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Non Adherence to Fluid Restriction among Patients who Undergoing Hemodialysis and Influencing Factors: Study at RSI Sakinah Mojokerto

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ABSTRACT

Background: Nonadherence to Fluid Restriction is main problem among chronic renal failure patients who undergoing hemodialysis, it causingan undesirable effect on health and risk of death. Several factors such as sociodemographic, knowledge, susceptibility of illness, perceived treat, perceived controlare some factors influencing Nonadherence behavior.

Purpose: The aim of this study was to analyze the factors influencing Non-adherence to Fluid Restriction who undergoing hemodialysis at RSI Sakinah Mojokerto.

Method: A descriptive analytic with crossectional techniques was conducted among 73 patients undergoing hemodialysis at RSI Sakinah Mojokerto by using purposive sampling technique. Data were collected through checklist and questionnaires. Descriptive statistic was used for data analysis and logistic regression test was used analysis the predictor of factors relating with Non-adherence to Fluid Restriction who undergoing hemodialysis.

Results: The results of this study showed 37% patients were Non-adherence to Fluid Restriction and 63% patients were adherence. There were three risk factors for non-adherencee, namely (Health Belief Model) HBM, history of disease and length of time undergoing hemodialysis. HBM 0.132 times higher (95% CI: 0.132, 0.035), history of disease 0.072 times higher (95% CI: 0.072, 0.012), and length of time undergoing hemodialysis 0.071 times higher (95% CI: 0.071, 0.016).

Conclusion: HBM, history of disease and length of time undergoing hemodialysis were risk factors for Non-adherence to Fluid Restriction. The nurse should consider the patient's adherence with fluid restrictions in providing nursing care.

Keywords: fluid restriction, non-adherence, risk factors

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BACKGROUND

Chronic kidney failure is a progressive condition that affected >10% of the general population worldwide, about >800 million individuals (Kovesdy, 2022). Globally, this disease was the eighth most common and the tenth cause of death in non-communicable diseases in 2019 (WHO, 2020). In Indonesia, the prevalence of chronic kidney failure was 3.8 % or 739, 208 people and increased by 90 percent from 2013. The death rate due to chronic kidney failure in Indonesia was more than 42 thousand people (Ministry of Health RI, 2018).

Moreover, the mortality rate among patients undergoing hemodialysis was 6.3–8.2 times higher. Pre-dialysis care, on dialysis, and non-adherence to treatment regimen were most common components affected patient survival (Beerappa & Chandrababu, 2019).

The patient's adherence to dialysis therapy and fluid restriction were related with patient's reluctance to follow the doctor's instructions. Measuring adherence is necessary in because we will know that patient non-cadherence can be an indication of the inability of patients to change their lifestyle while in therapy program (Krespi et al., 2004).

Serious diseases include bone demineralization, pulmonary edema, metabolic abnormalities, and cardiovascular consequences that ultimately result in mortality are caused by non-adherence to dialysis treatments. The number of patients who experienced non-adherence was reported to be quite high in some studies. Non-adherence to dialysis treatment occurs between 12.5% to 98.6% (Ghimire et al., 2015). Non-adherence of fluid restriction among patients was 9.7%–75.3 (Kugler C, Maeding I, 2011). Non-adherence to all dialysis sessions was reported at 7%–32%, non-adherence to medication at 15.4%–99% (Ghimire et al., 2015).

Patients who disregard fluid and dietary restrictions will experience an increase in interdialytic weight gain (IDWG), as well as increased cardiovascular morbidity and death. Overconsumption of salt activates osmoreceptors, which increases thirst and volume intake. This increases total body water content and raises IDWG. Hemodialysis volume removal is necessary for excessive IDWG. the rising risk of hospitalization for excess fluid with IDWG > 4% and the rising death risk with IDWG > 5.7% (Wong et al., 2017) (Beerappa &; Chandrababu, 2019).

The non-adherence rate of hemodialysis patients can be influenced by a variety of factors, such as social, economic, psychological, and factors related with health care system. To address this problem of non-adherence, thorough and in-depth research is needed to find the influencing factors and to create appropriate improvement strategies. Some studies mentioned that educational status, male sex, wearing a central venous catheter, undergoing short duration of HD as major risk factors for non-adherence (Ghimire et al., 2015) (Ozen et al., 2019).

The aim of this study was to analyses the factors affect patient non-adherence of limiting fluid intake. The results of this study are expected to give consideration to nurses on fluid restriction for patients undergoing hemodialysis therapy.

METHOD

Research Design

Descriptive analytical research using a cross-sectional design is employed.

Location and Time

This research was located at the Sakinah Islamic Hospital, Mojokerto Regency. The research was carried out in August-September 2023. This research was conducted on August-September 2023 at Sakinah Islamic Hospital, Mojokerto Regency. Research ethical

recommendations from Health Sciences Fakulty, Universitas Pesantren Tinggi Darul Ulum : 034.22-23/KEP- Unipdu/8/2023.

Population and Sample

The study population was all outpatient chronic kidney failure patients in the hemodialysis room of Sakinah Islamic Hospital, Mojokerto Regency as many as 139 patients. 73 samples with purposive sampling.

Collecting Data

The data were collected by using questionnaires, and the questionnaires consist of some questions related with knowledge, Health Belief Model, the adherence of hemodialysis management. Moreover, check list method used collected the data relating socio-demographic variables, adherence to fluid restriction, adherence to dialysis therapy, duration of hemodialysis, and causes of CRF using a check list and some data taken from medical records. The data were non-adherence for fluid restriction criteria if the data was 3.5% (Lindberg, 2008) and non-adherence for hemodialysis if the patients missed more than one dialysis session during the last 1 month period.

Questionnaire related Knowledge and Health Belief Model were validated by using Product Moment Correlation and reliability test used Cronbach's Alpha Coefficient Technique. From the results of the analysis, all questionnaires were declared valid and reliable.

Processing and Data Analysis

SPSS for Windows Version 25.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Numbers and percentages were used to display descriptive statistics. Bivariate statistics are employed in the analysis of variable relationships. The Kolmogorov-Smirnov test was used to assess the normal distribution. Unpaired nominal data were utilized in the chi-square and Fisher tests. To identify the variables influencing non-adherence, multivariate analysis included a regression analysis with a p value < 0.25 using the logistic regression test. P values less than 0.05 are seen as a sign of statistically significant differences.

RESULTS

Table1. Characteristic of Sample (n=73 samples)

Variable	Number	
	N	%
Age		
<50 Years old	35	47.9
>50 Years old	38	52.08
Employement		
Work	30	41.1
Not Work	43	58.9
Gender		
Female	30	41.1
Male	43	58.9
Education		
Senior High School	69	94.5
College	4	5.5
Period of Hemodialysis		
<1 year	21	28.8
>1 year	52	71.2

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History of illness		
Hypertension	50	68.5
Non Hypertension	23	31.5
Health belief model		
Negative	34	46.6
Positive	39	53.4
Knowledge		
Moderate	35	47.9
Good	38	52.08
The adherence of fluid restriction		
Adherence	27	37.0
Non-Adherence	46	63.0
The adherence of Dialysis		
Adherence	55	75.3
Non-Adherence	18	24.7

Based on Table 1, sociodemographic data were obtained more than half of respondents aged more than 55 years (52.08%) It means they are in the elderly group employment status was not working (58.9%), male gender (58.9%) and most of them obtained high school education (94.5%).

Moreover, the result of this study described most of them were more than 1 year for heamodialysis theraphy (71.2%), more than half of them have hypertension as hystorical of their illness (68.5%). Health belief model (HBM) data derived from questionnaires with parameters of perceived vulnerability, perceived severity, perceived benefits and perceived obstacles obtained results that had a positive HBM of 53.4% and a negative HBM of 46.6%. The results also showed that the knowledge of respondent were 47,9% were in sufficient level. Regarding the adherence of fluid restrion, the result showed that only 37 % and 75.3% the patients were asherence relating hemodialysis therapy.

Table 2. The Relationship between Sociodemography, HBM, Period of HD, History of illness, Knowledge and adherence of Fluid Restrictions among Patients at RSI Sakinah, Mojokerto (n=73).

Variable	Behavior				RO	CI (95%)		
	Adherence		Not Adherence			Lower	Higher	P Value
	n	%	N	%				
Age								
<50 years old	9	12.3	26	56.5	0.385	0.143	1.035	0.04*
>50 years old	18	24.7	20	27.4				
Gender								
Female	13	17.8	17	23.3	1.584	0.604	4.151	0.46
Male	14	19.2	29	39.7				
Employment								
Work	13	17.8	17	23.3	1.58	0.604	4.151	0.46
Not Work	14	19.2	29	39.7				
Education								
Senior High School	25	34.2	44	60.3	0.56	0.075	4.285	0.52
College	2	2.7	2	2.7				

Period of Hemodialysis								
< 1 year	15	20.5	6	8.2	8.33	2.65	26.20	0.00*
>1 year	12	26.4	40	54.8				
History of illness								
Hypertension	24	32.9	26	35.6	6.15	1.62	23.36	0.004*
Non Hypertension	3	4.1	20	27.4				
Health belief Model								
Negative	19	26	15	20.5	4.90	1.75	13.75	0.003*
Positive	8	11	31	42.5				
Knowledge								
Sufficient	20	27.4	15	20.5	5.90	2.048	17.02	0.001*
Good	7	9.6	31	42.5				

**uji chi square fisher's exact test,* P *Sig = ≤ 0,05 ;*RO: Odds Ratio*;* CI: confidence interval; HD:Hemodialysis

Based on Table 2, the results of the Fisher's exact chi square test statistic for sociodemographic data, the age variable showed p value <0.05. The OR value = 0.385, it means that respondents who aged less than 50 years have a 0.385 times higher chance for non-adherence of fluid restrictions than the patients who aged more than 50 years.

Another results showed that Fisher's exact chi square test statistic showed p value <0.05. OR value=8.33 for hemodialysis (HD) period. It means that the patients who in undergoing HD for less than 1 year had 9.33 times the change adherence for fluid restriction than the patients who undergoing HD for more than 1 year.

For History of illness variable showed the Fisher's exact chi square statistical test was p value <0.05. OR value=8.26, it means that CKD patients who had hypertension as their historical illness was 24 out of 50 and 8.26 times more likely were not adherence regarding the restriction of fluid compared with the patients who had history of diabetes and unknown disease.

Health belief Model variable showed chi square Fisher's exact test statistic was p value <0.05. OR value=4.9. It means that the patients who had negative Health Belief Model (31 out of 39) were not adherence for fluid restrictions with 4.9 times chance compared with the patients who had positive Health Belief Model.

The knowledge variable showed chi square Fisher's exact test statistic was p value <0.05. OR value = 11.72. It means that the patients who had good knowledge (31 out of 38) were adherence with fluid restriction with 11.72 times chance compared with the patients who had moderate level of their knowledge.

Table 3. Logistic Regression Analysis of Factors relating Non-non adherence of Fluid Restrictions (N = 73).

Variable	B	OR	95% CI	P
Health Belief Model	-2.026	0.132	0.132, 0.035	0.003*
Historical Illness	-2.630	0.072	0.072, 0.012	0.003*
Period of Hemodialysis	-2.639	0.071	0.071, 0.016	0.001*

In this study have 5 variables who have p value p< 0,25 they are age, duration of HD, historical illness, HBM and knowledge. All data analyzed by using Logistic Regression to determine which factors influence the adherence of fluid restrictions.

Hosmer and Lemeshow Goodness test showed that the value was 2.28 with a significance probability of 0.89 or > 0.05, it mean that 5variables in this study was feasibility of the regression model.

Logistic Regression Analysis with Backward Stepwise Method (Likelihood Ratio) showed that duration of HD, historical illness, HBM were statistical significant effect for the adherence of fluid restriction with p value < 0.05 .

Table 4. Correlation between IDWG and BUN, SC, Systole, Diastole (n=73 people)

Variable	Mean±SD	IDWG	
		R	p
BUN	108.08±47.43	0.147	0.216
SC	16.01±5.91	0.034	0.776
Systole	143.49±17.84	0.454**	0.00*
Diastole	85.85±9.18	0.454**	0.02*

IDWG (*Interdialysis Weight Gain*); BUN: blood urea nitrogen; SC: Serum creatinine; r: Pearson Correlation, *Pearson Correlation *test*, Correlation is significant at the 0.05 level (2-tailed).

For clinical parameters with a numerical data scale showed in table 4, the data showed that there was relationship between systolic and diastolic blood pressure and the respondent's IDWG (Interdialysis Weight Gain) with positive correlation value, it mean that if the IDWG of patients was high will followed by the increasing of blood pressure both systolic and diastolic.

DISCUSSION

The aim of this study was to analyze the risk factors for non-adherence with fluid restrictions among hemodialysis patients at RSI Sakinah, Mojokerto. Some factors such as (1). sociodemographics (age, gender, education, occupation), (2). Clinical factors include laboratory values for serum creatinine, BUN and blood pressure (systolic and diastolic), (3) other factors such as length of hemodialysis, history of disease as a cause of CKD, health belief model and respondent's knowledge regarding fluid restrictions. All the results were described by using statistical test by using SPSS 25 and non adherence criteria if the value more than 3.5% (Lindberg, 2008).

This study mentioned that the patients aged <50 years have 0.385 times higher chance for non adherence relating the restriction of fluid intake. Age is one of the factors related with adherence. Previous studies said that age, gender and educational level were influenced the adherence of fluid restriction among hemodialysis patients (Kugler et al., 2011)(Ozen et al., 2019). A person's mindset and maturity of knowledge become better as they get older (Herlina & Rosaline, 2021).

The results of this study showed that Logistic Regression Analysis test with the Backward Stepwise Method (Likelihood Ratio) on 5 variables including Age, duration of HD, historical illness, HBM and knowledge, there are three variables that have the most influence, respectively HBM, historical illness and period of undergoing hemodialysis.

The duration of hemodialysis's patient was a predictor of patient's non-adherence. Where patients who undergoing hemodialysis for less than 1 year are more at risk. This was in line with research from Siagian et al., (2021) his results showed that the longer time of hemodialysis therapy in line with the adherence for limitation fluid intake. The reason may be because the patient is still adapting to evaluating the effects of dialysis on their body and

concern about complications by the disease. The longer time of hemodialysis theraphy leads to greater interaction with all treatment information so that the level of understanding and behavior towards adherence is higher.

The results of this research were in line with research by Anita & Novitasari, (2017) Siagian et al., 2021): the increasing of knowledge among patents will increase patient's awareness relating the adherence of restrictions fluid intake. Many patients reported that they were received information about disease management through observation during HD treatment and discuss with health staff and other patients to get their undertanding about their disease.

Another factor that influences non-adherence behaviour is a history of kidney failure, where in this study, the majority of respondents have a history of hypertension and hypertension is a predictor of patient non-adherence. Hypertension can occured due to fluid overload and increased the burden of cardiovasculer.

If the patient does not adherece with fluids and diet, it causes an increase in blood pressure. Non-adherence with fluid restrictions causes increased interdialytic weight gain (IDWG), leading to increased cardiovascular burden. Excessive sodium intake will stimulates osmoreceptors to increasing thirst and promote volume intake, the increasing of total body water caused an increasing in IDWG. Excessive IDWG requires removal of a greater volume during hemodialysis. The risk of death with relative IDWG > 5.7% and increased risk of hospitalization for fluid overload with relative IDWG > 4% (Beerappa & Chandrababu, 2019).

In this study there was a relationship between IDWG and blood pressure. The explanation is that hypertension is a cause and consequence of kidney failure (Bidani & Griffin, 2004)]. hypertension causes a decrease in eGFR (Muntner et al., 2011). In addition, hypertension and CKD are independent risk factors for cardiovascular disease (CVD). So when hypertension and kidney failure occur together, the risk of morbidity and mortality due to cardiovascular disease will increase significantly (Pugh et al., 2019).

In order to change behaviour to be more adherence with fluid restrictions, a person needs a belief called HBM (Health Belief Model). HBM describes how a person considers whether or not to do something regarding health behaviours, in study we focus on the behaviour relating with the adherence of fluid restrictions. The parameters were used perceived vulnerability, perceived severity, perceived benefits and perceived barriers. The results of this study showed that 53.4% of respondents had positive HBM. OR value=4.9. Respondents with a negative Health Belief Model have a 4.9 times chance to non-adherence with fluid restrictions compared with positive scale of Health Belief Model. The logistic regression results showed that HBM was a predictor of respondents' non-adherence. Someone who has good perception will also have good behaviour including the adherence of fluid restriction (Sariyasih et al., 2022) (Abdelhalim et al., 2019).

Based on the results of this study, the role of nurses are important to carry out routine evaluation of the adherence of patients relating with fluid restrictions. Further research is also needed to develop new interventions that help patients to increasing the adherence behavior, especially the research conducting based on evidence based practice.

CONCLUSION

Some factors were influenced non-adherence for fluid restrictions are including age, the duration of HD, history of disease, HBM and knowledge. However, three variables (HBM, history of disease and duration of HD) were more statistically influence the adherence of patients relating the restriction of fluid intake who undergoing hemodialysis. Thus nurses

must consider patient compliance with fluid restrictions by identifying barriers and offering strategies to increasing their behavior to adherence with restriction of fluid intake, because non-adherence is a major problem among patients who undergoing hemodialysis.

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CONFLICTS OF INTEREST

With relation to the publishing of this paper, the authors declare that they have no conflicts of interest.

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