

# Factors associated with adherence to haemodialysis and pharmacological treatment in Peru

Melissa del Rocío Carrillo-Ucañay<sup>1</sup>, Lisseth Dolores Rodríguez-Cruz<sup>1</sup>, Rosa Jeuna Díaz-Manchay<sup>1</sup>, Mirtha Flor Cervera-Vallejos<sup>1,2</sup>, Francisca Constantino-Facundo<sup>1,2</sup>

<sup>1</sup>School of Nursing, Universidad Católica Santo Toribio de Mogrovejo, Chiclayo, Peru

<sup>2</sup>Haemodialysis Service, Hospital Almanzor Aguinaga Asenjo, Chiclayo, Peru

Please cite this article in press as:

Carrillo-Ucañay MR, Rodríguez-Cruz LD, Díaz-Manchay RJ, Cervera-Vallejos MF, Constantino-Facundo F. Factors associated with adherence to haemodialysis and pharmacological treatment in Peru. *Enferm Nefrol.* 2024;27(1):44-51

## Corresponding author:

Lisseth Dolores Rodríguez-Cruz  
lrodriguez@usat.edu.pe

Reception: 23-01-24

Acceptance: 05-02-24

Publication: 30-03-24

## ABSTRACT

**Introduction:** Inadequate adherence to pharmacological treatment and hemodialysis sessions leads to complications for patients with chronic kidney disease.

**Objective:** To analyze the factors associated with adherence to hemodialysis and pharmacological treatment.

**Material and Method:** This non-experimental, cross-sectional, correlational, and observational study was conducted following approval from the Ethics Committee. The population consisted of 90 patients, from which a sample of 71 was obtained. Information was collected through a questionnaire consisting of the Batalla and MMAS-8 tests. Statistical analysis was performed using Microsoft Excel 2016 and the Statistical Package for the Social Sciences 25.

**Resultados:** 49.30% of patients showed adherence to hemodialysis sessions. However, 94.37% displayed a lack of adherence to pharmacological treatment. Factors associated with adherence to the sessions included age, knowledge about the disease, duration of hemodialysis, number of comorbidities, and number of medications. Factors associated with adherence to pharmacological treatment were knowledge about chronic kidney disease and the number of comorbidities.

**Conclusions:** There is a higher probability of attending hemodialysis sessions when the patient is older, knows about the disease, and has been undergoing dialysis treatment for more than five years. There is a higher likelihood of low pharmacological adherence when the patient has three or

more comorbidities. Implementing educational intervention programs is recommended, along with considering strategies such as booklets or mobile phone alarms for medication intake and attendance at hemodialysis.

**Keywords:** treatment compliance and adherence; chronic kidney disease; hemodialysis.

## RESUMEN

### Factores asociados a la adherencia a la hemodiálisis y al tratamiento farmacológico en Perú

**Introducción:** La inadecuada adherencia al tratamiento farmacológico y las sesiones de hemodiálisis conllevan complicaciones para el paciente con enfermedad renal crónica.

**Objetivo:** Analizar los factores asociados a la adherencia a la hemodiálisis y al tratamiento farmacológico.

**Material y Método:** Diseño no experimental, transversal, correlacional y observacional, tras aprobación del Comité Ético. Población conformada por 90 pacientes, de la cual se obtuvo una muestra de 71. La información se recolectó mediante un cuestionario conformado por el test de Batalla y test MMAS-8. Se realizó análisis estadístico con Microsoft Excel 2016 y Statistical Package for the Social Sciences 25.

**Resultados:** El 49,30% de los pacientes presentaron adherencia a las sesiones de hemodiálisis, sin embargo, el 94,37% tuvo falta de adherencia al tratamiento farmacológico. Los

factores asociados con la adherencia a las sesiones fueron la edad, el conocimiento sobre la enfermedad, el tiempo de hemodiálisis, el número de comorbilidades y el número de fármacos. Los factores asociados con la adherencia al tratamiento farmacológico fueron el conocimiento sobre la enfermedad renal crónica, y el número de comorbilidades.

**Conclusiones:** Existe mayor probabilidad de cumplir con las sesiones de hemodiálisis cuando el paciente es adulto mayor, tiene conocimiento sobre la enfermedad, y lleva más de cinco años en tratamiento dialítico. Existe mayor probabilidad de tener baja adherencia farmacológica cuando el paciente presenta de 3 a más comorbilidades. Se recomienda la implementación de programas educativos de intervención y considerar estrategias como cartillas o alarmas en celulares para el consumo de fármacos y la asistencia a la hemodiálisis.

**Palabras clave:** cumplimiento y adherencia al tratamiento; enfermedad renal crónica; hemodiálisis.

## INTRODUCTION

Worldwide, 850 million people suffer from chronic kidney disease (CKD), and by 2040 it is projected to become the 5th most common cause of premature death<sup>1</sup>. This disease is considered silent, slow, and progressive, and when it reaches stage 5, renal replacement therapy (RRT) is required. Among these treatments is haemodialysis (HD), the most frequently used alternative in Peru, with a rate of 363 patients per million population<sup>2</sup>.

Despite high demand, there are factors associated with nonadherence both to HD sessions and to the multiple prescribed medication<sup>3</sup>. In Nepal, adherence to HD sessions was reported at 52%, while adherence to medications was 81%. Overall, 122 (55.5%) patients demonstrated good adherence, 89 (40.5%) moderate adherence, and 9 (4.1%) poor adherence<sup>4</sup>. In Egypt, the COVID-19 pandemic negatively affected patient adherence to both HD and pharmacological treatment<sup>5</sup>. In Brazil, pharmacological adherence was evaluated in patients undergoing HD, showing that 62.2% had low adherence while only 33.8% showed high adherence; furthermore, lower adherence was associated with patient-related factors (age, sex, and educational level)<sup>6</sup>. In Peru, a study of patients with stage 5 CKD found that 1 in 4 patients had low adherence to HD treatment, with distance from the dialysis centre identified as the main reason for nonadherence<sup>7</sup>.

The taxonomy of the North American Nursing Diagnosis Association includes lack of treatment adherence as one of its diagnoses<sup>8</sup>, with nonadherence to HD and pharmacological treatment being the most common difficulties faced by both renal patients and nursing staff in dialysis units<sup>9</sup>.

Therefore, it is necessary to assess which variables may affect treatment adherence in this population group, both in relation to medication use and attendance at HD sessions.

The aim of our study was to analyse factors associated with adherence to HD and pharmacological treatment.

## MATERIAL AND METHOD

We conducted a quantitative study with a nonexperimental, cross-sectional, correlational, and observational design.

The study population consisted of 90 patients with CKD treated at the San Francisco Clinic in Piura, Peru. Inclusion criteria were patients >18 years with a diagnosis of stage 5 CKD, associated comorbidities, and affiliation to the Comprehensive Health Insurance under the FISSAL (Fondo Intangible Solidario de Salud) contract. Exclusion criteria were 14 patients <1 year on therapy and 5 patients on private therapy, resulting in a final sample of 71 patients.

Data were collected from September through November 2021 by the principal investigator in the hospital waiting room, with a mean duration of 15 minutes.

The primary data collection technique was a survey<sup>10</sup>. The instrument was a questionnaire comprising three sections. The first collected patient-related factors including age, sex, and educational level according to ENDES classification<sup>11</sup>. The second measured knowledge of CKD using the Batalla test<sup>12</sup> and collected data on adherence to pharmacological treatment using the 8-item Morisky Green test (MMAS-8)<sup>13</sup>. A pilot study established internal validity of this scale, with a Cronbach of 0.807.

The third section recorded associated comorbidities, time on HD treatment, number of medications taken per day, and number of HD sessions in the last month.

Data were processed and analysed using Microsoft Excel 2016 and Statistical Package for the Social Sciences (SPSS) version 25. Absolute and relative frequencies were calculated, and associations between nominal or ordinal variables were tested with the chi-square test. Binary logistic regression and multinomial logistic regression were subsequently performed.

The study was approved by the Research Ethics Committee of the School of Medicine, *Universidad Católica santo Toribio de Mogrovejo* (Resolution N° 166-2021-USAT-FMED), and authorisation was obtained from the management of the San Francisco Clinic. Ethical principles<sup>14</sup> of autonomy, nonmaleficence, beneficence, and justice were applied. Patients participated voluntarily through informed consent, and no physical or psychological harm occurred during the study.

## RESULTS

Of the total patients surveyed, 60.56% (n=43) were older adults; 57.75% (n=41) were men; and 32.39% (n=23) had completed nonuniversity higher education. With regard to knowledge of CKD, 63.38% (n=45) of patients demonstrated adequate knowledge. More than half (52.11%; n=37) had at least 1 comorbidity, 63.38% (n=45) had been on HD treatment for <5 years, and 71.83% (n=51) consumed 4 to 7 medications per day. Regarding adherence, 56.34% (n=40) had medium adherence to pharmacological treatment, and 49.30% (n=35) attended all 12 monthly HD sessions (**table 1**).

**Table 2**, illustrates that factors significantly associated with adherence to pharmacological treatment were knowledge of CKD ( $p=0.0191$ ) and number of comorbidities ( $p=0.0184$ ).

**Table 3**, illustrates that factors associated with adherence to HD sessions were age ( $p=0.00095$ ), knowledge of CKD ( $p=0.0041$ ), time on HD treatment ( $p=0.00001$ ), number of medications/day ( $p=0.0075$ ), and number of comorbidities ( $p=0.0005$ ).

**Table 4**, illustrates that being an older adult was associated with a 4.782 (95%CI, 0.052–0.836) times greater probability of attending all 12 HD sessions per month. Having adequate knowledge of CKD was associated with a 6.137 (95%CI, 0.039–0.677) times greater probability of attending all 12 monthly HD

**Table 1.** Description of the sample and adherence.

		n	%
Patient	<b>Age</b>		
	Adult (30–59 years)	28	39.44%
	Older adult ( $\geq 60$ years)	43	60.56%
	<b>Sex</b>		
	Female	30	42.25%
	Male	41	57.75%
	<b>Education level</b>		
	Initial	8	11.27%
	Primary	13	18.31%
	Secondary	22	30.99%
	Higher university	5	7.04%
Higher non-university	23	32.39%	
Conocimiento sobre la ERC (Test de Batalla)	Adecuado	45	63.38%
	Inadecuado	26	36.62%
	<b>Treatment</b>		
Time on haemodialysis treatment	1 year	14	19.72%
	2 years	11	15.49%
	3 years	20	28.17%
	More than 5 years	26	36.62%
	<b>Treatment complexity</b>		
	<b>Number of drugs</b>		
	1–3 drugs/day	12	16.90%
	4–7 drugs/day	51	71.83%
	More than 7 drugs/day	8	11.27%
	<b>Number of comorbidities</b>		
	One	37	52.11%
Two	24	33.80%	
Three	6	8.45%	
More than three	4	5.63%	
Adherence to pharmacological treatment	High adherence	4	5.63%
	Medium adherence	40	56.34%
	Low adherence	27	38.03%
Attendance at haemodialysis sessions	12 sessions	–	49.30%
	Fewer than 12 sessions	–	50.70%
<b>TOTAL</b>		<b>71</b>	<b>100.00%</b>

CKD: Chronic Kidney Disease; HD: Haemodialysis; n: frequency.

sessions. For time on HD treatment, patients with  $\geq 5$  years of treatment had a 13.136 times greater probability of attending all 12 monthly HD sessions. In multinomial regression, independent of age, sex, educational level, knowledge of CKD, time on HD treatment, and number of medications per day, those with  $>3$  comorbidities had a 4.63 times greater probability of low pharmacological adherence and a 1.84 times greater probability of medium pharmacological adherence

## DISCUSSION

Regarding pharmacological treatment adherence, the vast majority of patients were found to be nonadherent to their medication, as their scores fell within the medium and low adherence ranges. This result is consistent with the findings of other researcher<sup>6-15</sup>, who reported that more than half of their study populations showed moderate<sup>5</sup> and low adherence.<sup>6-15</sup>. In contrast, a study conducted in the United States found higher levels of pharmacological adherence<sup>16</sup>, despite most patients being prescribed 9 medications. This may be attributed to more comprehensive follow-up of these patients in that developed setting.

For adherence to HD sessions, slightly more than half of the patients failed to attend the 12 scheduled monthly sessions. These findings are in line with a study conducted

in Argentina<sup>17</sup>, where approximately half of patients missed at least one HD session per month. Similarly, in Brazil<sup>18</sup>, more than half of the study population did not comply with their scheduled sessions, with nonadherence defined as more than one missed session. By contrast, studies in Iran<sup>19</sup> and Indonesia<sup>20</sup>, involving younger patients receiving HD less frequently (twice weekly), reported that most patients (83.3%) adhered to HD attendance.

Likewise, age was not associated with pharmacological adherence, a finding that mirrors results in patients with rheumatological disease, where age was not systematically linked to nonadherence to medication<sup>21</sup>.

However, an association was established between age and adherence to HD sessions: older adults were 4.782 times more likely to complete all monthly HD sessions. This finding is consistent with other research<sup>22</sup> confirming that younger patients have higher rates of nonadherence to HD sessions<sup>22</sup>. This may be because, over time, patients gain greater awareness of their disease, understand the consequences of missed sessions, and begin to incorporate HD as part of their daily lives.

No relationship was found between educational level and either pharmacological adherence or HD session attendance. These results differ from other studies<sup>23,15</sup>, which suggested

**Table 2.** Factors associated with adherence to pharmacological treatment.

FACTORS ASSOCIATED WITH THE PERSON		MMAS8			Total (n)	p-value
		Low adherence (n)	Medium adherence (n)	High adherence (n)		
Age	Adult	14	14	0	28	0.0964
	Older adult	13	26	4	43	
Sex	Female	12	16	2	30	0.8892
	Male	15	24	2	41	
Education level	Initial	2	5	1	8	0.2434
	Primary	7	4	2	13	
	Secondary	9	12	1	22	
	Higher university	3	2	0	5	
	Higher non-university	6	17	0	23	
Knowledge about CKD	Inadequate	15	11	0	26	0.0191
	Adequate	12	29	4	45	
FACTORS ASSOCIATED WITH TREATMENT						
Time on HD treatment (years)	1 year	6	8	0	14	0.5266
	2 years	6	5	0	11	
	3 years	8	11	1	20	
	More than 5 years	7	16	3	26	
Number of drugs/day	1-3 drugs/day	6	6	0	12	0.0827
	4-7 drugs/day	20	29	2	51	
	More than 7 drugs/day	1	5	2	8	
Number of comorbidities	One comorbidity	21	15	1	37	0.0184
	Two comorbidities	5	16	3	24	
	Three comorbidities	0	6	0	6	
	More than three comorbidities	1	3	0	4	

CKD: Chronic Kidney Disease; HD: Haemodialysis; n: frequency.

**Table 3.** Factors associated with adherence to haemodialysis.

		N° of sessions over the past month (August)		Total (n)	p-value
		Sessions (n)	Sessions (n)		
<b>FACTORS ASSOCIATED WITH THE PERSON</b>					
Age	Adult	21	7	28	0.00095
	Older adult	15	28	43	
Sex	Female	16	14	30	0.7046
	Male	20	21	41	
Education level	Initial	1	7	8	0.1319
	Primary	6	7	13	
	Secondary	12	10	22	
	Higher university	2	3	5	
Knowledge about CKD	Higher non-university	15	8	23	0.0041
	Inadequate	19	7	26	
	Adequate	17	28	45	
<b>FACTORS ASSOCIATED WITH TREATMENT</b>					
Time on haemodialysis treatment (years)	1 year	13	1	14	0.00001
	2 years	9	2	11	
	3 years	9	11	20	
	More than 5 years	5	21	26	
Number of drugs/day	1-3 drugs/day	11	1	12	0.0075
	4-7 drugs/day	22	29	51	
	More than 7 drugs/day	3	5	8	
Number of comorbidities	One comorbidity	27	10	37	0.0005
	Two comorbidities	8	16	24	
	Three comorbidities	0	6	6	
	More than three comorbidities	1	3	4	
<b>TOTAL</b>		<b>36</b>	<b>35</b>	<b>71</b>	

CKD: Chronic Kidney Disease; n: frequency.

that adherence decreases with higher educational attainment. Likewise, no association was found between sex and either pharmacological adherence or HD attendance, consistent with the findings of other authors<sup>15</sup>. A single study<sup>24</sup> identified male sex as a risk factor for nonadherence to HD treatment.

Knowledge of CKD was associated with both pharmacological adherence and timely attendance at HD sessions. Patients with adequate knowledge of CKD were 6.137 times more likely to complete all 12 monthly HD sessions. However, we found no studies that explored this association using the same instrument.

Duration of HD treatment was not related to pharmacological adherence, a finding consistent with other authors<sup>16</sup>. Conversely, another study<sup>24</sup> reported that longer HD duration (in months) was associated with lower risk of nonadherence to pharmacological treatment.

In this study, greater adherence was observed to HD than to medications, which could be explained by patients being more aware of the importance of attending dialysis sessions than

of taking medications, or by lack of family support at home to remind them to take medications at the prescribed time.

Furthermore, patients with  $\geq 5$  years of HD therapy were more likely to complete the 12 monthly sessions. In contrast, a study in Turkey<sup>24</sup> reported that shorter HD duration was a risk factor for nonadherence. This may be explained by patients evaluating the effects of dialysis on their bodies, interacting with other patients, and benefiting from the education provided by health care staff.

This study also found an association between pharmacological adherence and the number of comorbidities. Patients with  $>3$  comorbidities had a 4.63-fold higher likelihood of low adherence and a 1.84-fold higher likelihood of medium adherence. Similarly, other research has identified an increasing number of comorbidities as a significant predictor of medication adherence<sup>25</sup>, although this differs from a Norwegian study of older adults on peritoneal dialysis and HD across three hospitals<sup>23</sup>. In this regard, it is worth noting that multimorbidity and polypharmacy are common in CKD and may be directly related to poor adherence.

Tabla 4. Logistic regression.

BINARY LOGISTIC REGRESSION						
		Wald	Sig.	O.R.	95% CI	
					Lower	Upper
Edad	Adulto mayor	4.901	0.027	4.782	0.052	0.836
Age	Older adult	4.901	0.027	4.782	0.052	0.836
Sex	Female	2.197	0.138	0.368	0.098	1.381
Education level	Without higher education	0.000	0.991	0.991	0.236	4.171
Knowledge about CKD	Adequate	6.229	0.013	6.137	0.039	0.677
Time on haemodialysis treatment (years)	≥5 years	9.737	0.002	13.136	0.015	0.384
Number of drugs/day	1–7 drugs/day	1.172	0.279	3.145	0.395	25.051
Number of comorbidities	1–3 comorbidities	2.383	0.123	0.066	0.002	2.080

  

MULTINOMIAL REGRESSION						
MMAS-8		Sig.	O.R.	95% I.C		
				Lower	Upper	
Poor medication adherence	Age	Older adult	0.989	22.000	0.000	0.001
	Sex	Male	0.820	1.350	0.100	18.312
	Education level	With higher education	0.989	9.330	0.000	0.002
	Knowledge about CKD	Adequate	0.989	62.000	0.000	0.002
	Time on haemodialysis treatment (years)	≥5 years	0.517	2.920	0.114	74.664
	Number of drugs/day	>7 drugs/day	0.326	6.170	0.163	23.202
	Number of comorbidities	>3 comorbidities	0.000	4.630	3.651	5.891
Median medication adherence	Age	Older adult	0.989	10	0,000	0.002
	Sex	Male	0.802	0.72	0.061	8.67
	Education level	With higher education	0.989	3.11	0	0.001
	Knowledge about CKD	Adequate	0.99	23	0.000	0.002
	Time on haemodialysis treatment (years)	≥5 years	0.831	14	0.06	32.913
	Number of drugs/day	>7 drugs/day	0.648	2.02	0.099	41.324
	Number of comorbidities	>3 comorbidities	0.000	1.84	1.847	1.847

Sig.: Significance; OR: Odds Ratio; CI: Confidence Interval; CKD: Chronic Kidney Disease.

Similarly, an association was also found between the number of comorbidities and HD session attendance. Diabetes mellitus and hypertension were the most prevalent comorbidities in our study population, consistent with findings from other investigators<sup>19,26</sup>. In Peru, more than half of dialysis sessions are performed in patients with diabetes and hypertension<sup>27</sup>. This highlights the importance of raising awareness among patients and their families to ensure compliance with all recommendations.

Among the limitations of this study are the use of a nonprobabilistic census sample and potential self-selection bias, as participant selection was not based on statistical criteria for generalisation. Consequently, it was not possible to calculate the precision of the standard error, nor to determine the level of confidence in the estimates.

In conclusion, nearly half of patients adhered to their HD sessions, yet most demonstrated nonadherence to pharmacological treatment. Older adults, patients with

greater knowledge of CKD, and those with ≥5 years of HD treatment were more likely to adhere to their HD sessions. Conversely, patients with ≥ 3 comorbidities were more likely to exhibit low pharmacological adherence.

We, therefore, recommend implementing educational intervention programmes and strategies such as information leaflets or mobile phone reminders for both medication intake and HD attendance, to minimise forgetfulness as a barrier. We also believe it is necessary to conduct mixed-methods studies (quantitative and qualitative) that also address adherence to diet and fluid restriction.

### Conflicts of interest

None declared.

### Funding

Self-funded.

## REFERENCES

1. Li P, García G, Siu L, Andreoli S, Fung W, Hradsky A, et al. Salud renal para todos en todas partes. Desde la prevención hasta la detección y al acceso equitativo a la atención. *Rev Nefrol Dial Traspl* [Internet]. 2020 [cited 10 Jan 2024];40(1):1-13. Available from: <https://www.revistarenal.org.ar/index.php/rndt/article/view/502>
2. Ministerio de Salud del Perú. Análisis de la situación de la enfermedad renal crónica en el Perú, 2015. [Internet]. 2015 [cited 10 Jan 2024]. Available from: <https://bit.ly/38VxY6x>
3. Ghimire S, Castelino R, Lioufas N, Peterson G, Zaidi S. Nonadherence to Medication Therapy in Haemodialysis Patients: A Systematic Review. *PLoS ONE* [Internet]. 2015 [cited 10 Jan 2024];10(12):e0144119. Available from: <https://doi.org/10.1371/journal.pone.0144119>
4. Naalweh KS, Barakat MA, Sweileh MW, Al-Jabi SW, Sweileh WM, Zyoud SH. Treatment adherence and perception in patients on maintenance hemodialysis: a cross-sectional study from Palestine. *BMC Nephrol* [Internet]. 2017 [cited 10 Jan 2024];18:178. Available from: <https://doi.org/10.1186/s12882-017-0598-2>
5. Sultan B, Fouad A, Zaki H. Adherence to hemodialysis and medical regimens among patients with end-stage renal disease during COVID-19 pandemic: a cross-sectional study. *BMC Nephrol* [Internet]. 2022 [cited 10 Jan 2024];23:138. Available from: <https://doi.org/10.1186/s12882-022-02756-0>
6. Barros K, Renz C, Uhdich K, Campos F, Calegaro M, Fernandes E, et al. Adherence to drug treatments in patients with chronic kidney disease on hemodialysis. *O Mundo da Saúde* [Internet]. 201 [cited 10 Jan 2024];43(4):800-13. Available from: [https://bvsm.sau.de.gov.br/bvs/periodicos/mundo\\_saude\\_artigos/adherence\\_chronic\\_hemodialysis.PDF](https://bvsm.sau.de.gov.br/bvs/periodicos/mundo_saude_artigos/adherence_chronic_hemodialysis.PDF)
7. Herrera P, Palacios M, Mezones E, Hernández A, Chipayo D. Baja adherencia al régimen de hemodiálisis en pacientes con enfermedad crónica renal en un hospital de referencia del Ministerio de Salud en Perú. *An Fac Med* [Internet]. 2014 [cited 10 Jan 2024];75(4):323-6. Available from: <https://doi.org/10.15381/anales.v75i4.10848>
8. North American Nursing Diagnosis Association (NANDA). *Diagnósticos Enfermeros: Definiciones y Clasificación 2018-2020*. 11.a ed. Artmed; 2018. p. 187.
9. Ojeda M, Caro I, Ojeda D, García A, García S, García S. Consulta de enfermería y adherencia terapéutica del paciente en hemodiálisis. *Enferm Nefrol* [Internet]. 2017 [cited 10 Jan 2024];20(2):132-8. Available from: <https://doi.org/10.4321/S2254-288420170000200006>
10. Hernández R. *Metodología de la investigación*. Mexico: McGrawHill; 2018. p. 634.
11. Instituto Nacional de Estadística e Informática. *Manual de la Entrevistadora-ENDES 2018* [Internet]. 2023 [cited 10 Jan 2024]. Available from: <https://bit.ly/3zk0DfY>
12. Batalla C, Laguarda A, Ciurana R, Garcia M, Jordi E, Pérez A, et al. Cumplimiento de la prescripción farmacológica en pacientes hipertensos. *Atención Primaria* [Internet]. 1984 [cited 10 Jan 2024];1(4):185-91. Available from: <http://www.ub.edu/farmaciaclinica/projectes/webquest/WQ2/docs/batalla.pdf>
13. Chaves NM, Echeverri JE, Ballesteros DA, Quijano J, Camacho D. Validación de la escala de Morisky de 8 ítems en pacientes con enfermedad renal crónica. *Rev Med* [Internet]. 2016 [cited 10 Jan 2024];24(2):23-32. Available from: <http://www.scielo.org.co/pdf/med/v24n2/v24n2a03.pdf>
14. Insua JT. Principialismo, bioética personalista y principios de acción en medicina y en servicios de salud. *Pers y Bioética* [Internet]. 2018 [cited 10 Jan 2024];22(2):223-46. Available from: <https://doi.org/10.5294/pebi.2018.22.2.3>
15. Alkatheri AM, Alyousif SM, Alshabanah N, Albekairy A, Alharbi S, Alhejaili F, et al. Medication Adherence among Adult Patients on Hemodialysis. *Saudi J Kidney Dis Transplant* [Internet]. 2014 [cited 10 Jan 2024];25(4):762-8. Available from: <https://pubmed.ncbi.nlm.nih.gov/24969185/>
16. Cedillo-Couvert EA, Ricardo AC, Chen J, Cohan J, Fischer MJ, Krousel-Wood M, et al. Self-reported Medication Adherence and CKD Progression. *Kidney Int Reports* [Internet]. 2018 [cited 10 Jan 2024];3(3):645-51. Available from: <https://doi.org/10.1016/j.ekir.2018.01.007>
17. Gottlieb E, Tessey A, Tanús R, Hecker S, Fernández J. Saltar una o más sesiones de diálisis aumenta significativamente la tasa de mortalidad: impacto de medir la no adherencia. *Rev Nefrol Dial y Traspl* [Internet]. 2014 [cited 10 Jan 2024];34(2):62-70. Available from: <https://www.redalyc.org/pdf/5642/564261711008.pdf>
18. Nakao RT, Gorayeb R, Da Costa JAC. Factors associated with treatment adherence of Brazilian patients undergoing hemodialysis. *Actual en Psicología* [Internet]. 2016 [cited 10 Jan 2024];30(121):77. Available from: <https://doi.org/10.15517/ap.v30i121.23289>
19. Suganthi S, Porkodi A, Geetha P. Assessment of illness perception and treatment adherence among patients with end-stage renal disease. *Iran J Nurs Midwifery Res* [Internet]. 2020 [cited 10 Jan 2024];25(1):12. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6952918/>

20. Agustina F, Yetti K, Sukmarini L. Contributing factors to hemodialysis adherence in Aceh, Indonesia. *Enfermería Clínica* [Internet]. 2019 [cited 10 Jan 2024]; 29:238-42. Available from: <https://doi.org/10.1016/j.enfcli.2019.04.028>
21. Van Den Bemt BJJ, Zwikker HE, Van Den Ende CHM. Medication adherence in patients with rheumatoid arthritis: a critical appraisal of the existing literature. *Expert Rev Clin Immunol* [Internet]. 2014 [cited 10 Jan 2024]; 8(4):337-51. Available from: <https://doi.org/10.1586/eci.12.23>
22. Obialo CI, Bashir K, Goring S, Robinson B, Quarshie A, Al-Mahmoud A, et al. Dialysis «no-shows» on Saturdays: Implications of the weekly hemodialysis schedules on nonadherence and outcomes. *J Natl Med Assoc* [Internet]. 2008 [cited 10 Jan 2024]; 100(4):412-9. Available from: [http://dx.doi.org/10.1016/S0027-9684\(15\)31274-8](http://dx.doi.org/10.1016/S0027-9684(15)31274-8)
23. Parker K, Bull-Engelstad I, Aasebo W, Von N, Reier-Nilsen M, Os I, et al. Medication regimen complexity and medication adherence in elderly patients with chronic kidney disease. *Hemodial Int* [Internet]. 2019 [cited 10 Jan 2024]; 23(3):333-42. Available from: <https://doi.org/10.1111/hdi.12739>
24. Ozen N, Cinar FI, Askin D, Mut D, Turker T. Nonadherence in Hemodialysis Patients and Related Factors: A Multicenter Study. *J Nurs Res* [Internet]. 2019 [cited 10 Jan 2024]; 27(4):36. Available from: <https://pubmed.ncbi.nlm.nih.gov/30720548/>
25. Ghimire S, Peterson GM, Castelino RL, Jose MD, Zaidi STR. Medication Regimen Complexity and Adherence in Haemodialysis Patients: An Exploratory Study. *Am J Nephrol* [Internet]. 2016 [cited 10 Jan 2024]; 43(5):318-24. Available from: <https://doi.org/10.1159/000446450>
26. Villegas J, Martínez L, Rodríguez M, Vera S, Roldán M, Hernández A, et al. Evaluation of therapeutic adherence in patients with renal replacement therapy. *Med Interna Mex* [Internet]. 2020 [cited 10 Jan 2024]; 36(3):292-300. Available from: <https://www.medigraphic.com/pdfs/medintmex/mim-2020/mim203d.pdf>
27. Gobierno del Perú. Insuficiencia renal crónica: en el Perú 70% de diálisis se realizan en pacientes con hipertensión y diabetes [Internet]. 2022 [cited 10 Jan 2024]. Available from: [https://www.gob.pe/institucion/hospital\\_loayza/noticias/589210-insuficiencia-renal-cronica-en-el-peru-70-de-dialisis-se-realizan-en-pacientes-con-hipertension-y-diabetes](https://www.gob.pe/institucion/hospital_loayza/noticias/589210-insuficiencia-renal-cronica-en-el-peru-70-de-dialisis-se-realizan-en-pacientes-con-hipertension-y-diabetes)



This is an open access article distributed under a Creative Commons licence.  
<https://creativecommons.org/licenses/by-nc/4.0/>