysis and one fourth (25.7%) came alone.

**Table 3: Respondents' Adherence Behavior Score**

n=140

| Item Number | Adherence Behaviours             | Range of Score | Mean Score±SD  |
|-------------|----------------------------------|----------------|----------------|
| 14          | HD Attendance                    | 0-300          | 279.28 ±42.4   |
| 17          | Shortening HD                    | 0-200          | 166.07 ±38.5   |
| 18          | Duration of Shortening HD        | 0-100          | 70.5 ±29.57    |
| 26          | Adherence to Medication          | 0-200          | 189.64±20.33   |
| 31          | Adherence to Fluid Restriction   | 0-200          | 168.93±27.78   |
| 46          | Adherence to Dietary Restriction | 0-200          | 162.50 ± 36.54 |

Regarding adherence behaviour, mean score on six behavior subscales were calculated. Mean score on 'HD attendance' was 279.28±42.4 out of total score of 300. Mean score on 'shortening HD' was 166.07± 38.5.

In this study, 19.3% of the respondents missed 1 dialysis treatment in the past month and 80% of the respondents did not miss any session. Regarding shortening of dialysis time, majority (67%) of the respondents did not shorten the time of dialysis, 54% shortened once, 17% shortened twice and 17% shortened thrice. One fourth of respondents (24.3%) shortened dialysis by less than or equals to 10 minutes and 13.6% of respondents had shortened by 10-20 minutes.

**Table 4: Respondents' Level of Adherence**

n=140

| Level of Adherence | Total score | Frequency | Percentage |
|--------------------|-------------|-----------|------------|
| Poor Adherent      | <700        | 8         | 5.7        |
| Moderate           | 700-999     | 61        | 43.6       |
| Good               | 1000-1200   | 71        | 50.7       |

The overall adherence behavior of each patient was assessed by summing the scores of questions 14, 17, 18, 26, 31, and 46. Out of the 140 respondents, more than half (50.7%) of the respondents had good adherence to treatment and very few (5.7%) of them had poor adherence level.

**Table 5: Association between level of adherence and selected variables**

n=140

| Variables                                      | Level of Adherence |          |      | p-value |
|--|--------------------|----------|------|---------|
|  | Poor               | Moderate | Good |         |
| <b>Age group (in years)</b>                    |                    |          |      | 0.134£  |
| ≤48  | 3                  | 38       | 33   |         |
| >48  | 5                  | 23       | 38   |         |
| Mean ± SD= 47.75 ±14.10 Maximum=85 Minimum=20  |                    |          |      |         |
| <b>Sex</b>                                     |                    |          |      | 0.436£  |
| Male   | 2                  | 30       | 36   |         |
| Female   | 6                  | 31       | 35   |         |
| <b>Type of family</b>                          |                    |          |      | 0.036£  |
| Nuclear  | 3                  | 28       | 47   |         |
| Joint  | 5                  | 33       | 24   |         |
| <b>Educational status</b>                      |                    |          |      | 0.046£  |
| Literate                                       | 3                  | 42       | 35   |         |
| Illiterate                                     | 5                  | 19       | 36   |         |
| <b>Marital status</b>                          |                    |          |      | 0.053£  |
| Married  | 7                  | 53       | 69   |         |
| Unmarried                                      | 1                  | 8        | 2    |         |
| <b>Place of residence</b>                      |                    |          |      | 0.959£  |
| Rural  | 2                  | 21       | 24   |         |
| Urban  | 6                  | 40       | 47   |         |
| <b>Monthly income sufficient for treatment</b> |                    |          |      | 0.600£  |
| Yes  | 4                  | 32       | 31   |         |
| No   | 4                  | 29       | 40   |         |
| <b>Family history of CKD</b>                   |                    |          |      | 0.298£  |
| Yes  | 1                  | 2        | 5    |         |
| No   | 7                  | 59       | 66   |         |
| <b>Co-morbid illness</b>                       |                    |          |      | 0.259£  |
| Yes  | 5                  | 45       | 43   |         |
| No   | 3                  | 16       | 28   |         |
| <b>Duration of dialysis</b>                    |                    |          |      | 0.643£  |
| ≤ 3 years                                      | 5                  | 33       | 44   |         |
| >3 year  | 3                  | 28       | 27   |         |

Mean  $\pm$ SD= 3.32  $\pm$ 2.11, Minimum= 1, Maximum =12

Significance (<0.05), Fishers' exact test= £

This study shows that level of adherence is significantly associated with type of family (p=0.036) and educational status of respondents (p=0.046).

#### IV. Discussion

The study findings revealed that more than half of the respondents were under maintenance hemodialysis since 3 years or less. Minimum year of dialysis was 1 year and maximum 12 years. Among them only nine respondents (5.7%) had family history of CKD. Majority of the respondents (66.4%) had one or more co-morbidity. Majorities (91.4%) of them were hypertensive, 7.5% were diabetics and 5.4% were hypertensive and diabetics both. Similar finding was found in a study done by Ghanim H Al-Khattabi, in Saudi Arabia, in which 93.9% of respondents were hypertensive. However, a study done by Nurten Ozen in Turkey showed that 42% of the respondents were hypertensive and 37.6% were diabetic. This is probably due to differences in ethnic and cultural background of the studied sample.

On calculating the mean adherence score on four domains of treatment adherence, mean score on hemodialysis treatment was 279.28 out of maximum score of 300 which is the highest adherence score followed by adherence to medication whose mean score was 189.64 out of maximum score of 200, and then mean score on adherence to fluid restriction was 168.93 and on dietary recommendations it was 162.5. Very few respondents failed to attend all dialysis sessions, which is an important indicator of adherence to dialysis treatment.

This present study showed that the majority of the respondents had good level of adherence. Only few (5.7%) were poorly adherent to hemodialysis treatment which is supported by a study done in eastern part of Nepal by Thapa et al, which showed that only 14.5% were poorly adherent to treatment. Similarly another study done in Palestine by Naalweh et al., showed that only 4.1% of the respondents were poorly adherent and 55.5 % had good adherence level. This is also supported by another study done by Antony et al. in Kerala, India, which showed 6.6% of respondents were poorly adherent to treatment and 56.2% of the respondents had good adherence level. However a study done by Rakshitha et al. in Karnataka, India, revealed the contrast findings in which least among the respondents were highly adherent to HD treatment (28%).

This study showed that there was significant association between level of adherence and type of family (p=0.036) and educational status (p=0.046) of respondents. There were no significant associations with age, income, duration of dialysis, comorbid illness. Similar findings was found in a study done in Nepal by Shrestha et al., which showed significant association of hemodialysis adherence and educational status (p= 0.020). Chan YM et al., from Malaysia, suggested that long duration of dependence on dialysis (length of time on dialysis) may cause hemodialysis patients to accustom to the restrictions imposed by the disease and perceived themselves as having better compliance. However, this study did not find any association between HD duration and treatment adherence. A study by Ibrahim et al. in Cairo, Egypt and another study done in Turkey by Nurten et al. showed significant association between duration of dialysis and treatment adherence which is a contrast finding to my study.

#### V. Conclusion

This study concludes that majority of the respondents had good level of adherence to hemodialysis treatment and few respondents still had poor level of adherence. Poor adherence to hemodialysis regimen has been associated with increased risk of medical complications including higher risk of cardiac disease, poorer quality of life and decreased life expectancy thus causing a huge burden on health care institutions. Thus Patients on hemodialysis should be carefully monitored for non-adherence to avoid the adverse consequences of poor adherence.

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