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Implementation of Educational Leaflets in Improving Fluid Restriction Noncompliance in Hemodialysis Patients: A Case Study

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ABSTRACT
Hemodialysis is a treatment method for patients with end-stage chronic kidney disease. Hemodialysis cannot cure or reverse kidney disease, nor can it compensate for the loss of renal metabolism or endocrine activity, and the impact of kidney failure and its treatment on quality of life. Fluid restriction in patients with chronic kidney disease undergoing hemodialysis is essential to prevent the risk of fluid overload between hemodialysis sessions (Interdialytic Weight Gain/IDWG). Many factors cause patients to be non-compliant with fluid restriction, such as work demands and family support. This is greatly influenced by patients' understanding of the benefits and objectives of fluid restriction and the impact of excessive fluid intake in hemodialysis patients. The purpose of this study was to implement educational leaflets to improve understanding of fluid restrictions in hemodialysis patients. This study used a case study approach with three patients. The intervention was carried out over three days with meetings lasting 20-30 minutes. The population used in the study were CKD patients on HD at the hospital. Data were collected through interviews, direct observation, physical examinations, and through patient medical records. The results of this study showed significant improvement after the educational intervention using leaflets was given to three patients. On average, there was improvement. The study concluded that implementing education using leaflets was effective in helping patients understand fluid restrictions.
Keywords: *Educational Media, Leaflets, Understanding, Fluid Restrictions, Hemodialysis*.

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INTRODUCTION
Chronic Kidney Disease or chronic renal failure is a secondary clinical syndrome caused by definitive changes in kidney function or structure, characterized by its irreversibility and slow, progressive evolution. Chronic renal failure is a series of clinical symptoms caused by a progressive decline in kidney function over many years. Chronic kidney failure is divided into three stages: mild chronic kidney failure, moderate chronic kidney failure, and severe chronic kidney failure. Kidney failure can cause death if replacement therapy is not performed and has reached the end stage (Nugraha & Idramsyah, 2023).

According to the World Health Organization (WHO) in 2020, CKD ranks ninth among the ten deadliest diseases in the world. According to the United States Renal System (USRDS), there were 804,434 CKD patients in the United States in 2020 (United States Renal Data System (USRDS), 2021). This information shows that Chronic Kidney Disease (CKD) is a significant global health problem. Based on data from the Ministry of Health of the Republic of Indonesia in 2020, it was found that in Indonesia, the prevalence of CKD is 0.2%. Compared to other age groups, the prevalence of CKD in the 75 years and older age group is 0.6% (Feronika et al., 2025).

The 2018 Basic Health Research (RISKESDAS) conducted by the Health Research and Development Agency shows that the prevalence of CKD in Indonesia is 0.38% or 3.8 people per 1000 population, and about 60% of people with kidney failure have to undergo dialysis (Indonesian Ministry of Health, 2023). Most deaths in patients with chronic kidney disease (CKD) are often caused by complications from diabetic nephropathy, which can lead some patients to reach the end stage of kidney failure and require renal replacement therapy. It is estimated that around 100,000 patients in Indonesia require this therapy

due to the high risk of complications, as well as the high incidence, mortality, and medical costs (Larasati et al., 2025).

Chronic kidney failure can be treated in two ways: first, kidney transplantation, and second, hemodialysis. Patients with chronic kidney failure who have experienced kidney dysfunction usually have to undergo renal replacement therapy or hemodialysis. Hemodialysis is a treatment method for end-stage chronic kidney failure patients. Hemodialysis cannot cure or restore kidney disease, nor can it compensate for the loss of kidney metabolism or endocrine activity, and the impact of kidney failure and its treatment on quality of life (Nugraha & Idramsyah, 2023). Restricting fluid intake in chronic kidney failure patients undergoing hemodialysis is very important to prevent the risk of fluid overload between hemodialysis sessions (Interdialytic Weight Gain/IDWG) (Feronika et al., 2025).

Based on the observations made by the researcher, a hemodialysis patient with fluid restriction was found in Mr. Y, aged 36, who was undergoing hemodialysis with a fluid restriction of 800 cc. However, due to the demands of his job as a contractor, the patient often felt excessive fatigue and sweating, and the hot weather caused him to feel thirsty, so he often forgot about the fluid restriction. Several other patients also experienced the same thing. Many factors cause patients to be non-compliant in restricting fluid intake, such as work demands and family support. This is greatly influenced by the patient's knowledge in understanding the benefits and purposes of fluid restriction and the effects of excessive fluid intake on hemodialysis patients.

Based on the above description, it is known that knowledge is a major factor in determining patient non-compliance with fluid restrictions. Therefore, to improve patient understanding of fluid restrictions, education is very important for hemodialysis patients. One way to support education is through the use of media, including print, audio, and audio-visual media. Leaflets are a simple form of print media that is often used in health education.

METHODS

This study used a descriptive case study method on three patients with chronic renal failure who were undergoing hemodialysis with fluid restriction. The intervention provided was education about fluid restriction, including its definition, effects, and methods. The results of the intervention were assessed based on fluid intake monitoring, shortness of breath levels, and vital signs. The data were analyzed descriptively by comparing the monitoring results before and after the provision of education using leaflets.

RESULTS

Based on the results of nursing assessment and care of patients with CKD undergoing hemodialysis with fluid restrictions, three patients were selected as research respondents with the following characteristics

Table 1
Patient Characteristics

	Patient 1	**Patient 2**	**Patient 3**
Initial	Mrs. A	Mr. Y	Mr. H
Age	78 Years Old	36 Years Old	50 Years Old
Gender	Female	Male	Laki-laki
Diagnosis	CKD ON HD, DM, CVD NH	CKD ON HD	CKD ON HD
Vital Sign	Blood pressure : 150/90mmHg Pulse: 110 x/menit Temperature: 36,5°C	Blood pressure: 150/80 mmHg Pulse: 106x/minute	Blood pressure : 140/80 mmHg Pulse: 114x/minute breathing: 24 x/minute Temperature : 36°C SpO_2: 95%

	breathing: 22x/minute SpO_2: 98%	breathing: 23x/minute Temperature: 36,5°C SpO_2: 95%

Table 2
Monitoring of health education related to fluid restrictions

		Before Education	**After Education**
Patient 1 Mrs. A	Day I	Shortness of breath and edema breathing : 24, Pulse: 112	- O2 5 L/minute, SpO_2 98%. - Vital signs: - Pulse: 110 beats/minute - Breating: 22 breaths/minute - BP: 150/90 mmHg - Intake: 1000 cc, Output: 400 cc, balance +600 cc. - Edema Grade 3
	Day II	Shortness of breath and edema reduced : breathing 22, Pulse: 106	- O2 3 L/minute, SpO_2 98%. - Vital signs stable: - Pulse : 105 beats/min - Breathing : 20 breaths/min - BP: 140/90 mmHg - Intake: 900 cc, Output: 300 cc, - Pleural puncture: 8000 ml – - Fluid balance: -7,400 - Grade 1 edema in both legs
	Day III	Shortness of breath and edema Breathing 21, Pulse 103 - No edema	- No Edema - Vital signs stable: - Pulse: 80 beats/minute - Breathing: 18 breaths/minute - BP: 130/80 mmHg - Urine output remains ± 1000 cc/24 hours. - Intake: 900 cc, Output: 1000 cc, - Fluid balance -100
Patient 2 Mr. Y	Day I	Shortness of breath Breathing : 24, Pulse : 106, SpO2: 92	- Pulse: 106, Breathing 23/min, SpO_2 93%, BP 150/80 mmHg, - O2 5 L/min. - Intake 900 cc, output: 700 cc - Fluid balance +200 cc - No edema
	Day II	Shortness of breath Breathig : 22, Pulse : 101 SpO2: 94	- Pulse : 102 - Breathing : 21 x/minute - SpO_2: 95% - O_2 nasal cannula 3 L/min - BP: 140/80 mmHg - Intake: 800 cc, output 800 cc

			- Pleural fluid function 8,850 cc, yellow in color - Fluid balance - 8,850 cc - No edema observed
	Day III	No shortness of breath Breathing : 20, Pulse : 85 SpO2: 96	- Pulse : 80 - Breathing : 19 breaths per minute - SpO_2: 97% - Breathing room air - BP: 130/80 mmHg - No visible edema - Intake: 800 cc, output 900 cc - Fluid balance 100 cc
Patient 3 Mr. H	Day I	Shortness of breath and edema Breathing : 24, Pulse : 115 SpO2: 91%	- Pulse 114 x/minute - Breathing 24 x/minute - BP 140/80 mmHg - SpO_2 92% - O2 5 L/minute - Intake 800, output 150 - Fluid balance +650 - Grade 4 edema observed
	Day II	Shortness of breath and edema Breathing : 22, Pulse : 110 SpO_2: 95%	- Intake 600, output 100 - Pleural fluid function 7080 cc - Fluid balance -6,580 - Grade 2 edema visible - Vital signs stable: - Pulse : 108 beats per minute - Breathing : 21 breaths per minute - BP: 130/70 mmHg - SpO_2: 96% - O2 4 L/min
Day III		Shortness of breath and edema Breathing : 21, Pulse : 104 SpO2: 96%	- Intake 600, - output 650 - Fluid balance 50 - Grade 1 edema observed - Vital signs stable: - Pulse : 100 breaths/minute - Breathig : 19 breaths/minute - BP: 125/80 mmHg - SpO_2: 97% - O2 1 L/minute

DISCUSSION

Based on the case studies that have been conducted, this study will discuss three cases. Mrs. A (78 years old) is a patient diagnosed with stage V Chronic Kidney Disease (CKD) who undergoes routine hemodialysis, accompanied by comorbidities of type 2 diabetes mellitus, cerebrovascular disease (stroke), and non-hypertensive cardiovascular disease. Then, Mr. Y (36 years old) is a patient with a diagnosis of Chronic Kidney Disease (CKD) stage V who undergoes routine hemodialysis three times a week through CDL access in the right jugular vein. Mr. H (50 years old) is a patient diagnosed with stage V Chronic Kidney Disease (CKD) who undergoes routine hemodialysis twice a week and has had type 2 diabetes mellitus for 10 years.

Compliance with fluid intake control in hemodialysis patients is a very important factor in determining the health and well-being of patients undergoing hemodialysis. Good fluid management will have a major impact on preventing morbidity and prolonging life. If chronic kidney failure patients fail to comply with fluid intake restrictions, they will experience complications such as rapid weight gain exceeding 5%, edema, shortness of breath caused by excessive fluid volume, and uremic symptoms that can threaten life and even cause death (Rahman et al., 2024).

Based on the assessment data, the author found that in all three cases, the patients' primary complaint before admission to the hospital was shortness of breath, which had worsened over the past 3 days or even 1 month, indicating edema, hypervolemia, and a lack of knowledge and understanding among patients about fluid restrictions in hemodialysis patients.
Behavior based on knowledge tends to be more consistent than that not based on knowledge. Good, adequate, and insufficient knowledge also influences compliance with hemodialysis therapy. The data indicates that the better the knowledge, the more compliant the patient will be in performing hemodialysis therapy (Sekti et al., 2023).

The focus of this case study is to conduct interventions related to patients' lack of knowledge by providing educational leaflets. Various methods can be applied to improve the knowledge and compliance of patients with chronic kidney failure, with health education as the key intervention. Structured education plays an important role in clinical management and improving patients' quality of life. The use of diverse methods tailored to individual learning styles, along with repetition of material and practical exercises, will strengthen patients' memory and understanding of the information. The use of print media in health education enhances the effectiveness of information delivery through visual appeal that facilitates audience attention (Fajrianti et al., 2025).
Among the many educational media available, the author chose to use leaflets because of their advantages in facilitating education and efficiency. Leaflets remain the primary choice because they are concise, portable, easy to store, and more accessible to people who are not familiar with the internet, while the use of simple language in leaflets facilitates understanding, strengthens communication between nurses and patients/families, and supports the success of treatment programs (Fajrianti et al., 2025).

Leaflets are a health education medium that presents informative visuals in a concise and foldable format, making them easy to carry and store, and do not require electricity or internet access, making them very practical for communities with limited resources. With low production costs, leaflets provide an efficient economic solution. Ideally, each sheet contains 200–400 words, written in simple and concise language to ensure that the information can be understood and absorbed in one reading (Fajrianti et al., 2025).

Education using leaflets is carried out after observing patients' knowledge and understanding of fluid restrictions in hemodialysis patients. The first stage is orientation, which involves introducing oneself to the audience, conveying the purpose of the activity, and explaining why it is necessary to provide education on fluid restriction care for patients with Chronic Kidney Disease (CKD) at home, as well as the time and place. The next stage involved explaining the content and material on the definition of Chronic Kidney Disease, the causes of Chronic Kidney Disease, the signs and symptoms in Chronic Kidney Disease patients, and what should be avoided, and the factors that cause edema in patients, which necessitate fluid restriction because excess fluid in Chronic Kidney Disease patients affects the patient's physical condition, causing swelling throughout the body and, more dangerously, swelling of the lungs (pulmonary edema), which can cause shortness of breath in patients (Marni et al., 2020).

Based on case studies of three patients, namely Mrs. A, Mr. Y, and Mr. H, an implementation was carried out in the form of providing education on the definition of fluid restriction, fluids that are counted (water, juice, soup, porridge, ice, etc.), the effects of excess fluid (edema, shortness of breath, pleural effusion), how to divide the daily fluid intake of 900 cc for Mrs. A, 800 cc for Mr. Y, and 600 cc for Mr. H. In addition, the researchers also discussed ways to reduce thirst, such as gargling, sucking on small ice cubes, drinking in stages, and how excessive drinking can cause pulmonary edema, shortness of breath, and

increase the workload on the heart. Improving and addressing compliance issues with fluid restriction in hemodialysis patients, one of which is through education to enhance patients' ability to control fluid intake and increase their understanding and knowledge to prevent complications (Rahman et al., 2024). The success of implementing education using leaflets in this case can be seen from the results of fluid intake records, shortness of breath, and vital signs of patients. The evaluation results showed that patients were able to repeat the education and were compliant with fluid restriction. Before the education, fluid intake was still above 1000 cc for Mrs. A, 900 cc for Mr. Y, and 800 cc for Mr. H. After the education, there was a decrease to 900 cc for Mrs. A, 800 cc for Mr. Y, and 800 cc for Mr. H. The third monitoring results showed that the patients had complied with the recommended fluid restriction to 900 cc for Mrs. A, 800 cc for Mr. Y, and 600 cc for Mr. H.

Additionally, the results of the educational leaflet implementation can be seen from the measurement of patients' shortness of breath, where in all three case studies, there was a decrease in shortness of breath in patients. From grade 3, shortness of breath decreased until the third monitoring, where shortness of breath was no longer present. The improving TTV results of patients also illustrate the success of the implementation provided.

These results prove that education is a process that has inputs and outputs in an educational process that leads to the achievement of educational goals in the form of behavioral change (Marni et al., 2020). Education in the use of media also makes it easier for material providers to communicate. There was an increase in compliance scores after health education was conducted because respondents received a lot of information about hemodialysis and care through the materials provided in health education, both during health education and through leaflets given to respondents. The leaflets provided could be reread by respondents and other family members who did not attend health education. The health education provided aims not only to increase the respondents' knowledge (cognitive) but also to change the respondents' compliance behavior through the respondents' psychomotor domain (Kusumawardani et al., 2021).

CONCLUSION

The use of leaflets as an educational tool has an impact on patient compliance. This shows that education provided with the help of such media can improve the understanding of patients and even their families, enabling them to comply with the recommendations given.

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