Pancasakti Journal of Public Health Science and Research
Vol. 5, No. 2 May 2025: Page. 238–247
Doi: 10.47650/pjphsr.v5i2.1922
ISSN (Online): 2777-1296
OJS: http://journal.unpacti.ac.id/index.php/pjphsr

Determinants of Compliance Among Chronic Kidney Disease Patients Undergoing Hemodialysis at RSUD ODSK, North Sulawesi

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Article Info

Article History
Received: May 05, 2025
Revised: May 19, 2025
Accepted: May 22, 2025

Keywords:
Chronic Kidney Disease; hemodialysis; patient adherence; family support; health education

ABSTRACT

Chronic Kidney Disease (CKD) is a major chronic health issue that requires long-term therapy, one of which is hemodialysis. The success of hemodialysis therapy is highly influenced by patient adherence. However, the adherence rate to scheduled hemodialysis at ODSK Provincial General Hospital, North Sulawesi, is only 71.67%, which is still below the National Quality Indicator standard of 100%. This study aimed to analyze the factors influencing adherence among CKD patients undergoing hemodialysis at ODSK Provincial General Hospital in North Sulawesi. A quantitative approach with a cross-sectional design was employed. The sample consisted of 78 CKD patients who routinely underwent hemodialysis, selected using total sampling. Data were collected through a structured questionnaire. Chi-square tests and logistic regression analyses were conducted to assess the relationships between variables. The results revealed significant associations between adherence and several factors, including education level (p=0.009), duration of hemodialysis (p=0.004), knowledge (p=0.013), nurse support (p=0.006), and family support (p=0.006). The most influential factors were family support and patient knowledge, with family support emerging as the strongest predictor of adherence among CKD patients undergoing hemodialysis. Efforts to improve adherence should focus on patient education, strengthening the role of nurses and hospital services, and actively involving family members in the patient care process.

INTRODUCTION

Chronic Kidney Disease (CKD) is a medical condition characterized by a gradual decline in kidney function lasting for at least three months, which can be measured through the glomerular filtration rate (GFR) (Kusuma et al., 2019). In many cases, CKD patients do not exhibit symptoms until the disease reaches an advanced stage, typically stage 4, when the GFR falls below 30 mL/min/1.73m^2 (Kalantar-Zadeh et al., 2021).

One of the most commonly used treatment methods for CKD is hemodialysis, which serves to replace kidney function by removing metabolic waste products, excess fluids, and unnecessary substances from the body. Hemodialysis supports patient survival while allowing them to adjust their lifestyle in accordance with their health condition (Damayanti & Sarnianto,

2021). This procedure must be performed routinely, usually twice a week, with each session lasting approximately 3 to 4 hours. Although effective, hemodialysis therapy may lead to physical and psychological side effects, including malaise, headaches, and mental stress (Pebriantari & Dewi, 2020).

The level of patient adherence to hemodialysis schedules significantly affects treatment outcomes. Globally, adherence rates among CKD patients are reported to be around 89% (Bello, 2022). However, these rates vary, particularly in countries with limited access to and high costs of therapy. Non-adherence may result in the accumulation of toxic metabolic waste, increased risk of mortality, and reduced quality of life (Kusniawati, 2018).

In Indonesia, the prevalence of CKD has shown a significant increase. The 2018 Basic Health Research (Riskesdas) reported that 0.38% of the Indonesian population, equivalent to approximately 713,783 individuals, suffer from CKD. North Sulawesi Province has a prevalence of 0.53%, ranking third highest in the country after North Kalimantan and North Maluku (Riskesdas, 2018). At ODSK Provincial General Hospital in North Sulawesi, hemodialysis services are provided using 20 machines, with dialysis conducted 2 to 3 times per week. However, hospital performance indicators show that the rate of timely adherence to scheduled hemodialysis sessions among patients is only 71.67%, still far below the 100% target.

Several factors are suspected to influence patient adherence to hemodialysis, including patient education, duration of therapy, knowledge, healthcare access, nursing support, and family involvement. Therefore, this study aims to analyze the factors affecting adherence to hemodialysis among CKD patients at ODSK Provincial Hospital in North Sulawesi, in order to provide appropriate recommendations for improving the quality of care and therapeutic outcomes.

METHODS

This study employed a quantitative design with a descriptive-analytic cross-sectional approach aimed at describing the characteristics of patients with chronic kidney failure and analyzing the influence of educational level, duration of hemodialysis, knowledge, service accessibility, nurse roles, and family support on patient adherence to hemodialysis treatment. The research was conducted in the Hemodialysis Unit of ODSK General Hospital, North Sulawesi, from December 2024 to March 2025.

A total sampling technique was applied, involving 78 patients who met the inclusion criteria out of a population of 93 patients. Data were collected using a structured questionnaire that had been validated and tested for reliability. The questionnaire covered demographic aspects, knowledge, service accessibility, nurse roles, family support, and adherence (modified from the ESRD-AQ instrument).

Data analysis was conducted using the Chi-square test to examine associations between variables and logistic regression to identify the most influential factors, with data processed using SPSS. Ethical considerations were addressed through approval by the institutional ethics committee and the acquisition of informed consent from all respondents.

RESULTS

Univariate Analysis

The study was conducted between December 2024 and March 2025 and involved a total of 78 respondents. The distribution of respondents was categorized based on patient characteristics at RSUD ODSK, North Sulawesi Province.

Table 1. Distribution of respondents based on patient characteristics at RSUD ODSK, North Sulawesi Province (n = 78)

Patient Characteristics		n	%
Education	Higher	15	19,2
	Middle to lower	63	80,8
Duration of Hemodialysis	≥1 year	43	55,1
	<1 year	35	44,9
Knowledge	Good	45	57,7
	Poor	33	42,3
Access to Services	Easy	65	83,3
	Difficult	13	16,7
Role of Nurses	Supportive	68	87,2
	Less supportive	10	12,8
Family Support	Strong	50	64,1
	Weak	28	35,9
Patient Adherence	Adherent	66	84,6
	Non-adherent	12	15,4

Source: Primary Data, 2025

The majority of hemodialysis patients at RSUD ODSK, North Sulawesi Province, had a middle to lower educational background (63 patients; 80.8%), while a smaller portion held higher education degrees (15 patients; 19.2%). More than half of the respondents (43 patients; 55.1%) had undergone hemodialysis therapy for more than one year. Most participants (45 patients; 57.7%) demonstrated good knowledge regarding treatment and lifestyle practices, although 42.3% (33 patients) still require further health education. Hemodialysis services were perceived as easily accessible by 83.3% of the patients (65 individuals), and 87.2% (68 individuals) regarded the nurses' role as highly supportive during the therapy process. Family support was reported as strong by 64.1% of respondents (50 individuals). Adherence to the hemodialysis schedule was relatively high, with 84.6% of patients (66 individuals) consistently attending their treatment sessions, while 15.4% (12 individuals) encountered challenges in maintaining adherence. Overall, the demographic profile, level of knowledge, service accessibility, and multidisciplinary support appear to contribute positively to patient adherence.

Bivariate Analysis

To identify the association between the independent and dependent variables, a Chi-square statistical test was employed. The analysis was conducted sequentially according to the

number of variables examined. The complete results of the data analysis are presented in Table 2.

Table 2. Distribution of Respondents Based on Adherence Among Chronic Kidney Disease Patients Undergoing Hemodialysis and Independent Variables at ODSK Provincial Hospital, North Sulawesi (n = 78)

Variable	Patient Adherence				n	P	OR 95% CI
	Adherent		Non-adherent				
	n	%	n	%			
Education							
Higher	9	60	6	40	15	0,009	0,158 0,042 – 0,598
Middle to lower	57	90,5	6	9,5	63		
Duration of Hemodialysis							
≥1 year	41	95,3	2	4,6	43	0,004	8,200 1,660 – 40,516
<1 year	25	71,4	10	28,6	35		
Knowledge							
Good	42	93,3	3	6,7	45	0,013	5,250 1,295 – 21,281
Poor	24	72,8	9	27,2	33		
Access to Services							
Easy	56	86,1	9	13,9	65	0,411	1,867 0,429 – 8,116
Difficult	10	77	3	23	13		
Role of Nurses							
Supportive	61	89,7	7	10,3	68	0,006	8,714 2,012 – 37,739
Less supportive	5	50	5	50	10		
Family Support							
Strong	47	94	3	6	50	0,006	7,421 1,810 – 30,430
Weak	19	68	9	32	28		

Source: Primary Data, 2025

The analysis results regarding the effect of education on patient adherence are presented in Table 2. It was found that among the 15 respondents with higher education, 9 individuals (60%) demonstrated adherence to undergoing hemodialysis. In contrast, among respondents with moderate to low educational backgrounds, 57 individuals (90.5%) were adherent. The statistical test yielded a p-value of 0.009, indicating a significant association between educational level and adherence to routine hemodialysis among patients with chronic kidney failure.

Further analysis revealed the effect of hemodialysis duration on patient adherence. Among the 43 respondents who had been undergoing hemodialysis for ≥1 year, 41 individuals (95.3%) showed adherence. Conversely, in the group who had been receiving hemodialysis for less than 1 year, only 25 out of 35 respondents (71.4%) were adherent. The statistical analysis showed a p-value of 0.004, signifying a significant relationship between the duration of hemodialysis and patient adherence.

Regarding knowledge level, the analysis showed that of the 45 respondents with good knowledge, 42 individuals (93.3%) were adherent to hemodialysis therapy. In comparison,

among the 33 respondents with limited knowledge, only 24 individuals (72.8%) demonstrated adherence. The p-value of 0.013 indicates a significant association between the level of patient knowledge and adherence to hemodialysis treatment.

In terms of access to health services, the findings showed that among the 65 respondents who reported easy access to health services, 56 individuals (86.1%) adhered to hemodialysis therapy. Meanwhile, in the group with perceived difficult access, 10 out of 13 respondents (77%) still showed adherence. However, the p-value of 0.411 indicates no statistically significant relationship between access to healthcare services and adherence to hemodialysis among chronic kidney failure patients.

The role of nurses also demonstrated an influence on patient adherence. Among the 68 respondents who perceived the nurses' role positively, 61 individuals (89.7%) adhered to their hemodialysis regimen. On the other hand, only 5 out of 10 respondents (50%) who viewed the nurse's role less favorably were adherent. This suggests that patients' perception of the nursing role has a strong correlation with adherence, as supported by a statistically significant p-value of 0.006.

Finally, family support emerged as another influential factor in patient adherence. Among the 50 respondents who received good family support, 47 individuals (94%) were adherent to hemodialysis. In contrast, in the group with limited family support, only 19 out of 28 respondents (68%) showed adherence. The p-value of 0.006 indicates a significant effect of family support on adherence to routine hemodialysis among patients with chronic kidney failure.

Multivariate Analysis

To identify the most influential factors associated with adherence among patients with chronic kidney disease undergoing hemodialysis, a multivariate analysis was conducted using multiple logistic regression.

a. Selection of Variables for Multivariate Analysis

The results of the bivariate selection using multiple logistic regression showed that education level, duration of hemodialysis, knowledge, service accessibility, nurse's role, and family support had p-values of less than 0.25. Therefore, these variables were included in the multivariate model construction. The detailed results of the bivariate analysis are presented in Table 3.

Table 3. Bivariate selection results using logistic regression between adherence among chronic kidney disease patients undergoing hemodialysis and independent variables at ODSK Provincial General Hospital, North Sulawesi (n = 78)

Variable	p-Value
Education	0,009
Duration of Hemodialysis	0,004
Knowledge	0,013
Access to Services	0,411*
Role of Nurses	0,006
Family Support	0,006

*Not Included in Further Modeling

b. Multivariate Model Development

Table 4 below presents the results of the selection process for variables included in the multivariate modeling.

Table 4. Variables Selected for Inclusion in the Multivariate Model Factors Associated with Adherence among Chronic Kidney Disease Patients Undergoing Hemodialysis at ODSK Provincial General Hospital, North Sulawesi (n = 78)

Variabel	B	Wald	Sig	Exp (B)	95%CI
Education	-0,817	0,856	0,355	0,442	0,78 – 2,492
Duration of Hemodialysis	0,579	0,307	0,580	1,785	0,230 – 13,855
Knowledge	1,225	1,106	0,293	3,404	0,347 – 33,387
Role of Nurses	2,388	3,790	0,052	10,890	0,984 – 120,524
Family Support	-3,152	7,154	0,007	0,043	0,004 – 0,431

Variables with p-values greater than 0.05 were gradually eliminated from the model, beginning with the variable showing the highest p-value. This elimination process was then reapplied iteratively. The final results of the multivariate modeling are presented in Table 5.

Table 5. Final results of the multivariate modeling of the most influential factors affecting treatment adherence among chronic kidney disease patients undergoing hemodialysis at ODSK Regional General Hospital, North Sulawesi Province (n = 78)

Variable	B	Wald	Sig	Exp (B)	95%CI
Knowledge	1,962	4,090	0,043	7,116	1,062 – 47,662
Family Support	-3,442	8,811	0,003	0,032	0,003 – 0,311

The results of the table analysis suggest that patient knowledge and family support play a significant and dominant role in influencing adherence to hemodialysis among individuals with chronic kidney failure.

DISCUSSION

The Influence of Educational Level on Hemodialysis Compliance

The findings reveal that 80.8% of the 78 respondents had low-to-medium educational attainment, while only 19.2% had higher education. Chi-square analysis demonstrated a significant association between educational level and hemodialysis compliance (p = 0.009; OR = 0.10; 95% CI = 0.042–0.598), indicating that patients with higher education were 84.2% less likely to adhere to treatment compared to those with lower education levels. This phenomenon aligns with studies by Wells (2011) and Laksono (2019), which showed that formal education does not necessarily correlate positively with patient adherence.

Within the framework of Bourdieu's Theory of Practice (1986), patients with lower education tend to internalize a habitus that views health professionals as absolute authorities, making them more receptive to medical instructions. Conversely, more educated patients often activate critical cultural capital, seek second opinions, and assess the risks and benefits of treatment more rationally. This observation is also in line with the Health Belief Model (Notoatmodjo, 2014), where health behavior is influenced by perceived benefits and barriers, which are shaped by sociodemographic characteristics. Less-educated patients tend to perceive

hemodialysis as the sole viable option, whereas those with higher education often consider psychosocial and economic implications before adhering to treatment.

Nevertheless, the relatively small sample of highly educated patients (n = 15) may limit the statistical power and generalizability of these findings.

Duration of Hemodialysis and Patient Compliance

Treatment duration was also significantly associated with adherence. Patients who had undergone hemodialysis for ≥1 year exhibited a 95.3% compliance rate, compared to 71.4% among those treated for <1 year ($p = 0.004$; OR = 8.2). This finding is consistent with Kolb's Experiential Learning Theory (1984), which posits that concrete and reflective experiences foster adaptive behavior. Patients with longer treatment durations are more likely to understand the importance of adherence and the consequences of non-compliance, leading to more consistent behavioral patterns.

This finding is supported by Agustani (2022), who reported greater discipline among patients with over six months of treatment. These patients also tend to be better adapted to physical, emotional, and lifestyle changes associated with long-term therapy.

Knowledge Level and Patient Compliance

Among patients with good knowledge, 93.3% were compliant with hemodialysis schedules, compared to 72.8% in the low-knowledge group. The association was statistically significant ($p = 0.013$; OR = 5.2), indicating that well-informed patients were 5.2 times more likely to comply. This supports Nutbeam's Health Literacy Framework (2000), which emphasizes the role of individual capacity to access, understand, and utilize health information effectively.

These results are in line with Laksono (2019), who found that knowledge is a key determinant of treatment adherence. Patients who understand the process, benefits, and risks of hemodialysis are more likely to engage in responsible health behaviors.

Healthcare Access and Compliance

While 86.1% of patients with good access reported high compliance, 77% of those with access barriers were also adherent. Statistical analysis revealed no significant association between service access and compliance ($p = 0.411$; OR = 1.8; 95% CI = 0.429–8.116). This aligns with Ramadhani (2022), who similarly reported no significant relationship between healthcare accessibility and adherence.

According to Andersen's Behavioral Model of Health Services Use (1968), access is an enabling factor but not the primary driver of healthcare behavior. In chronic conditions such as kidney failure, perceived need and motivation—rather than mere availability—play a more decisive role. Even when physical access is present, intrinsic motivation and social support often become the main influences on adherence to long-term care.

Nurses' Role and Patient Compliance

A total of 89.7% of patients who perceived nurses' roles as positive were compliant with therapy. In contrast, only 50% of those who rated nursing care as poor adhered to their treatment regimen. This association was statistically significant ($p = 0.006$; OR = 8.7), indicating a strong influence of nursing care perception on patient behavior.

According to Orem's Self-Care Deficit Nursing Theory (cited in Hartweg, 1991), nurses function as educators and facilitators in supporting patients' self-care behaviors. For chronic kidney disease patients, who often experience care deficits, nursing interventions serve as critical motivators and behavioral reinforcers. Mukaromudin (2024) also emphasized the crucial role of nurses in improving adherence among hemodialysis patients.

Family Support and Compliance

Family support was significantly associated with adherence (p = 0.006; OR = 7.4; 95% CI = 1.810–30.430). Patients who received strong family support were considerably more likely to comply with hemodialysis schedules. This finding supports the Family Health Theory (Wright & Leahey, as cited in Baia, 2014), which highlights the role of family systems in influencing health decision-making and behaviors.

Similarly, Paath (2020) found a significant correlation (p = 0.000) between family involvement and treatment compliance. In practical terms, family support provides emotional encouragement, logistical assistance, and shared decision-making—all of which reinforce adherence to therapy.

Multivariate Analysis: Determinants of Compliance

Multivariate logistic regression analysis revealed that among all examined variables, patient knowledge (p = 0.043) and family support (p = 0.003) emerged as the most significant predictors of adherence. These findings underscore the importance of health education and family involvement as key strategies in improving treatment compliance among chronic kidney disease patients undergoing hemodialysis.

CONCLUSION

This study concludes that several key factors significantly influence the adherence of chronic kidney disease patients undergoing hemodialysis at RSUD ODSK in North Sulawesi Province. These include educational level, duration of hemodialysis treatment, knowledge about the disease and its management, the perceived role of nurses, and family support. In contrast, healthcare access was not found to be a significant determinant of adherence. Among all variables examined, knowledge and family support emerged as the most influential predictors of patient compliance. These findings underscore the multifactorial nature of treatment adherence and highlight the importance of addressing both cognitive and social dimensions in patient care.

Based on the results of this study, it is recommended that healthcare institutions prioritize continuous health education programs tailored to the individual needs of hemodialysis patients, regardless of their formal education level. Health education should be delivered through interactive and culturally appropriate strategies that enhance patient understanding and self-management. In addition, family members should be actively involved in the care process through structured counseling sessions and support systems that empower them to assist patients in adhering to their treatment schedules. Furthermore, the role of nurses should be strengthened by equipping them with the necessary training and institutional support to function as patient educators, motivators, and facilitators. Policymakers are also

encouraged to integrate these strategies into local health service protocols to improve long-term treatment outcomes for patients with chronic kidney disease.

REFERENCES

Andersen, R., Agustani, S. and others (2022) 'Analisis faktor-faktor yang berhubungan terhadap kepatuhan pasien gagal ginjal kronik dalam menjalani hemodialisa di Unit Hemodialisa RSUD 45 Kuningan 2021', Journal of Public Health Innovation Health Sciences Journal, 2(2), June, pp. [page numbers if available]. doi:10.34305/jphi.v2i2.411.

Badan Penelitian dan Pengembangan Kesehatan (2019) Laporan nasional Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia. Available at: https://labmandat.litbang.kemkes.go.id/images/download/laporan/RKD/2018/Laporan_Nasional_RKD2018_FINAL.pdf.

Baia, R. (2014) 'Review of: Wright LM, Leahey M. Nurses and families: a guide to assessment and intervention in family. 5th ed. São Paulo: Roca, 2012', Revista Rene.

Bello, A.K., Okpechi, I.G., Osman, M.A. et al. (2022) 'Epidemiology of haemodialysis outcomes', Nature Reviews Nephrology, 18, pp. 378–395.

Damayanti, Y.A. and Sarnianto, P. (2021) 'Analisis kualitas hidup pada pasien hemodialisis di rumah sakit wilayah Cirebon', Jurnal Ilmiah Indonesia, 6(6), pp. 5–24. doi: http://dx.doi.org/10.36418/syntax-literate.v6i6.3108.

Hartweg, D.L. (1991) Dorothea Orem: Self-care deficit theory. Newbury Park, CA: Sage Publications.

Kalantar-Zadeh, K., Jafar, T.H., Nitsch, D., Neuen, B.L. and Perkovic, V. (2021) 'Chronic kidney disease', The Lancet, 398, pp. [page numbers if available]. doi: 10.1016/S0140-6736(21)00519-5.

Kusniawati (2018) 'Hubungan kepatuhan menjalani hemodialisis dan dukungan keluarga dengan kualitas hidup pasien gagal ginjal kronik di ruang hemodialisa Rumah Sakit Umum Kabupaten Tangerang', Jurnal Medikes (Media Informasi Kesehatan), 5(2), pp. 206–233. doi:10.36743/medikes.v5i2.61.

Kusuma, H. et al. (2019) Mengenal penyakit ginjal kronis dan perawatannya. Semarang: Penerbit Fakultas Kedokteran Universitas Diponegoro.

Kolb, D.A. (1984) Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice-Hall.

Laksono, G.D. (2019) 'Faktor-faktor yang mempengaruhi kepatuhan pasien gagal ginjal kronik dalam menjalani program therapi hemodialisa di RS PKU Muhammadiyah Gombong', The 10th University Research Colloquium.

Mukaromudin, M., Mulyadi, E. and Novhriyanti, D. (2024) 'Hubungan dukungan keluarga dan peran perawat terhadap kepatuhan pasien gagal ginjal kronik (GGK) dalam menjalani terapi hemodialisa di ruang hemodialisa RSUD Jampangkulon', Journal of Public Health Innovation (JPHI), 4(2), pp. 333–340. doi: 10.34305/jphi.v4i02.1004.

Notoatmodjo, S. (2014) Promosi kesehatan dan ilmu perilaku. Jakarta: Rineka Cipta.

Nutbeam, D. (2000) 'Advancing health literacy', Health Promotion International, 15(3), pp. 183–184. doi:10.1093/heapro/15.3.183.

Paath, C.G.J. (2020) 'Study cross sectional: Dukungan keluarga terhadap kepatuhan hemodialisa pada pasien gagal ginjal kronis', Journal Keperawatan (JKp), 8(1), pp. 106–112.

Pebriantari, N.K.G. and Dewi, I.P.A. (2020) 'Hubungan komplikasi intra hemodialisis dengan kualitas hidup pada pasien chronic kidney disease (CKD) stage V yang menjalani hemodialisis di ruang hemodialisa BRSU Tabanan', Jurnal Riset Kesehatan Nasional, 2(1), pp. 9–17. doi: http://dx.doi.org/10.37294/jrkn.v2i1.95.

Ramadhani, D. (2022) 'Faktor-faktor yang berhubungan dengan tingkat kepatuhan pasien penyakit ginjal kronik dalam menjalani hemodialisis', Jurnal Kesehatan Ilmiah Indonesia, 7(2), [December], pp. [page numbers if available].

Wells, J.R. (2011) 'Hemodialysis knowledge and medical adherence in African Americans diagnosed with end-stage renal disease: Results of an educational intervention', Nephrology Nursing Journal, 38(2), pp. 155–162.