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Original Research

The Relationship Between Medical Staff Education and Hemodialysis Therapy Adherence to Improve Quality of Life in Patients with Chronic Kidney Disease (CKD) at RSUD Menggala

Diajeng Ariwidowati, Endang Budiati and Sugeng Eko Irianto*

Master of Public Health Study Program, Faculty of Health, Universitas Mitra Indonesia, Lampung, Indonesia

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***Correspondence:**
Sugeng Eko Irianto
Address: Faculty of Health, Universitas Mitra Indonesia, Lampung, Indonesia.
Email: ekoindo@gmail.com

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ABSTRACT

Background: Chronic kidney disease (CKD) is a chronic condition that requires routine and continuous hemodialysis therapy. Patient adherence to hemodialysis at RSUD Menggala is crucial to prevent complications and improve quality of life. Various factors are suspected to influence adherence, including environmental factors, educational instruments/media, and individual factors. This study aimed to analyze the relationship between environmental, instrument, and individual factors and adherence to hemodialysis therapy among CKD patients at RSUD Menggala in 2025. **Methods:** This study used a quantitative analytical cross-sectional design to examine the relationship between healthcare professionals' educational interventions and adherence to hemodialysis therapy among stage 5 CKD patients at RSUD Menggala in 2025. Data were collected from 84 respondents using structured questionnaires and analyzed using Chi-square and logistic regression tests with SPSS version 26 to identify factors associated with adherence to hemodialysis therapy. **Results:** The majority of respondents showed moderate to high adherence to hemodialysis therapy. Bivariate analysis revealed significant associations between environmental factors (p=0.004), educational instruments (p=0.003), and individual factors (p<0.001) with adherence. Patients with supportive environments, adequate educational media, and positive individual characteristics were more likely to adhere to therapy. Multivariate analysis showed that individual factors were the most dominant determinant (p=0.001; OR=12.308), indicating that patients with favorable individual factors had more than twelve times higher likelihood of adherence compared to those with unfavorable factors. **Conclusion:** Individual factors play the most significant role in improving adherence to hemodialysis therapy among CKD patients at RSUD Menggala.

Keywords: Hemodialis; chronic kidney disease; patient adherence

1. INTRODUCTION

Patient adherence to hemodialysis (HD) is a crucial factor in the successful management of chronic kidney disease (CKD). Hemodialysis requires lifelong commitment, typically performed two to three times per week for four to five hours per session. Adherence includes attending scheduled sessions, completing the prescribed duration, following fluid and dietary restrictions, and taking medications regularly. However, psychological distress, limited knowledge, inadequate family support, and economic challenges often contribute to poor adherence.[1]

Globally, CKD prevalence continues to rise and represents a major public health burden. An estimated 2.2–7 million CKD patients die annually due to lack of access to renal replacement therapy.[2] In Indonesia, CKD prevalence has increased significantly, particularly among individuals aged over 55 years.[3,4] Despite the growing need for HD, adherence to treatment regimens remains suboptimal. Non-adherence can lead to fluid overload, electrolyte imbalance, cardiovascular complications, decreased quality of life, and increased mortality.[5]

Health education is recognized as a key strategy to improve adherence. Structured and theory-based educational interventions, particularly those grounded in health behavior theories such as Green's model, emphasize perceived susceptibility, severity, benefits, and barriers in influencing behavior6. Previous studies have demonstrated a significant relationship between health education and adherence to fluid and dietary restrictions among HD patients.[7,8] Nevertheless, adherence problems persist, indicating the need for more effective, theory-driven interventions. Therefore, strengthening structured health education programs is essential to enhance adherence and improve clinical outcomes in CKD patients undergoing hemodialysis.

Recent studies have highlighted that adherence to hemodialysis therapy is a complex and multifactorial issue influenced not only by clinical conditions but also by psychosocial, behavioral, and educational factors. Several recent international studies have demonstrated that structured and patient-centered educational interventions significantly improve adherence behavior, treatment compliance, and clinical outcomes among CKD patients undergoing hemodialysis.[9,10] For instance, interventions incorporating continuous counseling, individualized education, and behavioral reinforcement have been shown to enhance patients' understanding of treatment importance and increase their motivation to adhere to prescribed regimens. In addition, a study by Kim et al. (2021) found that patients who received comprehensive education from healthcare professionals were more likely to comply with fluid restrictions, medication schedules, and dialysis attendance compared to those who received standard care.[11]

Furthermore, recent evidence emphasizes that the effectiveness of educational interventions depends on how well they are tailored to individual patient characteristics, including cognitive level, psychological readiness, and social support systems. Patients with higher levels of knowledge and stronger family or social support tend to demonstrate better adherence behaviors and improved quality of life outcomes. Conversely, the lack of structured education programs, limited interaction with healthcare providers, and inadequate communication strategies may contribute to persistent non-adherence among hemodialysis patients. Despite the growing body of evidence, gaps remain in the implementation of standardized, theory-based educational interventions in many healthcare settings, particularly in regional hospitals where resources, training, and program evaluation systems are still limited.

Therefore, this study is important to provide empirical evidence on the role of healthcare professionals' educational interventions in improving adherence to hemodialysis therapy and enhancing patients' quality of life. The findings of this study are expected to contribute to the development of more effective, evidence-based educational strategies, support healthcare providers in optimizing patient-centered care, and serve as a reference for policymakers in strengthening chronic disease management programs, particularly in resource-limited settings. This study aims to analyze the relationship between healthcare professionals' educational interventions and adherence to hemodialysis therapy in improving the quality of life of patients with CKD at RSUD Menggala in 2025.

2. METHODS

2.1 Study Design

This study employed a quantitative analytical research design with a cross-sectional approach. The cross-sectional design was used to examine the relationship between healthcare professionals' educational interventions and adherence to hemodialysis therapy among CKD patients at a single point in time. This design allows for the identification of associations between variables without requiring long-term follow-up, making it suitable for assessing behavioral and clinical factors in a clinical setting.

2.2 Time and Location

The study was conducted at RSUD Menggala, specifically in the Hemodialysis Unit, in 2025. Data collection was carried out over a two-month period from December 2025 to January 2026. The selected location represents a referral hospital providing routine

hemodialysis services, allowing access to patients undergoing regular treatment and ensuring the feasibility of data collection.

2.3 Population, Sample, and Sampling Technique

The study population consisted of all patients diagnosed with stage 5 CKD who were undergoing routine hemodialysis therapy at RSUD Menggala in 2025. The sample size was calculated using the Lemeshow formula and adjusted by adding 10% to account for potential non-response or dropouts, resulting in a total sample of 84 respondents.

A total sampling technique was applied because the population size was relatively small (fewer than 100 patients). Therefore, all eligible patients who met the inclusion criteria were recruited into the study. Inclusion criteria included patients who were undergoing regular hemodialysis, were able to communicate effectively, and were willing to participate. Exclusion criteria included patients with severe complications or those who were unable to complete the questionnaire.

2.4 Variables

The independent variable in this study was healthcare professionals' educational interventions, which included several components: medical education, dietary management education, vascular access care education, complication prevention education, and psychosocial support education. The dependent variable was adherence to hemodialysis therapy, which included adherence to scheduled dialysis sessions, medication compliance, dietary restrictions, and fluid intake limitations. Each variable was measured using a structured questionnaire and categorized based on predefined scoring criteria.

2.5 Data Collection

Primary data were collected using structured questionnaires administered directly to respondents during their hemodialysis sessions. The questionnaires were designed to assess the level of education provided by healthcare professionals and the level of patient adherence to therapy. Prior to data collection, the questionnaire was tested for validity and reliability to ensure the accuracy and consistency of the instrument.

Data collection was conducted by trained research assistants who provided explanations to respondents when necessary to ensure proper understanding of each question. Secondary data were obtained from patients' medical records to support clinical information, such as diagnosis and treatment history. The data collection process followed a standardized procedure, including respondent identification, informed consent, questionnaire distribution, and verification of completed responses.

2.6 Data Analysis

Data processing involved several stages, including editing, coding, data entry, and data cleaning to ensure data completeness and accuracy. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 26. Univariate analysis was conducted to describe the characteristics of respondents and study variables using frequency distributions and percentages. Bivariate analysis was performed using the Chi-square test to examine the relationship between healthcare professionals' educational interventions and adherence to hemodialysis therapy, with a significance level of $p < 0.05$. Variables that met the criteria in bivariate analysis were further analyzed using multivariate analysis (logistic regression) to identify the most dominant factors influencing adherence. The results were presented in the form of odds ratios (OR) with 95% confidence intervals (CI).

2.7 Ethical Practices

This study was conducted in accordance with ethical principles for research involving human participants. Ethical approval was obtained from the Health Research Ethics Committee, Faculty of Health, Universitas Mitra Indonesia, with ethical clearance number: S.25/027/FKES10/2026. Before data collection, all respondents were informed about the purpose, procedures, benefits, and potential risks of the study. Written informed consent was obtained from each participant prior to their inclusion in the study. Participation was voluntary, and respondents had the right to withdraw at any time without any consequences. Confidentiality and anonymity of participants were strictly maintained by ensuring that all data were coded and not linked to personal identities.

3. RESULTS

3.1 Characteristics of Respondents

A total of 84 respondents participated in this study (Table 1). Based on age distribution, the majority of respondents were in the 56–65 years age group (31.0%),

followed by those aged 46–55 years (22.6%) and above 65 years (21.4%). This indicates that most hemodialysis patients were in the older adult age group, which is consistent with the higher prevalence of CKD in older populations.

Table 1. Distribution of respondents based on sociodemographic characteristics (n = 84)

Variable	Frequency	Percentage
Age		
17–25 years	2	2.4
26–35 years	8	9.5
36–45 years	11	13.1
46–55 years	19	22.6
56–65 years	26	31.0
>65 years	18	21.4
Gender		
Male	39	46.4
Female	45	53.6
Education level		
Elementary school	10	11.9
Junior high school	18	21.4
Senior high school	33	39.3
Diploma	5	6.0
Bachelor degree	18	21.4
Occupation		
Civil servant / military / police	3	3.6
Private employee	21	25.0
Self-employed	26	31.0
Farmer	12	14.3
Housewife	3	3.6
Unemployed	19	22.5
Marital status		
Single	10	11.9
Married	68	80.95
Widowed/divorced	6	7.14

Based on occupation, the largest proportion of respondents were self-employed (31.0%), followed by private employees (25.0%) and unemployed individuals (22.5%). Most respondents were married (80.95%), indicating that the majority had family support, which may influence adherence behavior. Overall, these characteristics provide an overview of the sociodemographic profile of CKD patients undergoing hemodialysis at RSUD Menggala.

3.2 Univariat Analysis

3.2.1 Hemodialysis adherence

Most respondents were categorized as non-adherent (66.7%), while only 3.6% were categorized as always adherent (Table 2). The distribution of adherence to hemodialysis therapy showed that the majority of respondents were categorized as non-adherent (66.7%). Meanwhile, 17.9% were categorized as rarely adherent, 11.9% as often adherent, and only 3.6% as always adherent.

These findings indicate that adherence to hemodialysis therapy among CKD patients in this setting is generally low. The high proportion of non-adherent patients suggests that many patients do not fully comply with recommended treatment schedules, medication use, or lifestyle modifications. This condition may increase the risk of complications and negatively affect patients' quality of life.

Table 2. Distribution of hemodialysis adherence (n = 84)

No.	Adherence category	Frequency (n)	Percentage (%)
1	Non-adherent	56	66.7
2	Rarely	15	17.9
3	Often	10	11.9
4	Always	3	3.6
	Total	84	100

3.3 Bivariate Analysis

Fisher's Exact test was applied due to unmet Chi-square assumptions. The results showed significant relationships between educational factors and adherence behavior (Table 3). Bivariate analysis was conducted using Fisher's Exact test due to the unmet assumptions for the Chi-square test. The results demonstrated that all independent variables had statistically significant relationships with hemodialysis adherence ($p < 0.05$).

Table 3. Relationship between educational factors and hemodialysis adherence

Variable	*p*-value
Material factor	0.001
Environmental factor	0.004
Instrument factor	0.003
Individual factor	0.000

All independent variables were significantly associated with hemodialysis adherence ($p < 0.05$).

Specifically, material factors (p = 0.001), environmental factors (p = 0.004), instrument factors (p = 0.003), and individual factors (p < 0.001) were all significantly associated with adherence behavior. This indicates that patients who received better educational materials, had supportive environments, adequate educational instruments, and positive individual characteristics were more likely to adhere to hemodialysis therapy.

3.4 Multivariate Analysis

Logistic regression analysis using backward stepwise method identified two dominant variables influencing adherence. Multivariate analysis using logistic regression with a backward stepwise method identified two dominant variables influencing adherence to hemodialysis therapy, namely environmental factors and individual factors. Environmental factors were significantly associated with adherence (p = 0.003; OR = 8.341; 95% CI: 2.10–33.12), indicating that patients with supportive environments had more than eight times higher likelihood of being adherent compared to those without such support (Table 4).

Individual factors showed the strongest association (p = 0.001; OR = 12.308; 95% CI: 3.45–43.89), meaning that patients with favorable individual characteristics—such as better knowledge, motivation, and psychological readiness—were over twelve times more likely to adhere to hemodialysis therapy.

Table 4. Final logistic regression model

Variable	p-value	OR	95% CI
Environmental factor	0.003	8.341	2.10 – 33.12
Individual factor	0.001	12.308	3.45 – 43.89

The individual factor was the most dominant variable affecting adherence to hemodialysis therapy.

4. DISCUSSION

Characteristics of Respondents. This study involved 84 respondents, with the majority aged 56–65 years (31.0%) and >65 years (21.4%). The increasing prevalence of CKD with advancing age is well documented. Age-related decline in glomerular filtration rate and the accumulation of comorbid conditions such as hypertension and diabetes mellitus contribute significantly to CKD progression. Older patients undergoing hemodialysis often face physical limitations and multiple health problems that may influence their adherence to long-term therapy.

In terms of gender, slightly more respondents were female (53.6%) than male (46.4%). Although biological differences may influence CKD progression, adherence behavior is largely shaped by psychosocial and educational factors rather than sex alone.

Most respondents had completed senior high school (39.3%), followed by bachelor's degree and junior high school (21.4% each). Education level is closely related to health literacy, which affects patients' ability to understand disease severity, treatment benefits, and the risks of non-adherence. Higher educational attainment is associated with better treatment compliance in chronic diseases.

Regarding occupation, most respondents were self-employed (31.0%) and private employees (25.0%). Employment status may influence adherence due to time constraints, work fatigue, and financial burdens. Economic and transportation barriers have been identified as common factors affecting dialysis adherence. The majority of respondents were married (80.95%), indicating the potential presence of family support. Social support plays an essential role in chronic disease management, as emotional and instrumental assistance from family members improves adherence to dialysis schedules and dietary restrictions.

Hemodialysis Adherence. The findings revealed that 66.7% of respondents were categorized as non-adherent, while only 3.6% were always adherent. This indicates that adherence to hemodialysis therapy remains suboptimal. Non-adherence in hemodialysis patients may include skipping sessions, shortening dialysis duration, and failing to follow fluid and dietary restrictions.

Several factors may explain this low adherence rate, including psychological stress, depression, treatment fatigue, and inadequate knowledge. Long-term dialysis therapy significantly impacts quality of life and may lead to emotional distress, which negatively affects adherence behavior.[12] Therefore, strengthening educational and psychosocial interventions is crucial to improve adherence and patient outcomes

The bivariate analysis using Fisher's Exact test demonstrated significant relationships between all educational factors and hemodialysis adherence (p < 0.05). This confirms that educational components play a crucial role in shaping patient behavior. The material

factor was significantly associated with adherence (p = 0.001). Clear, structured, and patient-centered educational materials enhance understanding and awareness regarding the importance of regular dialysis therapy. Effective health education improves patient knowledge and promotes positive behavioral change. Patients who understand the risks of missing dialysis sessions such as fluid overload and cardiovascular complications are more likely to adhere to therapy.

Environmental Factor and Adherence. The environmental factor showed a significant relationship with adherence (p = 0.004). A supportive environment, including family encouragement, accessible healthcare services, and effective communication with health professionals, positively influences adherence behavior. Environmental reinforcement is an important determinant of health behavior according to behavioral theories. Social support has consistently been associated with better dialysis attendance and treatment compliance.

Instrument Factor and Adherence. The instrument factor was also significantly related to adherence (p = 0.003). Educational tools such as brochures, audiovisual media, reminder systems, and counseling sessions enhance patient engagement and reinforce learning. Multimodal educational interventions have been shown to improve adherence outcomes among patients undergoing dialysis therapy.

Individual Factor and Adherence. The individual factor showed the strongest statistical significance (p = 0.000). This factor includes knowledge, beliefs, motivation, and self-efficacy. According to health behavior theory, individuals who perceive their illness as serious and believe in the benefits of treatment are more likely to adhere to medical recommendations. Self-efficacy and positive attitudes toward therapy are strong predictors of adherence in CKD patients.

Logistic regression analysis identified environmental and individual factors as dominant predictors of hemodialysis adherence. The environmental factor had an Odds Ratio (OR) of 8.341 (95% CI: 2.10–33.12; p = 0.003), indicating that patients with supportive environments were more than eight times more likely to adhere to therapy compared to those without support. This finding aligns with previous studies emphasizing the importance of social and healthcare support systems in chronic disease management. The individual factor was the most dominant variable (OR = 12.308; 95% CI: 3.45–43.89; p = 0.001). Patients with strong internal motivation, good knowledge, and positive attitudes were approximately twelve times more likely to adhere to hemodialysis therapy. Similar studies have demonstrated that patient empowerment and self-efficacy significantly predict adherence behavior in dialysis populations.

This study has several strengths that should be acknowledged. First, it provides comprehensive analysis by incorporating multiple dimensions of educational factors, including material, environmental, instrumental, and individual components, allowing for a more holistic understanding of adherence behavior among CKD patients undergoing hemodialysis. Second, the use of multivariate analysis enables the identification of the most dominant factors influencing adherence, which is valuable for designing targeted and evidence-based interventions. In addition, the use of validated and reliable instruments enhances the credibility and accuracy of the findings.

However, this study also has several limitations. The cross-sectional design limits the ability to establish causal relationships between variables, as data were collected at a single point in time. The relatively small sample size and single-center setting (RSUD Menggala) may limit the generalizability of the findings to broader populations. Furthermore, data on adherence were collected using self-reported questionnaires, which may be subject to recall bias and social desirability bias. Future studies are recommended to use longitudinal designs, larger and more diverse samples, and objective measures of adherence to strengthen the evidence and improve the applicability of the findings.

5. CONCLUSION

This study confirms that healthcare professionals' educational interventions are significantly associated with adherence to hemodialysis therapy among patients with CKD at RSUD Menggala. Among the examined factors, individual factors emerged as the most dominant determinant influencing patient adherence. These findings support the hypothesis that effective education plays a crucial role in improving adherence behavior in hemodialysis patients. It is recommended that healthcare providers strengthen patient-centered educational strategies to enhance adherence and treatment outcomes. Future studies are encouraged to explore additional influencing factors and apply longitudinal or mixed-

method approaches to gain deeper insights into adherence behavior.

Ethical Approval

Ethical approval was obtained from the Health Research Ethics Committee, Faculty of Health, Universitas Mitra Indonesia, with ethical clearance number: S.25/027/FKES10/2026.

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Competing Interests

All the authors declare that there are no conflicts of interest.

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Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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