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by Lutfi Wahyuni 2

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The Correlation of Long Term Hemodialysis and Inter Dyalysis Weight Gain (IDWG) in CKD Patients



Rutfi Wahyuni¹, Chaterina Janes Pratiwi², Agus Haryanto³, Rudi Hariono⁴
^{1,2,3,4}Nursing Department, STIKes Bina Sehat PPNI Mojokerto, Indonesia

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Abstract

CKD patients have kidney damage and their function is replaced using hemodialysis. An indicator of the success of hemodialysis patients in managing fluids is control weight gain, known as Interdialytic Weight Gain (IDWG). The purpose of this study was to determine the correlation of long term hemodialysis and Inter Dyalysis Weight Gain (IDWG) in CKD Patients. Correlation analytic research design with a cross-sectional approach. The population in this study were all patients undergoing hemodialysis at RSUD Dr. Soeroto Ngawi. Sampling technique consecutive sampling. The sample in this study amounted to 42 people. The research instrument used an observation sheet. Data analysis using Spearman Rho test. The results showed that most of the respondents underwent hemodialysis < 12 months, namely 26 people (62%), for hemodialysis 3-4 hours, 42 respondents (100%), and most of the respondents experienced IDWG which could not be tolerated, namely 30 people (71.5%). The results of the Spearman Rho test showed that p-value = 0.000 so that H1 was accepted, meaning that there was a correlation between the length of time undergoing hemodialysis and duration of HD with Interdialytic Weight Gain (IDWG) at Dr. Soeroto Ngawi General Hospital, meaning that the longer you undergo hemodialysis, the lower the IDWG value or the more tolerated the IDWG value. It is expected that patient seek as much information as possible from health workers, especially regarding fluid restriction diets and related to increasing IDWG so that fluid intake is more controlled, trying to control food and drinks so that fluid intake is maintained and IDWG can be tolerated.

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Correspondence Address:

STIKes Bina Sehat PPNI Mojokerto – East Java, Indonesia

Email: ltf.hidayat@gmail.com

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INTRODUCTION

Chronic Kidney Disease (CKD) is currently one of the most common diseases and is a concern in the world, including in Indonesia. The number of patients with this disease is very large and tends to increase from year to year (Sari, 2017). The length of time a person undergoes hemodialysis affects the level of knowledge about fluid restriction and intradialysis weight control, adherence to fluid restrictions which will affect IDWG. The longer the patient undergoes hemodialysis therapy, the more knowledge will be gained and can have a positive attitude towards fluid diet compliance. Durante HD affects fluid withdrawal in CKD patients so that it will affect body weight after hemodialysis and have an impact on IDWG. Durante and the length of time CKD patients undergo hemodialysis will often be exposed to the side effects of hemodialysis both acute and chronic and interdialytic weight gain is one of these effects. The longer you undergo HD, the lower or smaller your IDWG (Priska & Herlina, 2019).

The progressive irreversible decline in kidney function when the kidneys are unable to maintain metabolic, fluid, and electrolyte balance which causes uremia and azotemia (Bayhakki, 2013). CKD patients have kidney damage and their function is repulsing hemodialysis. Hemodialysis is carried out to remove metabolic wastes or certain toxins from the human blood circulation (Bayhakki & Hasneli, 2017). An indicator of the success of HD patients in managing fluids to control weight gain, is known as Interdialytic Weight Gain (IDWG) (Silaen et al., 2020). IDWG is a basis for knowing the amount of fluid that enters during the interdialytic period (Siregar, 2020). The longer the patient undergoes hemodialysis, the more often he is exposed to the side effects of hemodialysis both acute and chronic and IDWG is one of these effects (Irma Mustikasari, Noorratri, & Surakarta, 2017).

The results of a systematic review and meta-analysis conducted by Hill et al, 2016, obtained a global prevalence of CKD of 13.4% (Kemenkes RI, 2017). The results of the Basic Health Research (Riskesdas) in 2018, the prevalence of kidney failure in Indonesia was 0.8% (Kemenkes RI, 2019). The incidence of CKD in East Java is 4,828 patients (15.65%). The length of hemodialysis in Indonesia in 2018 was < 3 hours as much as 1%, 3-4 hours 39%, and > 4 hours as much as 60% (Tim, 2018). CKD patients require their patients to replace kidney function with hemodialysis. One of

the impacts is the occurrence of IDGW (Bayhakki, 2013).

The results of the study (Bayhakki & Hasneli, 2017) showed that about 60% to 80% of hemodialysis patients died due to an excessive increase in IDWG, the longest duration of hemodialysis was under two years, and as many as 20 respondents or 58.8%. Based on IDWG data, the highest number was IDWG < 3 Kg, namely 73.5% and 2.9% had IDWG > 3 Kg. The results of the study (Juliardi et al., 2020) showed that 50% of hemodialysis patients had IDWG 3%, and 50% of hemodialysis patients had IDWG > 3%. Prevention efforts that can be done in CKD patients undergoing HD therapy can be in the form of maintaining fluid intake, reducing high sodium consumption, eating a high-fiber diet, and living a healthy life limitation of fluid intake in patients undergoing HD therapy is so that patients can carry out normal activities, maintain fluid-electrolyte balance and keep the accumulation of metabolic waste products from being excessive (Hanum, Nurchayati, & Hasneli, 2015).

Measurement and assessment of fluid volume excess that occurs can be done by monitoring fluid intake and output and weighing. Fluid intake and output must be monitored properlregularly. Weighing is done periodically and at the same time every day (Gomes et al., 2020). Assessment of indicators of increased fluid overload should also be performed (improved pulse quality, increased jugular venous distention, crackles on auscultation of the lung and increased peripheral edema). Monitoring the presence of signs of fluid accumulation in the body can provide a warning to patients to further suppress the dedesiredto as prevent complaints of shortness of breath and disturbances in sleep/rest patterns, and others (Siregar, 2020).

METHOD

This research design uses correlation analytics with the crocross-sectionalproach. The population in this study were all patients undergoing hemodialysis at RSUD Dr. Soeroto Ngawi in September 2021 as many as 42 people. The sampling technique of this research is consecutive sampling. The research instrument used an HD durDuranteservation sheet and the length of undergoing hemodialysis was categorized as < 12 months, 12-24 months, and > 24 months, while IDWG was obtained by measuring I, namely post hemodialysis weight (BB I), taking measurement II,

weight the next pre hemodialysis body (BB II), calculate the difference (measurement II-measurement I) divided by measurement II and then multiplied by 100% as follows:

The IDWG criteria are divided into 2, namely tolerable, if the increase in body weight is 3% of

the dry weight and cannot be be toleratef the increase in body weight is > 3% of the dry weight (Siregar, 2020). Data analysis using Spearman Rho test.

RESULT

1. Characteristics of Respondents

Table 1: Frequency Distribution of Respondents' Characteristics at RSU Dr. Soeroto Ngawi

Characteristics	Frequency	(%)
Age		
≤ 45 years	9	21.4
> 45 years	33	78.6
Gender		
Male	24	57.1
Female	18	42.9
Education		
Senior junior School	10	23.8
Senior High School	32	76.2
Total	42	100

Table 1 shows that almost all respondents aged > 45 years, namely 33 people (78.6%). Characteristics of Respondents Based on Gender showed that most of the respondents were male, namely 24 people (57.1%). Characteristics of Respondents Based on Education shows that almost all respondents have higher education (high school, college), namely 32 people (76.2%).

2. Special Data

Table 2: Frequency Distribution of Respondents Based on Variables at RSU Dr. Soeroto Ngawi

Variable	Frequency	(%)
Long Undergoing Hemodialysis		
< 12 months	26	62
12-24 months	7	16.6
> 24 months	9	21.4
Durante Hemodialysis		
< 3 o'clock	0	0
3-4 o'clock	42	100
> 4 o'clock	0	0
IDWG		
Tolerable	12	28.5
Intolerable	30	71.5
Total	42	100

Table 2 shows that most of the respondents underwent hemodialysis < 12 months, namely 24 people (57.2%). Characteristics of Respondents Based on Hemodialysis Duration showed that all respondents underwent hemodialysis with a duration of 3-4 hours or to be precise 4 hours, namely 42 people (100%). Characteristics based on IDWG showed that most of the respondents experienced an intolerable IDWG, namely 30 people (71.4%).

Table 3: Tabulation of the Correlation of Long Undergoing Hemodialysis with Interdialytic Weight Gain (IDWG) at RSU Dr. Soeroto Ngawi in May 2021

Long Undergoing Hemodialysis	IDWG				Total	
	Tolerable		Intolerable			
	F	%	F	%	F	%
< 12 months	1	4,2	23	95,8	24	100
12-24 months	2	22,2	7	77,8	9	100
> 24 months	9	100	0	0	9	100
Total	12	28,6	30	71,4	42	100

Spearman Rho test that p value = 0.000 with a significant degree of 95% and a correlation coefficient of 0.754

Table 3 shows that almost all respondents who underwent hemodialysis <12 months had an intolerable IDWG, namely 23 of 24 respondents (95.8%) and almost all respondents who underwent hemodialysis for 12-24 months had an intolerable IDWG, namely 7 of 9 respondents (77.8%), and all respondents who underwent hemodialysis > 24 months had a tolerable IDWG, namely 9 out of 9 respondents (100%).

The results of the Spearman Rho test analysis show that p value = 0.000** with a significant degree of 95% and a correlation coefficient of 0.754 is negative so that H1 is accepted so that there is a strong negative correlation between the length of hemodialysis and Interdialytic Weight Gain (IDWG) at Dr. Soeroto General Hospital, Ngawi, which means that the longer you undergo hemodialysis, the lower the IDWG value or the more tolerable the IDWG value will be.

DISCUSSION

1. Long Undergoing Hemodialysis

Table 2 shows that most of the respondents underwent hemodialysis for < 12 months, namely 24 people (57.2%) and underwent hemodialysis for 12-24 months and > 24 months, namely 9 people (21.4%).

The high number of years undergoing hemodialysis also shows that most hemodialysis patients survive for a long time even though their kidneys are not functioning properly and various health problems due to kidney damage are experienced (Bayhakki & Hasneli, 2018). The survival ability of CKD patients undergoing hemodialysis is influenced by various factors, such as the severity of the disease experienced, the condition of various body systems that are disturbed by toxins due to CKD, regulation of fluid and food intake to adherence to the hemodialysis schedule (Wijayanti, Isro'in, & Purwanti, 2017). The theory above shows that the duration of hemodialysis in CKD patients varies in length, depending on the severity of the disease, regulation of fluid and food intake, and adherence to hemodialysis. If CKD patients can regulate fluid and food intake and regularly undergo hemodialysis, hemodialysis can last for years, because until now there is no effective drug that can cure chronic kidney failure, so this disease is classified as a chronic disease that can last for years. years in the patient. Based on Table 4.5 shows that all respondents underwent hemodialysis

with a duration of 3-4 hours or to be precise 4 hours, namely 42 people (100%). According to PERNEFRI (2003) the time or duration of hemodialysis is adjusted to individual needs. Each hemodialysis is carried out 4-5 hours with a frequency of 2 times a week. NKF (2001) mentions hemodialysis is ideally carried out 10 hours/week with a QB of 200-300 mL/min. Meanwhile, according to Corwin (2000) hemodialysis takes 3-4 hours and is done 3 times a week. At the end of the interval, 2 – 3 days between hemodialysis, salt, water, and pH balance is no longer normal again. Hemodialysis plays a role in causing anemia because some red blood cells are damaged in the hemodialysis process. In this study, all respondents were given hemodialysis with a scheduled duration of 3-4 hours, in emergency conditions they were not included in this study so the duration of hemodialysis respondents was 3-4 hours.

Several other things can affect how long a CKD patient takes to undergo hemodialysis. Based on general data of respondents with hemodialysis duration <12 months, most of them aged >45 years as many as 19 respondents (45.2%), male sex as 17 respondents (40.5%), highly educated as many as 18 respondents (42.9%). Most of the respondents are adults, so there is an opportunity to be more obedient to fluid and sodium restrictions that CKD patients must do to survive on hemodialysis longer (Irma Mustikasari et al., 2017). While clinically men have a risk of experiencing chronic kidney failure 2 times greater than women. This is possible

because women pay more attention to health and maintain a healthy lifestyle than men so that men are more susceptible to chronic kidney failure than women. Women are more compliant than men in fluid regulation because women are better able to take care of themselves and can regulate fluid regulation (Bayhakki & Hasneli, 2018).

The level of education is often associated with knowledge, where someone with higher education is assumed to be easier to absorb information (Irma Mustikasari et al., 2017). The length of time a patient undergoes hemodialysis can be influenced by age, individuals who are mostly adults they tend to be more obedient to implementing a CKD treatment program. In this case, it's a boy. More about this source textSource text required additional translation information. If you are at greater risk of CKD to be able to undergo hemodialysis for a long time and survive, then CKD patients must be able to control their food and fluid intake. The higher a person's education, the more likely they are to be able to survive, including hemodialysis, because individuals with higher education will know what can and cannot be consumed by CKD patients to survive longer, thus the length of time undergoing hemodialysis will also be longer.

2. Interdialytic Weight Gain (IDWG)

Table 2 shows that the majority of respondents experienced IDWG which could not be tolerated, namely 30 people (71.4%), while those that could be tolerated were 12 people (28.6%). IDWG is influenced by compliance, gender, age, fluid intake, thirst, self-efficacy, duration of hemodialysis, and stress (Rizani, Marlinda, & Suryani, 2019a). HD patients, even though they are hypervolemic, often experience excessive thirst which is one of the stimuli for the sensation of thirst. Responding to thirst normally is by drinking, but CKD patients are not allowed to respond in a normal way to the thirst they feel, so fluid restriction must be carried out, because fluid intake will cause an increase in IDWG above the patient's renal tolerance limit (Istanti, 2014).

Respondents whose IDWG could not be tolerated because their weight before the next hemodialysis increased >3% compared to their body weight after the previous hemodialysis or more than 1.5 kg. Respondents whose IDWG can be tolerated because the increase does not exceed 3% so that the body can still achieve fluid balance. Respondents with IDWG intolerable were mostly aged > 45 years as many as 25 respondents (59.5%)

and male sex as many as 19 respondents (45.2%). Age can affect IDWG due to decreased thirst sensation caused by the aging process and the presence of cerebral dysfunction and decreased osmoreceptor sensitivity. This reduces fluid intake thereby reducing intradialytic weight gain (Priska & Herlina, 2019). Meanwhile, in hemodialysis patients, the weight gain between the two times of dialysis in men was higher than in women. Men have a different body composition from women where there is more muscle tissue in men than women who have more fat tissue (Irma Mustikasari et al., 2017). Physiologically, the elderly will experience a decrease in body functions including the sensation of thirst, so that they can control the fluid that enters the kidneys.

From the experience and maturity of the soul, as well as in terms of public trust, someone who is more mature is trusted by people who are not yet mature. Where age is one of the factors that affect the maturity of thinking patterns in digesting information. The more mature persons age, the more critical thinking in dealing with a problem, including regulating fluid intake. Meanwhile, men generally have a higher IDWG than women because physiologically men's body fluids are more than women's and men's body fluids bind more easily than women who have more fat because fat doesn't bind water.

3. Long-term Correlation with Hemodialysis with Interdialytic Weight Gain (IDWG)

Table 3 shows that almost all respondents who underwent hemodialysis <12 months had an intolerable IDWG, namely 23 of 24 respondents (95.8%) and almost all respondents who underwent hemodialysis for 12-24 months had an intolerable IDWG, namely 7 of 9 respondents (77.8%), and all respondents who underwent hemodialysis > 24 months had a tolerable IDWG, namely 9 out of 9 respondents (100%). The results of the Spearman Rho test analysis show that p value = 0.000** with a significance degree of 95% and a correlation coefficient of 0.754 is negative so that H1 is accepted so that there is a strong negative correlation between length of hemodialysis and Interdialytic Weight Gain (IDWG) at Dr Soeroto General Hospital. Ngawi, which means that the longer you undergo hemodialysis, the lower the IDWG value or the more tolerable the IDWG value will be. In line with the research of Sulistini, Sari, and Hamid (2013) where they found there was a

correlation between the length of time undergoing hemodialysis and IDWG.

The longer the patient undergoes hemodialysis therapy, the more knowledge will be gained and can have a positive attitude towards fluid diet compliance. The longer CKD patients undergo hemodialysis, the more often they are exposed to side effects of hemodialysis both acute and chronic and interdialytic weight gain is one of these effects (Irma Mustikasari et al., 2017). The longer you have HD, the lower or smaller your IDWG (Priska & Herlina, 2019). Each patient takes a different amount of time to improve his knowledge and attitude. The longer the patient undergoes hemodialysis therapy, the more knowledge he gains and can have a positive attitude towards fluid diet compliance, so that the longer he undergoes hemodialysis, the patient is already familiar with fluid diet settings. This causes IDWG at a tolerable level.

For patients who have been undergoing hemodialysis for a long time but still experience IDWG which cannot be tolerated due to many factors that affect IDWG. The length of time undergoing hemodialysis was not a determining factor for IDWG values. This is because the duration of hemodialysis in patients varies, which also affects the IDWG of different patients. The length of time a person undergoes hemodialysis affects the level of knowledge about fluid restriction and intradialytic weight control, and adherence to fluid restrictions which will affect IDWG. The duration of hemodialysis is only one of many other factors that affect IDWG.

CONCLUSION

Based on the results of the study, it can be concluded that there is a correlation between the duration of hemodialysis and Interdialytic Weight Gain (IDWG) at Dr. Soeroto Ngawi General Hospital, meaning that the longer the hemodialysis period, the lower the IDWG value or the more tolerable the IDWG value. This is because the longer undergoing hemodialysis, the more knowledge about what hemodialysis patients must undergo including dietary compliance, fluid restriction, and compliance in undergoing hemodialysis so that IDWG can be limited.

SUGGESTION

1. For Hemodialysis Patients

Seek as much information as possible from health workers, especially regarding fluid

restriction diets and related to increasing IDWG so that fluid intake is more controlled, trying to control food and drinks so that fluid intake is maintained and IDWG can be tolerated. Motivating patients to fluid compliance so that dietary compliance is controlled, trying to control food and drinks so that fluid intake is maintained, and IDWG.

2. Share the Research Place

Provide education about fluid and food diets for hemodialysis patients using booklets or leaflets so that patients are easier to manage their diet.

3. For Further Researchers

Develop research on other factors that affect Interdialytic Weight Gain (IDWG) for example providing information through videos, books, or leaflets so that it is more useful for the development of nursing science.

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CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest with the topic or any associated objects upon the publication of this study.

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