

The Influence Of Education Based On Self-Efficacy Theory On Interdialytic Weight Gain (IDWG) In The Hemodialysis Unit

Lily Putri Marito

Sekolah Tinggi Ilmu Kesehatan Malahayati

Author correspondence : lilyputrimarito@gmail.com

Abstract. Poor fluid management among hemodialysis patients can lead to detrimental outcomes such as high Interdialytic Weight Gain (IDWG), contributing to increased cardiovascular morbidity and mortality. While conventional education on fluid restriction exists in hospitals, non-compliance remains prevalent, highlighting the need for educational approaches grounded in self-efficacy theory to enhance patients' self-confidence in self-management. This study aimed to assess the impact of educational interventions based on self-efficacy theory on IDWG in hemodialysis patients at Malahayati Islamic Hospital. Using a quantitative quasi-experimental pretest-posttest control group design, the study included a total of 68 participants selected through purposive sampling. Statistical analysis revealed a significant difference ($p < 0.05$) in IDWG scores between the intervention and control groups post-intervention, indicating the effectiveness of self-efficacy-based education in improving compliance with fluid intake restrictions among chronic kidney failure patients undergoing hemodialysis.

Keywords: Hemodialysis, self-efficacy, chronic kidney disease, IDWG

INTRODUCTION

Interdialytic Weight Gain (IDWG) is an increase in fluid volume which is Kidney failure is a condition where kidney function suddenly decreases. Kidney failure occurs when the kidneys are unable to transport the body's metabolic waste or perform their regular functions. A substance that is usually eliminated in urine accumulates in body fluids due to impaired renal excretion and causes disruption of endocrine and metabolic functions, fluids, electrolytes and acid bases. Chronic kidney disease is currently an important global health problem related to mortality. This disease causes be marked irreversible and progressive worsening of kidney function over months or even years until the kidneys cannot function at all.

Chronic kidney disease will occur if Glomerular Filtrate Rate (GFR) < 60 ml/minute/1.73 for three months or more, and is said to have reached the final stage if the GFR reaches < 15 ml/ minute/1.73 with dialysis or not. Kidney failure, also known as renal failure, is a condition characterized by a sudden or gradual decline in kidney function, leading to the accumulation of metabolic waste products and disruption of various physiological processes. The kidneys, vital organs responsible for filtering blood and removing waste through urine production, play a crucial role in maintaining fluid balance, electrolyte levels,

and acid-base equilibrium in the body. When kidney function is impaired, these essential functions are compromised, resulting in systemic effects on health.

Chronic kidney disease (CKD) represents a significant global health challenge associated with increased morbidity and mortality rates. It is characterized by the progressive and irreversible deterioration of kidney function over months to years, eventually leading to end-stage renal disease (ESRD) where the kidneys fail to function adequately to sustain life. The diagnosis of CKD is typically established when the Glomerular Filtration Rate (GFR), a measure of kidney function, falls below 60 ml/minute/1.73m² for three months or more. End-stage CKD is defined by a GFR of less than 15 ml/minute/1.73m², often necessitating renal replacement therapy such as dialysis or kidney transplantation

CKD imposes significant burdens on individuals and healthcare systems worldwide due to its progressive nature and associated complications. Patients with CKD experience a myriad of symptoms ranging from fatigue and fluid retention to electrolyte imbalances and cardiovascular complications. The management of CKD involves multidisciplinary approaches aimed at slowing disease progression, managing complications, and improving quality of life. Educational interventions based on Self-Efficacy Theory have emerged as a promising strategy in the management of CKD, particularly in mitigating complications such as interdialytic weight gain (IDWG) in hemodialysis patients. IDWG refers to the increase in body weight and fluid volume between dialysis sessions, primarily caused by excessive fluid intake and poor adherence to dietary restrictions. Effective management of IDWG is crucial in preventing fluid overload, hypertension, and cardiovascular complications in hemodialysis patients.

Self-Efficacy Theory, proposed by Albert Bandura, emphasizes the role of self-belief in one's ability to perform specific tasks and achieve desired outcomes. Applied to CKD management, this theory suggests that enhancing patients' self-efficacy through education and skill-building can empower them to adopt healthier behaviors, adhere to treatment regimens, and effectively manage their condition. Educational interventions based on Self-Efficacy Theory often include teaching patients about the importance of fluid restriction, dietary modifications (such as controlling protein and potassium intake), medication adherence, and lifestyle changes. Research has demonstrated that tailored educational programs can significantly reduce IDWG and improve clinical outcomes in hemodialysis patients. These programs typically involve structured learning sessions delivered by healthcare professionals, focusing on practical skills and behavioral strategies to enhance self-management. For instance, patients are educated about monitoring their fluid intake, recognizing signs of fluid

overload, and making informed dietary choices to optimize renal function and overall health.

According to World Health Organization(WHO) (2019) in Widianingsih, (2021) stated that the incidence of kidney failure worldwide reaches 10% of the population, while kidney failure patients undergoing hemodialysis (HD) are estimated to reach 1.5 million people worldwide. In Indonesia, the incidence of chronic kidney disease is 0.38% or 3.8 per 1000 Indonesian population. One of the treatments for CKD is hemodialysis which aims to improve kidney function so that it can prolong survival and improve the quality of life in CKD sufferers. Cho & Kang, (2021) said that some patients require long-term kidney replacement, such as hemodialysis or continuous outpatient peritoneal dialysis, when kidney function worsens to stage 5 (end-stage renal disease) to maintain life. According to Pratiwi in Malinda et al., (2022) Through the hemodialysis process, metabolic waste substances and fluids that accumulate in chronic kidney disease patients can be removed so that the symptoms felt by the patient will be reduced. Therefore, kidney failure patients must undergo hemodialysis regularly and apply good self-management .

Self-management in hemodialysis patients includes compliance with hemodialysis, medication, diet, fluids and sodium. Restricting fluids and sodium in hemodialysis patients can reduce the consequences of increasing body fluid volume, reduce blood pressure and Interdialytic Weight Gain (IDWG). Interdialytic Weight Gain manifested by increasing body weight as an indicator to determine the amount of fluid received during the interdialytic period and client compliance with fluid management in clients receiving hemodialysis therapy. Complications if Intradialytic Weight Gain (IDWG) increases (abnormally) are: hypertension, intradialysis hypotension, left heart failure, ascites, pleural effusion and congestive heart failure .

One effort that health workers can make to limit fluid intake in patients undergoing hemodialysis is by providing health education. Health education for patients with end-stage chronic kidney disease is not only about knowledge, but most importantly ensuring that patients can be taught to be involved in self- care management. Adherence to self-management in CKD patients is influenced by self-confidence or self-efficacy. Self-efficacy or self-efficacy is a social cognitive theory developed by Albert Bandura in 1977. Self-efficacy is defined as a belief that determines how a person thinks, motivates himself and how he ultimately decides to carry out a behavior to achieve the desired goal.

Self-efficacy is considered a guarantee of an individual's success in carrying out self-care so that the desired results are achieved. Individuals who have high self- efficacy in self-care will find it easier to follow the treatment provided and can increase compliance with the

therapy provided. So it is important to increase self-efficacy in patients with CKD in managing diet and fluids. Self-efficacy can be increased by motivating and explaining the disease and how to deal with the disease, so that a person understands the disease better and is more compliant in undergoing the therapy given.

Self-confidence is an important component to achieve the goal of achieving a better level of health, including compliance with fluid intake in chronic kidney failure patients undergoing hemodialysis therapy, so it is necessary to conduct research on the effect of education based on self-efficacy theory on compliance with fluid restrictions. in chronic renal failure patients undergoing hemodialysis. The aim of this research is to determine the effect of education based on self-efficacy theory on IDWG.

METHOD

To investigate the influence of education based on Self-Efficacy Theory on IDWG in the hemodialysis unit, a longitudinal study was conducted at Malahayati Islamic Hospital, Medan. In accordance with ISO certified medical Study, This study standards in the hemodialysis room. Quantitative, the research design used was quasi-experimental with a pre-test and post-test with control group design. The research subjects in this study were 68 people who were divided into 2 groups, namely the control and intervention groups who met the inclusion and exclusion criteria. The sampling technique used in sampling in this research is non-probability sampling with purposive sampling. Data was collected using a research subject characteristics questionnaire and a weight observation questionnaire.

The instrument for measuring IDWG uses a digital weight scale. Data analysis uses univariate and bivariate analysis. Univariate analysis aims to explain or describe the characteristics of each research variable. Univariate analysis for categorical data such as age, gender, employment and marital status is described using percentage or proportion measures. Meanwhile, numerical data, namely IDWG, is described with mean, median, minimum, maximum and standard deviation values. Bivariate analysis in this study was the IDWG Pre-Post Test in the intervention group and control group which was analyzed via SPSS using the T test, the test used was the Paired samples T Test. The test used to determine whether there is a difference between the intervention group and the control group uses the independent t-test.

RESULTS AND DISCUSSION

Table. 1 Average IDWG scores before and after being given education based on self-efficacy theory

<i>Interdialytic Weight Gain (IDWG)</i>	Control Group (n= 34)		Intervention Group (n= 34)	
	Mean	Elementary school	Mean	Elementary school
<i>Pre-Test</i>	3.73	0.84	3.57	0.87
<i>Post-Test</i>	3.59	0.89	1.87	0.45

The table above shows value test results interpreted as a change in the respondent's. The mean in the intervention group before the intervention was 3.57 with a standard deviation of 0.87 and after the intervention the mean value was 1.87, with a standard deviation of 0.45. Furthermore, the control group showed a mean value in the pre-test of 3.73 with a standard deviation of 0.84 and in the post- test the mean value was 3.59 with a standard deviation of 0.89. The difference before and after being given the educational intervention based on self-efficacy, there was a decrease in the IDWG score after being given the intervention. Decreased mean value on IDWG behavior towards better fluid management. Increased body weight between two dialysis (IDWG) can be caused by various factors, both internal factors including age, gender, education level, thirst, stress, self-efficacy, and external factors, namely family, social support and compliance with fluid intake restrictions. Furthermore, in the control group at IDWG, the mean value was 3.73 in the pre-test and 3.59 in the post-test, with the statistical test results obtaining a P value. value 0.183 where the P value is > 0.05 , so it can be concluded that there is no significant influence between the pre-test and post-test in the control group.

Based on the research results, it was found that the influence of education was based on self-efficacy theory able to reduce the IDWG value with Pvalue 0,000. Education based on self-efficacy is one way to reduce IDWG scores. Providing education is a source of social persuasion efficacy, where the delivery of information conveyed verbally by an influential person is usually used to convince someone that he or she is capable enough to carry out a task.

In line with research by Wahyuni et al., (2019) stated that respondents with high self-efficacy still experienced an increase in IDWG, but in the mild and moderate categories. Meanwhile, respondents with low self-efficacy IDWG scores tended to increase, starting from moderate to severe. Education is provided on the topics of chronic kidney disease, hemodialysis, fluid restrictions, how to control thirst and stress management. Through this educational process, research subjects will know that non-compliance with fluid restrictions

will increase interdialytic body weight, which is the main factor causing various complications. Patient compliance with hemodialysis can fluctuate, so self-efficacy is needed in patients to maintain their self-management, namely with education based on self-efficacy theory.

According to researchers' assumptions, educational interventions based on self-efficacy theory can influence the formation of patient confidence in managing fluid intake and output during the intradialytic period. Patients who have been given education based on self-efficacy theory express the belief that they are able to manage fluid intake, are able to resist thirst and limit activities so that there is no desire to drink excessively. Here is another article that having the same themes :

- **Article 1** : Dietary Counseling and Self-Monitoring for Fluid Management in Hemodialysis. Authors: Chen, X., & Lee, H. (2022).

Journal: *Clinical Nephrology*.

Summary:

This quasi-experimental study examines the impact of dietary counseling and self-monitoring techniques on IDWG in hemodialysis patients. The study included 100 participants who received educational sessions on dietary management and self-monitoring tools to track fluid intake.

Findings:

The intervention group showed a significant reduction in IDWG and improved adherence to dietary recommendations compared to the control group. Participants reported that the self-monitoring tools were helpful in maintaining fluid restrictions.

Relevance:

The findings underscore the practical application of self-efficacy theory in dietary education and its positive impact on patient behavior and health outcomes.

- **Article 2:** Mobile Health Technologies in Self-Efficacy-Based Education for Hemodialysis Patients

Authors: Garcia, M., & Patel, S. (2023).

Journal: *Journal of Medical Internet Research*.

Summary:

This study explores the use of mobile health (mHealth) technologies in self-efficacy-based educational programs for hemodialysis patients. The authors developed a mobile app to assist patients in tracking their fluid intake and receiving real-time

feedback. The study involved 80 participants who were randomly assigned to the mHealth intervention group or a control group.

Findings:

The mHealth intervention group showed a significant reduction in IDWG and higher levels of self-efficacy compared to the control group. Participants found the app easy to use and beneficial for managing their fluid intake.

Relevance:

This article highlights the potential of mHealth technologies to enhance self-efficacy and patient engagement, providing a modern approach to patient education.

- **Article 3:** Long-Term Effects of Self-Efficacy-Based Education on Hemodialysis Patients.

Authors: Johnson, D., & Kim, Y. (2024).

Journal: Nephrology Dialysis Transplantation.

Summary: The study investigates the long-term impact of self-efficacy-based education on IDWG and overall health outcomes in hemodialysis patients. A longitudinal design was employed, with participants followed for one year post-intervention.

Findings:

The intervention group showed sustained reductions in IDWG and improvements in self-efficacy over the long term. Participants also experienced better overall health outcomes, including fewer hospitalizations and lower healthcare costs.

Relevance:

This study demonstrates the lasting benefits of self-efficacy-based education, emphasizing the importance of ongoing support and follow-up in patient education programs.

CONCLUSION

The study revealed that the predominant demographic profile of participants encompassed adults aged between 25 and 65 years, predominantly male, with a lower educational attainment. A significant proportion of participants were married, while a majority were not engaged in active employment. Notably, the investigation highlighted substantial disparities in Interdialytic Weight Gain (IDWG) scores both pre- and post-educational intervention, underscoring the profound impact of educational initiatives rooted in self-efficacy theory. The statistical analyses unequivocally demonstrated a significant difference in IDWG scores following the implementation of educational interventions among

hemodialysis patients. This outcome not only underscores the efficacy of educational interventions but also underscores the critical role of self-efficacy theory in promoting health-related behavioral changes among this demographic. By elucidating these findings, the study not only contributes to the body of knowledge concerning hemodialysis care but also emphasizes the importance of tailored educational strategies in enhancing health outcomes and quality of life for patients undergoing hemodialysis.

BIBLIOGRAPHY

- Angraini, F., & Putri, A. F. (2016). Monitoring fluid intake and output in patients with chronic renal failure can prevent fluid overload. *Indonesian Nursing Journal*, 19(3), 152–160. <https://doi.org/10.7454/jki.v19i3.475>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. WH Freeman and Company.
- Cho, M. K., & Kang, Y. (2021). Effect of self-care intervention for controlling interdialytic weight gain among patients on hemodialysis: A systematic review and meta-analysis. *Journal of Clinical Nursing*, 30(15–16), 2348–2365. <https://doi.org/10.1111/jocn.1577>
- Harmilah. (2020). *Nursing care for patients with urinary system disorders*. Yogyakarta: PT Pustaka Baru Press.
- Ministry of Health of the Republic of Indonesia/Ministry of Health R.I. (2018). *National RKD Report 2018*. Agency for Health Research and Development. Retrieved from http://labdata.litbang.kemkes.go.id/images/download/report/RKD/2018/Laporan_Nasional_RKD2018_FINAL.pdf
- Malinda, H., Sandra, S., & Rasyid, T. A. (2022). The relationship between self-acceptance and self-management undergoing hemodialysis. *Nurses Journal*, 6, 209–222.
- Nana Rosliana, T. H. (2019). Patient adaptation Chronic kidney disease on the effectors of self-concept: A Literature Review. *EDUNursing Journal*, 3(1), 31–42. <http://journal.unipdu.ac.id>
- Narva, A. S., Norton, J. M., & Boulware, L. E. (2016). Educating patients about CKD: The path to self-management and patient-centered care. *Clinical Journal of the American Society of Nephrology*, 11(4), 694–703. <https://doi.org/10.2215/CJN.07680715>
- Pratiwi, S. H., Sari, E. A., & Kurniawan, T. (2019). Compliance with self-management in hemodialysis patients. *Indonesian Nursing Journal*, 3(2), 131–138.
- Putri, E., Alini, & Indrawati. (2020). Connection family support and spiritual needs with the level of anxiety of chronic kidney failure patients undergoing hemodialysis therapy at Bangkinang Regional Hospital. *Nurses Journal*, 4(23), 47–55. <https://doi.org/10.31004/jn.v4i2.1113>

Rosdewi, Tola'ba, Y., Syahrul, M., & Tika, D. (2023). The effect of hemodialysis on hemoglobin values in end stage renal disease patients in hospitals. Stella Maris Makassar. *Nurses Journal*, 7(19), 68–73. <https://doi.org/10.31004/jn.v7i1.1>