

ORIGINAL ARTICLE

Self-Efficacy and Compliance to Fluid Restriction in Chronic Kidney Disease Patients Undergoing Hemodialysis

Nonok Karlina, Citra Setyo Dwi Andhini, Ani Nurhaeni, Dewi Erna Marisa, Dwiyanti Purbasari

Institut Teknologi dan Kesehatan Mahardika, Cirebon, West Java, Indonesia

ABSTRACT

Introduction: Hemodialysis is an essential therapy for patients with chronic kidney disease (CKD) to maintain fluid and metabolic balance. Previous studies have shown that higher self-efficacy is associated with better adherence to fluid restriction, yet most findings are derived from cross-sectional designs, non-specific measurements, and limited evidence in the Indonesian context. Addressing this gap, the present study aims to evaluate the relationship between self-efficacy and compliance with fluid restriction among CKD patients undergoing hemodialysis. **Methods:** A cross-sectional study was conducted involving 48 CKD patients undergoing routine hemodialysis at a dialysis center. Self-efficacy was measured using the validated Bahasa Indonesia version of the Chronic Kidney Disease Self-Efficacy Scale. Compliance with fluid restriction was assessed using the Indonesian version of the Fluid Restriction Compliance Observation Form. A forward logistic regression method using SPSS was utilized for identify the relationship between self-efficacy and compliance to fluid restriction with confounders adjustment. **Results:** In CKD patients undergoing hemodialysis who has higher score of self-efficacy are associated with increased likelihood of compliance to fluid restriction after adjustment for confounders (adjusted OR = 1.18, $p = 0.024$). **Conclusion:** Having higher self-efficacy is likely to be associated with higher odds of compliance to fluid restriction among CKD patients undergoing hemodialysis. Hence, self-efficacy should be adequately monitored through intervention designed to enhance self-management during hemodialysis process, specifically fluid restriction..

Malaysian Journal of Medicine and Health Sciences (2026) 22(SUPP9): 130-134. doi:10.47836/mjmhs.22.s9.20

Keywords: Compliance, Chronic Kidney Disease, Fluid, Hemodialysis, Self-Efficacy.

Corresponding Author:

Nonok Karlina

Email: nonok.karlina@mahardika.ac.id

Tel: +6287720201121

INTRODUCTION

Chronic kidney disease (CKD) is a permanent decrease in kidney function, with kidney gradually losing their capacity to maintain fluid balance and metabolism(1). A meta-analysis study revealed that 434.3 million adults have CKD in Asia (Liyanage). Based on an Indonesian nationwide survey, 38% of adults are diagnosed with CKD and 19.33% undergoing hemodialysis, with West Java ranking ninth highest (2).

Renal replacement therapy, hemodialysis, is a common management method for individuals with CKD to improve their quality of life Indonesian data shows that this therapy is the most prevalent treatment approach for CKD patients in Indonesia(3) Hemodialysis patients should take responsibility for many aspects of their treatment to manage this chronic condition successfully. Specifically, for CKD patients undergoing prolonged

hemodialysis, it is crucial to maintain enough fluid levels to ensure proper blood flow to the kidneys and increase the filtration rate and urine output(4) However, a previous study revealed that the prevalence of nonadherence to fluid restrictions was substantially high.

Perceived disease-related self-efficacy is a fundamental component of effectively managing chronic diseases(5). In CKD patients, self-efficacy plays a significant role in slowing the advancement. It has been demonstrated that a higher degree of self-efficacy in patients with CKD is connected with a higher quality of life and lower levels of depression and anxiety(6). In addition, greater self-efficacy was associated with adherence to medication, diet, and fluid restriction among hemodialysis patients across different countries(7). Therefore, the self-efficacy of patients undergoing dialysis is a valuable determinant of effective management, nursing interventions, and better outcomes(8).

Despite substantial evidence indicating a significant association between self-efficacy and compliance to fluid restrictions in chronic kidney disease patients undergoing hemodialysis in Indonesia, the results

remain less robust in the data analysis, which was conducted more than five years ago data(9,10). In addition, the prevalence of individuals with CKD undergoing hemodialysis is increasing rapidly with the lower prevalence of compliance with fluid restriction; investigating self-efficacy as a determinant factor on fluid restriction compliance with adjusting several confounders is imperative(11,12). Therefore, this study examined the relationship between self-efficacy and compliance with fluid restriction in chronic kidney disease undergoing hemodialysis.

MATERIALS AND METHODS

Study design and sample

A cross-sectional study involving forty-eight patients was conducted to examine the association of self-efficacy and compliance to fluid restriction in CKD patients undergoing hemodialysis in one of government hospital in West Java. The CKD patients undergoing hemodialysis who agreed to participate were recruited. The inclusion criteria were being 18 years of age or above, diagnosed with CKD, undergoing hemodialysis for at least 3 months, and understanding and being able to use Bahasa Indonesia for speaking and writing. Patients who have a critical condition (i.e., loss of consciousness) or severe mental illness were excluded.

Data collection

This study was conducted between May to June, 2022. After being informed of the research context, purpose, and eligibility criteria, participants provided written informed consent. Subsequently, they answered questions pertaining to basic demographics data and completed the questionnaires. Participants could withdraw from the study at any time.

Measurements

Self-efficacy was evaluated using the Chronic Kidney Disease Self-Efficacy (CKD-SE). This questionnaire consists of 25 questions, with each item scored on a 6-point Likert scale ranging from 1 (not at all confident) to 6 (totally confident). Higher scores indicate greater self-efficacy. The Chronic Kidney Disease Self-Efficacy (CKD-SE) questionnaire was translated and culturally adapted into Bahasa Indonesia before use in this study. Content validity was evaluated by three experts in nephrology nursing and medical-surgical nursing, and the questionnaire was then pilot-tested for construct validity and reliability among 30 hemodialysis patients at Medimas Hospital, West Java. The Indonesian version of the CKD-SE demonstrated satisfactory internal consistency, with Cronbach's alpha for the subscales ranging from 0.843 to 0.901. In our study sample, a Cronbach's alpha value of 0.832 confirmed good internal consistency of the Bahasa Indonesia CKD-SE.

Fluid restriction compliance was assessed with the Fluid Intake Restriction Compliance observation form

developed in our pilot study(13). Participants were instructed to record the various fluids they consumed daily, which were then compared to their daily fluid consumption restrictions. Participants were classified as either compliant or non-compliant with fluid restriction(7). We assessed the inter-rater reliability between two evaluators using the Fluid Intake restriction compliance observation form. The Kappa values ranged from 0.54 to 0.87, indicating satisfactory inter-rater reliability.

Statistical analysis

All statistical analyses were conducted using IBM SPSS statistics version. In the univariate analyses, all data presented as numbers and frequencies (categorical data). The association of each confounder with compliance to fluid restriction was first analyzed using univariate binomial regression analysis. Multivariate binomial logistic regression analysis was performed to examine the predictive compliance to fluid restriction for the occurrence of depression after adjustment for confounders. Variables with $p < 0.25$ in the bivariate analysis were included in the multivariate analysis. A forward logistic regression method was applied to identify the relationship between self-efficacy and compliance to fluid restriction with confounders adjustment. Hosmer-Lemeshow goodness-of-fit test were performed to identify the models that fit the measured outcome. The significance level hypothesis testing was set at $p < 0.05$.

Ethical Approval

Ethical approval of this study was obtained by the institutional research board of STIKES Mahardika (approved the number 118/KEPK STIKMA/VII/2022).

RESULTS

A total of 48 participants were included in this study, 20 (41.7%) were woman and 28 (58.3%) were man, with majority participant at 75 years old and above, below bachelor education, and have more than 6-months duration of undergoing hemodialysis. Of the included participants, 38 (79.17%) had adequate compliance to fluid restriction, with average self-efficacy score of 74.31.

Table I presents the distribution of characteristics, confounders, and the association of each confounder with the compliance to fluid intake restriction. Only time of undergoing hemodialysis was significantly associated with compliance to fluid intake restriction. However, we include gender and time of undergoing hemodialysis as confounders ($p < 0.25$) in the multivariate analysis.

Table II presents the results of multivariate binomial logistic regression analysis with compliance to fluid restriction as the outcome measure. CKD patients undergoing hemodialysis who has higher score of self-efficacy are associated with increased likelihood

Table I. Distribution of socio-demographic factors based on compliance to fluid restriction

Variables	All participants (N = 48)	Compliance (N = 38)	Non-compliance (N = 10)	p value
Age				
< 75 years	45 (93.8)	35 (92.1)	10 (100.0)	0.488
≥ 75 years	3 (6.2)	3 (7.9)	0 (0.0)	
Gender				
Male	28 (58.3)	21 (55.3)	7 (70.0)	0.230
Female	20 (41.7)	17 (44.7)	3 (30.0)	
Education				
Below bachelor education	36 (75.0)	28 (73.7)	8 (80.0)	0.517
Bachelor education	12 (25.0)	10 (26.3)	2 (20.0)	
Hemodialysis duration				
< 6 months	17 (35.4)	17 (44.7)	0 (0.0)	0.009
≥ 6 months	31 (64.6)	21 (55.3)	10 (100.0)	

Table II. Hierarchical logistic regression analysis of factors significantly associated with compliance to fluid restriction.

Variables	Compliance of fluid restriction					
	Step 1		Step 2		Step 3	
	AOR	p value	AOR	p value	AOR	p value
Self-efficacy	1.12	0.003*	1.21	0.013*	1.18	0.024*
Gender	-	-				
Male			Ref	Ref	Ref	Ref
Female			29.69	0.103	32.47	0.073
Hemodialysis duration	-	-	-	-		
≥ 6 months					Ref	Ref
< 6 months					1.04	0.088

Abbreviation: AOR, Adjusted Odds Ratio/WHO.

*p < 0.05

of compliance to fluid restriction after adjustment for confounders (adjusted OR = 1.18, p = 0.024). The goodness-of-fit test indicated a good model fit (p = 0.426).

DISCUSSION

To the best of our knowledge, this was the first study to examine the association of self-efficacy with the compliance to fluid restriction using confounder adjustment. Our results indicated that every increasing score of self-efficacy substantially increase the odds of adequate compliance in CKD patients undergoing hemodialysis regarding fluid intake restriction in this population. The robustness of this relationship remains consistent after adjustment of several confounders. Previous studies consistently concluded that higher self-efficacy is beneficial for increasing compliance with fluid intake restriction in CKD patients undergoing hemodialysis (13).

Self-efficacy is a personal belief in one's ability to organize and execute courses of action required to attain designated types of performances (2,14). Thus, understanding the concept of self-efficacy may support self-management behavior in managing the disease. Meta-analysis studies revealed that self-management interventions have considerable beneficial effects on several conditions, including hypertension, low back pain, and asthma (15,16). In terms of patients undergoing hemodialysis, self-efficacy has been found to be

associated not only with adherence to fluid restriction but also with medication and dietary (17,18). Further, self-efficacy could also correlate with the increased patient quality of life (19).

In addition, even though the results are not significant, we observed that gender and hemodialysis duration have been found to be confounding variables that predict compliance to fluid restriction. In this study, compliance was higher in female than male participants, similar to the previous study (20). CKD patients with hemodialysis are long-term ongoing treatment, and compared with males, females may have adequate coping mechanisms for dealing with hemodialysis conditions, with relatively higher medication adherence (21). Besides, in this study also found that compliance was higher in participants who underwent hemodialysis for <6 months than ≥6 months. In patients with long-term therapies, long-term adherence and persistence are significant challenges. A study revealed that disease duration become one of the key factors in predicting medication adherence in patients with chronic diseases (22–24).

Our findings, together with those of previous studies, suggest that increasing the level of self-efficacy independently increases the likelihood of compliance to fluid restriction in CKD patients undergoing hemodialysis. Clinicians should, therefore, prescribe interventions that enhance patients' self-efficacy, for example, self-management or patient activation interventions, to optimize compliance, specifically fluid restriction.

Additionally, several limitations of this study need to be acknowledged. First, cross-sectional, observational nature of our study precluded the determination of any causal relationship. Second, self-report techniques may incur some reporting bias. Third, small sample size may produce some non-significance results.

CONCLUSION

Our findings revealed that having higher self-efficacy is likely to be associated with higher odds of compliance to fluid restriction among CKD patients undergoing hemodialysis. Future studies should evaluate the correlation of self-efficacy on others compliance other than fluid restriction, such as dietary or medication adherence and on patient's quality of life.

REFERENCES

- Liyanage T, Toyama T, Hockham C, Ninomiya T, Perkovic V, Woodward M, et al. Prevalence of chronic kidney disease in Asia: a systematic review and analysis. *BMJ Glob Health*. 2022 Jan 25;7(1):e007525. doi:10.1136/bmjgh-2021-007525
- Sadeli R, Harnavi H, Drajad P, Deka V. The role of urinary potassium examination on the progressivity of chronic kidney disease: a narrative literature review. *Bioscientia Medicina: Journal of Biomedicine and Translational Research*. 2022 Sep 22;6(12):2495-2508. doi:10.37275/bsm.v6i12.636
- Andrea M. Physical activity is a necessary part of care in patients with chronic kidney disease: short historical overview. *Prim Health Care*. 2017;7(2):271. doi:10.4172/2167-1079.1000271
- Rivera E, Clark-Cutaia MN, Schrauben SJ, Townsend RR, Lash JP, Hannan M, et al. Treatment adherence in CKD and support from health care providers: a qualitative study. *Kidney Med*. 2022 Nov 1;4(11):100545. doi:10.1016/j.xkme.2022.100545
- Curtin RB, Walters BAJ, Schatell D, Pennell P, Wise M, Klicko K. Self-efficacy and self-management behaviors in patients with chronic kidney disease. *Adv Chronic Kidney Dis*. 2008 Apr;15(2):191-205. doi:10.1053/j.ackd.2008.01.006
- Nguyen TTN, Liang SY, Liu CY, Chien CH. Self-care self-efficacy and depression associated with quality of life among patients undergoing hemodialysis in Vietnam. *PLoS One*. 2022 Jun 1;17(6):e0270100. doi:10.1371/journal.pone.0270100
- Masoud SAE, Abd-Elaziz SH, Mohamed SK, Abdo OI. Self-efficacy and adherence to medication and fluid restriction among patients undergoing hemodialysis. *Egyptian Nursing Journal*. 2023 Jan;20(1):50-56. doi:10.4103/enj.enj_4_23
- Almutary H, Tayyib N. Evaluating self-efficacy among patients undergoing dialysis therapy. *Nurs Rep*. 2021 Mar 1;11(1):195-201. doi:10.3390/nursrep11010019
- Mailani F, Mahathir M, Yuni AR. Self-efficacy and compliance fluid intake restrictions in chronic kidney disease patients undergoing hemodialysis: a cross-sectional study. *Jurnal Keperawatan Komprehensif*. 2023 Jul;9(3). doi:10.33755/jkk
- Syaripudin A, Purbasari D, Marisa D. Buku ajar keperawatan gawat darurat. 1st ed. Vol. 1. Palu, Sulawesi Tengah: Feniks Muda Sejahtera; 2022.
- Marisa DE, Elengoe A, Wahyuni S. Aromatherapy: achieving its benefits and uses in modern times. *International Journal of Society Reviews*. 2024 Apr;2(4):963-972.
- Marisa DE, Al-Jaberi M, Elengoe A, Wahyuni S, Supriyadi Y. Reducing insomnia in the elderly with lavender aromatherapy in Karyamulya sub-district, Kesambi District, Cirebon City. *Journal of Health Research and Technology*. 2024 Feb 20;2(1):117-124. doi:10.58439/jhrt.v2i1.202
- Lai PC, Wu SFV, Alizargar J, Pranata S, Tsai JM, Hsieh NC. Factors influencing self-efficacy and self-management among patients with pre-end-stage renal disease. *Healthcare (Basel)*. 2021;9(3):266. doi:10.3390/healthcare9030266
- Hamza Hermis A, Ibrahim Abed R. Effectiveness of self-regulation fluid program on patients with hemodialysis self-efficacy for fluid adherence in Al-Diwaniyah Teaching Hospital. *Iraqi National Journal of Nursing Specialties*. 2021;34.
- Oliveira E, Ennis-Durstine K, Figueiredo S. When providers become the center of our attention: can we comfort them? A qualitative thematic analysis from a hospitalwide cross-sectional survey. *Qual Life Res*. 2020;29 Suppl 1:S104. doi:10.1007/s11136-020-02626-y
- Lin CC, Wu CC, Anderson RM, Chang CS, Chang SC, Hwang SJ, et al. The chronic kidney disease self-efficacy instrument: development and psychometric evaluation. *Nephrol Dial Transplant*. 2012 Oct;27(10):3828-3834. doi:10.1093/ndt/gfr788
- Marisa DE, Dioso RI, Elengoe A, Kamasturyani Y, Iyos R. Tackling adolescent anemia: a systematic review of integrated interventions. *Al-Rafidain Journal of Medical Sciences*. 2025 Jan 4;8(1):6-13. doi:10.54133/ajms.v8i1.1601
- Marisa DE, Dioso RI, Elengoe A, Kamasturyani Y. Efforts to increasing hemoglobin levels and its impact on adolescent girls entering pregnancy in Indonesia. *African Journal of Biomedical Research*. 2025 Jan;28(1):334-338. doi:10.53555/AJBR.v28i1S.3614
- Peters M, Potter CM, Kelly L, Fitzpatrick R. Self-efficacy and health-related quality of life: a cross-sectional study of primary care patients with multimorbidity. *Health Qual Life Outcomes*. 2019 Feb 14;17(1):37. doi:10.1186/s12955-019-1103-3
- National Institute for Health and Care Excellence.

Renal replacement therapy and conservative management. NICE guideline NG107. London: National Institute for Health and Care Excellence; 2018.

21. Siregar CT. Buku ajar manajemen komplikasi pasien hemodialisa. 1st ed. Ariga RA, editor. Yogyakarta: Deepublish Publisher; 2020.
22. Marisa DE. Support of family to people live with HIV/AIDS (PLWHA) in the working area of Kaliwedi Health Center in District of Cirebon. *Jurnal Kesehatan Mahardika*. 2018;5(1):57-63.

doi:10.54867/jkm.v5i1.37

23. Marisa DE. Motivasi pelaksanaan latihan ROM pada pasien stroke berdasarkan dukungan keluarga di Puskesmas Ciledug Kabupaten Cirebon. *Jurnal Kesehatan Indra Husada*. 2022;8(1). doi:10.36973/jkih.v8i1.203
24. Marisa D, Syaripudin A. The correlation between anxiety and sleep quality in tuberculosis patients in the work area of Public Health Center Sitopeng Area Cirebon City. *Jurnal Kesehatan Mahardika*. 2020;7(2):1-5. doi:10.54867/jkm.v7i2.5