

KNOWLEDGE AND FLUID INTAKE MANAGEMENT LEAD MAINTENANCE DRY WEIGHT OF PATIENT UNDERGOING HEMODIALYSIS

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Abstract

The incidence of end-stage renal disease in the worldwide. Approximately 70% (three million people worldwide) progress from renal failure to hemodialysis therapy. Renal failure is associated with a risk of fluid and electrolyte imbalance. Dry body weight is an indicator of adherence to fluid management, and the risk of complications prevents critical conditions. Risk of various complications, such as hypotension or hypertension, categories of knowledge, and lifestyle of fluid restriction. Knowledge of the relationship between knowledge and management of fluid intake retrieved from dry body weight hemodialysis patients. Quantitative Research with Cross-sectional Data Respondents and population comprised outpatients in the hemodialysis wards of the Jakarta Islamic Hospital Cempaka Putih zone in mid-year 2024. spearman rank statistical test knowledge with dry body weight p-value (0.004 <math><a0.05</math>) correlation coefficient 0.328. fluid intake management, with a dry body weight p-value (0.009 <math><a0.05</math>) correlation coefficient of 0.302. Conclusion: There was a significant relationship between knowledge and fluid intake management and dry body weight of hemodialysis patients. Future researchers should explore factors that can affect dry body weight.

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INTRODUCTION

Globally, millions of people live with end-stage renal disease and many require renal replacement therapy such as hemodialysis; please replace this sentence with precise, cited epidemiologic statistics. According to the World Health Organization (WHO), chronic kidney disease (CKD) accounts for approximately 9% of the global health burden. In a survey of 165 countries, 50% of them offered hemodialysis services 1. In 2020, kidney failure cases rose to 1.79 million, with renal replacement therapy costs reaching 2.24 trillion 2. The primary issue is kidney failure in eliminating metabolic waste and maintaining fluid and electrolyte balance 3. Hypertension, glomerulonephritis, and diabetes mellitus affect 90% of ESRD patients. Elevated serum blood urea nitrogen (BUN) leads to azotemia, renal glycosuria, increased granularity, glomerular filtration rate (GFR) levels below 15 ml/min/1.73m², urine albumin content over 300mg/g, and albumin creatinine

>30mg/mmol, indicating CKD. At this stage, renal replacement therapy such as hemodialysis is necessary 4.

The Indonesian Renal Registry (IRR) reported 17,193 new patients and 11,689 patients undergoing ESRD in Indonesia in 2019, with 2,221 hemodialysis patient deaths 5. Nutritional education and counseling are vital for maintaining kidney function and reducing morbidity in ESRD patients 6. Uncontrolled fluid intake often leads to death by increasing the dry weight gain 7. Hemodialysis causes protein and amino acid loss, negatively affecting the protein balance (Ministry of Health of the Republic of Indonesia, 2023 8. Poor fluid management can cause complications, such as fluid overload, weight gain, heart failure, and pulmonary edema 9. The increase in hemodialysis patients is due to low public awareness of signs of chronic kidney failure and the importance of self-examination. Knowledge improves the understanding of disease conditions,

and highly educated individuals exhibit better self-care than those with lower education levels 10.

Previous research has categorized CKD knowledge among respondents into low (50%), moderate (26.7%), and high (23.3%). The interdialysis body weight for CKD respondents was classified as good (80%), sufficient (13.3%), or poor (6.7%). The Spearman rank test indicated a significant difference in interdialytic weight gain (IDWG) knowledge among patients with chronic kidney failure ($P < 0.05$) 11.

A previous study divided patients into three categories: good fluid intake (74.1%), sufficient fluid intake (18.5%), and poor fluid intake (7.4%). Interdialytic body weight gain (IDWG) in hemodialysis patients was classified as heavy (5.6%), moderate (27%), or light (66%). The Spearman rank test confirms a relationship between fluid intake and IDWG in hemodialysis patients 12. Previous studies have shown a strong, significant relationship between knowledge and dry weight of hemodialysis patients, as well as between fluid intake management and dry weight. As a nurse, it is very important to understand the knowledge and management of fluid intake in CKD patients to improve the quality of nursing care. This study aimed to investigate the correlation between knowledge and fluid intake management with the dry weight of hemodialysis patients. The incidence of end-stage renal disease (ESRD) is increasing globally.

METHODS

This research is quantitative, with statistical analysis and a non-experimental cross-sectional research type. Nonprobability purposive sampling for sampling techniques. Using Slovin's formula $n = \frac{N}{1+N(e)^2}$ applied to a population of 204 individuals with a 10% error tolerance, the calculated sample size of 67.11 was rounded to 68 and subsequently increased by 10% to yield a final requirement of 75 participants. The type of data is the primary data (research instruments) answered by respondents, and the dry weight observation data. The study was conducted in April-May 2024 at the Jakarta Islamic Hospital Cempaka Putih.

A validated and reliable modified dry weight knowledge questionnaire and dry weight fluid intake management

questionnaire were utilized, and reliability and validity tests were conducted on 30 respondents. The knowledge questionnaire demonstrated validity ($0.366-0.652 > r$ Table (0.361) and reliability ($0.754 > \alpha$ (0.7), while the fluid intake management questionnaire exhibited validity ($0.375-0.777 > r$ Table (0.361) and reliability ($0.813 > \alpha$ (0.7), indicating their suitability for use. Inclusion Criteria Adults aged 18–59 years, Currently undergoing hemodialysis therapy, informed consent signed, One-day-time patients, Consented to complete the required survey instrument. and Have been undergoing hemodialysis for more than 3 months. Exclusion Criteria Hearing impairment, Age over 60 years, Decreased consciousness and Inpatients (hospitalized patients). The Univariate data analysis was performed on respondent characteristics (age, sex, education, occupation, and duration of hemodialysis) and research variables (knowledge, fluid intake management, and dry weight). The strength of the relationship between the independent and dependent variables was determined using bivariate analysis with Spearman's rank test.

RESULTS AND DISCUSSION

The analysis shows that the majority of respondents were middle-aged (41-59), with 55 individuals (73.3%), predominantly male at 41 (54.7%), mainly high school educated at 39 (52%), and most had undergone hemodialysis for over 12 months, totaling 58 (77.3%). According to Table 2, data analysis indicated that the variables of Knowledge, Fluid Intake Management, and Dry Body Weight in Hfemodialysis Patients were median-split due to non-normal distribution, with an alpha value of 0.002. The analysis showed that knowledge was mostly in the good category (47, 62.7%), Fluid Intake Management was predominantly good (32, 56.0%), and the Dry Body Weight of hemodialysis patients was generally good (40, 46.7%) A Spearman correlation coefficient ($\rho = 0.328$) indicates a weak-to-moderate positive association between knowledge and dry weight; the clinical relevance should be interpreted cautiously.. This finding aligns with Kartini's study, which also demonstrated a

significant relationship between patient knowledge and dry weight gain in patients with chronic kidney failure undergoing hemodialysis ($P < 0.05$, Spearman's rank test p -value 0.009) 11.

Most of the participants in this study had good knowledge and good fluid intake management, which was in line with 13 who reported that hemodialysis patients had a good understanding of their disease and diet. This aligns with the findings, which identified a relationship between age, sex, education level, and adherence to fluid restrictions in chronic kidney failure patients undergoing hemodialysis at Kajen Regional Hospital, Pekalongan Regency 14. It shows respondents at Jakarta Islamic Hospital Cempaka Putih's hemodialysis ward were predominantly middle-aged males with high school and college education, and had been on hemodialysis for over a year. A study conducted by Trisnaningtyas et al. also showed that male patients are more at risk of developing chronic kidney failure because men's work is heavier than women's, and women have more estrogen hormones that can inhibit the formation of cytokines 19.

Table 1. Characteristics of the Study Participants

Characteristics	Frequency	(%)
Age		
Early Adulthood (19-40)	20	26.75
Middle Adult (41-59)	55	73.3
Gender		
Man	41	54.7
Woman	34	45.3
Education		
Primary school	11	14.7
High School	39	52.0
College/academy	25	33.3
Job		
Not Working	40	53.3
Working	35	46.7
Hemodialysis Duration		
3-6 Months	4	5.3
6-12 Months	13	17.3
> 12 Months	58	77.3

Table 2. Frequency Distribution of Respondents Based on Knowledge, Fluid Intake Management and Dry Body Weight

Variables	Frequency (n)	(%)	Median
Knowledge			
Poor ($\leq 75\%$)	28	37.3	77
Good ($\geq 76\%$)	47	62.7	
Fluid Intake Management			
Poor ($\leq 75\%$)	33	44.0	77
Good ($\geq 76\%$)	42	56.0	
Dry Weight			
Bad ($\geq 3\%$)	35	46.7	2.91
Good ($< 3\%$)	40	53.3	

A study at Cempaka Putih Islamic Hospital investigated the association between knowledge, fluid intake management, and dry body weight in 75 hemodialysis patients. Most were middle-aged men with secondary education, unemployed, and undergoing hemodialysis for over 12 months. The majority had good knowledge and fluid intake management, and a dry body weight of less than three percent was more common. Spearman's rank tests showed significant relationships between knowledge and fluid intake management with dry body weight. The strength of the relationship between knowledge and management of fluid intake with dry weight showed a moderately strong relationship. This indicates that the role of nurses is very important in increasing patient knowledge and improving patient dry weight monitoring.

Experience and education influence knowledge. Higher education enhances an individual's understanding of their disease conditions and enables better self-care. Therefore, more educated individuals are better at acquiring and processing information than less educated. Learning can occur through personal or other experiences 11,10,16. According to findings, a person's learning ability depends on the information source, which is often acquired through the senses, particularly sight and hearing 19. Many respondents preferred to receive education from health workers during hemodialysis sessions. a better level of knowledge will improve patient self-care. This is in line with a study the study found that the duration of hemodialysis can affect self-care management and Interdialytic Body Weight Gains (IDWG) 18.

Sixteen respondents demonstrated poor knowledge, particularly regarding the definition, influencing factors, indications, and complications associated with dry weight. These respondents showed limited understanding of the good dry weight gain

percentages and complications arising during dialysis. Insufficient knowledge negatively impacts dry weight gain in hemodialysis patients as they fail to comprehend critical information about their therapy. Fluid intake is critical for body function for several reasons. It directly contributes to weight gain, particularly in individuals with chronic kidney disease (CKD), in which fluid removal is compromised due to impaired kidney function. This impairment leads to interdialytic weight gain (IDWG) as excess fluid accumulates in the body, causing weight gain between dialysis sessions 12.

This study showed that there was a significant relationship between knowledge and fluid intake management with dry weight. This is in line with a study that reported a significant relationship between high knowledge and compliance with fluid intake restrictions in hemodialysis patients 17. Respondents with high knowledge were 3.4 times more likely to comply with fluid intake restrictions. According to a study, showed that knowledge of fluid restrictions is crucial for effective fluid management 20. Respondents with high knowledge levels tend to have good self-control, self-discipline, and limited hemodialysis fluids, thus affecting normal dry body weight 11. Respondents with lower knowledge levels tend to exhibit excessive fluid intake, leading to higher interdialytic body weight gain (IDWG) 11.

The strength of the relationship between knowledge and management of fluid intake with dry weight showed a moderately strong relationship. This indicates that the better the knowledge and management of fluid intake, the better the patient's dry weight. This is due to the learning process and support from nurses regarding the disease process, treatment procedures, diet, medication, and fluid intake management. This is in line with the research, which shows that the existence of nurse information support regarding fluid intake management during the hemodialysis process is one of the main sources of patients, thus triggering patients to maintain their dry weight 22.

This study is not in accordance with research, which found that the level of knowledge has no significant relationship to fluid intake with dry 10. This can be caused by a lack of motivation

in patients with kidney failure in regulating fluid intake. Managing fluid intake is complicated for patients with CKD. Effective management of IDWG is facilitated by a high level of self-care management, which is influenced by various factors, such as personal traits, available resources, daily activities, and lifestyle choices 18. Fluid and sodium intake in dialysis patients is managed by adjusting salt and fluid removal through dialysis, restricting salt intake, and replenishing fluids between sessions. Typically, this is done by adjusting the dry weight. Increasing the duration or frequency of dialysis sessions for patients with high interdialytic weight gain or fluid intolerance is an effective solution, as it reduces intradialytic hemodynamic stress and enhances the accuracy of volume assessments through documented fluid intake and output 4. Hemodialysis patients with dry weight exceeding three percent are prone to complications, with factors such as age, sex, education, and duration of hemodialysis contributing to the relationship between fluid intake management and dry weight 19.

CONCLUSION

In a study conducted at Cempaka Putih Islamic Hospital, the knowledge, fluid intake control, and dry body weight of 75 hemodialysis patients were examined. The majority were middle-aged men who had completed secondary school, were jobless, and had been receiving hemodialysis for more than a year. A dry body weight of less than three percent was more prevalent, and most individuals had a strong understanding and effective fluid intake management. Significant correlations between dry body weight and fluid intake control and knowledge were found using Spearman's rank tests. There was a moderately substantial correlation between dry weight and knowledge and fluid intake control. This suggests that nurses play a critical role in enhancing patient dry weight monitoring and raising patient awareness.

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