

# The Influence of IDWG Improvement of Hypotension Events in Hemodialized Patients in Rasyida Hospital Medan

Fery Juliardi<sup>1</sup>, Febriantoni<sup>2</sup>, Juliana Dewi<sup>3</sup>, Katiti<sup>4</sup>, M. Aryandra Hasibuan<sup>5</sup>, Tiarnida<sup>6</sup>

<sup>1,2,3,4,5</sup> Nursing Of Faculty , Univeritas Prima Indonesia, Medan, Indonesia

## ARTICLE INFO

### Keywords:

IDWG, Hypotension, Hemodialysis, Kidney Failure

### E-mail:

[Feryfery31@gmail.com](mailto:Feryfery31@gmail.com)

## ABSTRACT

Kidney failure is a condition in which the loss of the ability of the kidneys to filter fluids and food scraps, when these conditions occur levels of toxins and harmful liquids will accumulate in the body. One treatment for kidney failure is hemodialysis. Hemodialysis is a therapy that is carried out if the condition of the kidneys is unable to function or has malfunction up to values below 15 ml / min / 1.73. Although hemodialysis is safe and beneficial for patients, it does not mean that it has no side effects. An increase in body weight between the two hemodialysis IDWG (Interdialytic Weight Gain) times is a frequent side effect, one of which is intradialysis hypotension. Objective: to identify the effect of increasing IDWG on the incidence of hypotension in hemodialysis patients at the Rasyida Kidney Hospital in Medan. Method: quantitative research design with analytic survey through a cross sectional approach. The population in this study were all patients with chronic kidney failure who did hemodialysis at the Rasyida Kidney Hospital in Medan. The sample in this study amounted to 22 respondents. Patients will be measured body weight and blood pressure. Measurements were made before and after hemodialysis at visits I, II and III. Results: The majority of hemodialysis patients in Medan Rasyida Kidney Special Hospital were > 50 years (50%), and 50% were male and 50% female, 50% of patients experienced hypotension and increased IDWG. The results of bivariate chi square can be p-value 0,000. So, it can be concluded that there is an effect of increasing IDWG on the incidence of hypotension in hemodialysis patients.

Copyright © 2020 Science Midwifery.

## 1. Introduction

Disease is an abnormal condition of the body or mind that causes discomfort. The disease is classified into two types namely, infectious and non-communicable diseases, where non-communicable diseases have a prevalence of causes of death of almost 70% in the world (RI Health Profile 2017) and 73% of causes of death in Indonesia, where one of the non-communicable diseases is kidney failure.[1]

Kidney failure is a condition in which the loss of the ability of the kidneys to filter fluids and food scraps, when these conditions occur levels of toxins and harmful liquids will accumulate in the body. According to the 2015 Global Burden of Disease Study, estimated that 1.2 million people died due to chronic kidney failure, this has increased by 32% since 2005 (Bull World Health Organ 2018), whereas in Indonesia kidney failure is the 6th out of 8 diseases not highest infectious prevalence of 2%.[1]

According to WHO (World Health Organization) data, around 1.5 million people in the world live dependent on dialysis, whereas according to PERNEFRI data (Indonesian Nephrology Association) patients with chronic kidney failure in Indonesia who underwent new hemodialysis around 100,000 people. Based on 2013 RISKESDAS data, the prevalence of patients with chronic kidney failure in North Sumatra was ranked 23 out of 34 provinces with a prevalence of 0.2%. [2] Where according to the Report of Indonesian Renal Registry in North Sumatra Province in 2017 there were 2690 new patients undergoing hemodialysis. [3]

Rasyida Medan Kidney Special Hospital, which operates as a special hospital for dialysis patients every month, serves 380 hemodialysis patients, so the researchers choose Medan Rasyida Kidney Special Hospital to be a place for research. Hemodialysis is a therapy that is carried out if the condition of the kidneys is unable to function or has malfunction up to values below 15 ml / min / 1.73. Although hemodialysis is safe and beneficial for patients, it does not mean that it has no side effects. An increase in body weight between the two hemodialysis IDWG (Interdialytic Weight Gain) times is a frequent side effect. IDWG (Interdialytic Weight Gain) in excess of 4.8% will cause increased mortality even though the amount is not stated. On the addition of too high a value of IDWG (Interdialytic Weight Gain), there are negative effects such as the occurrence of intradialysis hypotension. [4]

Determination of IDWG (Interdialytic Weight Gain) itself based on dry weight (dry weight) of the patient and also from the measurement of the patient's clinical condition. Dry weight is the weight of the patient without excess fluid volume in the body after the patient has finished hemodialysis [5]. The higher the IDWG, the greater the amount of excess in the patient's body and the higher the risk of complications, especially hypotension. [6] According to Neuman, the IDWG can tolerate no more than 3% of dry body weight.

Intradialysis hypotension often occurs due to large ultrafiltration accompanied by inadequate vascular filling compensation mechanisms, impaired vasoactive or autonomic responses, osmolar shifts, excessive anti-hypertension administration and decreased cardiac pumping ability. Hypotension during hemodialysis can be prevented by evaluating dry weight and modification of ultrafiltration, so it is expected that the amount of fluid expelled more at the beginning than at the end of dialysis. [7]

This is in line with the results of research conducted by Purnomo Widiyanto on the positive correlation of changes in interdialysis body weight with changes in blood pressure in post hemodialysis patients where from the results of the statistical test the relationship between interdialysis body weight with the incidence of hypotension in groups of patients with an increase in BW > 8% by 16 patients (80%) and in the group of patients with a rise in weight <8% by 9 patients (45%). Statistical test results obtained p-value = 0.050 which means there is a significant relationship. From the analysis results obtained RR = 2.750 which means patients with interdialysis weight gain  $\geq 8\%$  have a risk of 2.75 times to experience changes in blood pressure toward hypotension. [8]

The results of the study titled The relationship between interdialysis weight gain and interdialysis hypotension in patients with chronic kidney disease that the stastitic test results obtained P-value  $0.005 < \alpha < 0.05$  then  $H_0$  is rejected. This means there is a significant and significant relationship between interdialysis weight gain with the occurrence of hypotension interdialysis in patients with chronic kidney disease. [6]

## 2. Method

This type of research uses quantitative research with analytic surveys through a cross sectional approach. Data collection using observation or data collection at the same time at a time (point time approach) by using weight scales and manual and digital tension, to determine the effect of increased IDWG with the incidence of hypotension in patients with chronic kidney failure who do hemodialysis at the Kidney Special Hospital Rasyida Medan.

The sampling technique using purposive sampling in accordance with the inclusion criteria as follows: the patient is willing to be a respondent, patients who undergo hemodialysis 2 times a week according to schedule, and are able to communicate verbally.

Whereas the exclusion criteria are patients who are not cooperative, patients who have complications from other diseases, patients who cannot stand up.

The number of samples in this study were 22 patients who underwent hemodialysis. The instruments in this study were weight scales, sphygmomanometers and stethoscopes that had been calibrated by the Rasyida Medan special kidney hospital. Data analysis using frequency distribution for the characteristics of respondents and chi square analysis test to test bivariate variables.

## 3. Results & Analysis

### 3.1 Characteristic Description of Respondents Hemodialysis Patients in Rasyida Kidney Special Hospital, Medan

Based on the results of research conducted aims to determine the effect of an increase in hemodialysis patients IDWG on the incidence of hypotension in Rasyida Special Hospital. Then the frequency distribution can be seen in table 1 below:

**Table1.**

Frequency Distribution of Hemodialysis Patient Respondents in Rasyida Medan Special Hospital

Characteristic Respondents	Frequency	Persentase (%)
<b>Gender</b>		
Male	11	50,0
Female	11	50,0
<b>Age</b>		
<40 Years	4	18,2
41-50 Years	7	31,8
>50 Years	11	50,0

Based on the table 1 respondent in this study, the majority of hemodialysis patients at Medan Rasyida Kidney Hospital are > 50 years old (50.0%), 41-50 years 31, 8%, <40 years 18.2%. Based on sex, the respondents in this study were 50% male and 50% female.

**Table 2**

IDWG Overview and the Incidence of Hypotension in Hemodialysis Patients at the Rasyida Kidney Hospital in Medan

Chategory	Frequency	Persentase (%)
<b>Increase IDWG</b>		
<= 3 %	11	50,0
>3 %	11	50,0
<b>Hypotension</b>		
Hypotension	11	50,0
No hypotension occurs	11	50,0

Based on table 2 it can be explained that patients who experienced hemodialysis experienced an increase in IDWG <3% by 11 patients by 50%, and > 3% by 11 patients as well. As for the incidence of hypotension, the patient experienced 50% hypotension (11 respondents) and did not experience 50% hypotension either.

### 3.2 Bivariate Analysis

Bivariate analysis is used to test 2 variables, in this study the increase in IDWG and the incidence of hypotension in hemodialysis patients, can be seen in Table 3 below:

**Tabel 3**

Effect of Increased IDWG on the Occurrence of Hypotension in Hemodialysis Patients at Rasyida Kidney Hospital in Medan

Increase IDWG	Hypotension		p value
	No Hypotensio n Occurs	Hypotensio n	
IDWG ≤3 %	11	0	0,000
IDWG ≥3%	0	11	

Based on table 3, it can be explained that the results of the bivariate cross table analysis / chi square test obtained a p-value of 0,000 <0.005 so that it can be concluded that there is an influence between an increase in IDWG on the incidence of hypotension in hemodialysis patients at the Rasyida Kidney Hospital in Medan.

### 3.3 Discussion

Based on research conducted with sig. (2-tailed) 0.000, it can be concluded that there is an effect of increasing IDWG on the incidence of hypotension in hemodialysis patients. This is in line with the research of Handayani (2013) that one of the factors influencing the increase in IDWG in hemodialysis patients is the occurrence of intradialysis hypotension. [9] This is also in line with the results of research conducted by Sulistini, Sari, and Hamid (2014), that there is a relationship between pre hemodialysis blood pressure and the addition of interdialytic body weight in the Hemodialysis Hospital. Hoesin Palembang. [10]

Another supportive study is a study conducted by Mirta & Handayani (2015), that there is an interdialysis weight gain relationship with the incidence of intradialysis hypotension in Chronic Kidney Disease patients in the Hemodialysis Room of RSUD Dr. H. Abdul Moeloek Lampung

Province in 2015 with a value of p value  $0.005 < 0.05$ . An interdialysis weight gain of  $> 6\%$  is three times greater at risk of intradialysis hypotension than an interdialysis weight gain of  $< 6\%$ . Patients experienced an incidence of intradialysis hypotension as much as 26.8%. [6]

Hemodialysis is a way to remove metabolic waste products in the form of a solution (ureum and creatinine) and water that is in the blood through a semipermeable membrane or called a dialyzer. Although hemodialysis can prolong the life of patients who experience kidney failure.

Hemodialysis can also cause complications, one of the complications faced by patients is an increase in fluid volume between the two dialysis times which is manifested by weight gain or referred to as IDWG. This increase in BB in hemodialysis patients also raises new problems including hypotension, impaired physical function, shortness of breath, and others.

Complications of IDWG increase occur due to the inability of the kidney excretion function, so that regardless of the amount of fluid consumed by the patient, weight gain will occur, adding too much weight can cause negative effects on patients including hypotension, muscle cramps, hypertension, shortness of breath, nausea and vomiting. [11]

Intradialysis hypotension is a complication that occurs around 25% -35%. Intradialysis hypotension can also be defined as a decrease in systolic blood pressure  $> 40$  mmHg or diastolic  $> 20$  mmHg within 15 minutes. [6] Meanwhile, according to the National Kidney Foundation (2002) Intradialysis hypotension is defined as a decrease in systolic blood pressure  $> 20$  mmHg or decrease in MAP  $> 10$  mmHg when hemodialysis patients are associated with symptoms; stomach discomfort, yawning, nausea, vomiting, muscle cramps, dizziness and anxiety.

Many factors that cause intradialysis hypotension are related to inadequate volume, vasoconstriction, and other heart factors. Intradialysis hypotension factors are: high ultrafiltration speed, short dialysis time with high ultrafiltration, cardiac dysfunction, autonomic dysfunction (DM, uremia), antihypertensive therapy, eating during hemodialysis, inaccuracy in determining the patient's dry weight, wide surface area membrane dialyzer, hypocalcemia and hypokalemia, low sodium levels and use of acetate dialysate, bleeding, anemia and sepsis and hemolysis. According to Raharjo (2010), inter Dialytic Weight Gain (IDWG) is an increase in bed weight between two dialysis times, weight gain is influenced by two factors namely excess fluid and nutritional intake of patients with chronic kidney failure. The higher the IDWG, the greater the amount of excess in the patient's body and the higher the risk of complications, especially hypotension. [12]

Intradialysis hypotension often occurs due to large ultrafiltration accompanied by inadequate vascular filling compensation mechanisms, impaired vasoactive or autonomic responses, osmolar shifts, excessive anti-hypertension administration and decreased cardiac pumping ability. Hypotension during hemodialysis can be prevented by evaluating dry weight and modification of ultrafiltration, so it is expected that the amount of fluid expelled more at the beginning than at the end of dialysis. [7]

Based on the research of Inrig et al., Patients who experienced intradialytic hypotension had the characteristics of advanced age, lower Interdialytic Weight Gain, higher Urea Reduction Ratio, longer hemodialysis time, and the number of antihypertensive drugs more than patients without intradialytic hypertension, while the study Rosansky found that patients with high residual renal function had the potential to experience intradialytic hypotension so it was assumed that patients with low residual renal function had the potential to experience intradialytic hypertension. IDWG values that exceed 4.8% of the patient's dry weight are associated with various comorbidities, namely: intradialysis hypertension, intradialysis hypotension, left heart failure, peripheral edema, pulmonary edema, ascites, pleural effusion and congestive heart failure. Too high an ultrafiltration rate triggers interdialysis hypotension. [13]

According to the analysis of researchers there are several things that can cause intradialysis hypotension, but the main thing is not accurate in determining the patient's dry weight (Dry weight). This is very much related to the prescription hemodialysis program that will be carried out, 2 especially in terms of patient fluid withdrawal (Ultrafiltration). If the ultrafiltration is too high even though it does not correspond to the increase in body weight (increase in body fluids in liters), then the patient will experience symptoms of intradialysis hypotension, such as cramps, cold sweat, dizziness and yawning, TD can drop to  $< 90/60$  mmHg. This happens because of a decrease in fluid volume, especially intravenous fluids that are too fast, which will cause a decrease in cardiac output, even though the dialysis time has not yet been completed. The occurrence of intradialysis hypotension often occurs in the first hour and the last hour of dialysis.

#### 4. Conclusions

The conclusions in this study were the majority of hemodialysis patients at the Medan Rasyida Kidney Special Hospital, the majority were > 50 years old (50.0%), and 50% were male and 50% female. The picture of an increase in IDWG in hemodialysis patients at the Rasyida Medan Kidney Special Hospital 50% had an IDWG increase of <3% and 50% an increase of > 3%. As for the incidence of hypotension 50% of patients experience hypotension, and 50% of patients do not experience hypotension. Based on the bivariate test results there is an influence between the increase in IDWG on hypotension with a p-value of 0,000.

#### 4. References

- [1] GERMAS.2018.*Air Bagi Kesehatan : Upaya Peningkatan Promotif Preventif bagi Kesehatan Ginjal di Indonesia*. Jakarta: Menteri Kesehatan.
- [2] Riskesdas.2018.*Hasil Utama Riskesdas 2018*.Badan Penelitian dan Pengembangan Kesehatan:Kementerian Kesehatan RI
- [3] INFODATIN.2017.*Situasi Penyakit Ginjal Kronis*.Jakarta.Pusat Data dan Informasi Jalarta:KEMENKES RI
- [4] Moissl, U., Guillen, M.A., Wabel, P., Fontsero, N., Carrera, M., Campistol, J.M, Maduell, F. (2013). Bioimpedance Guided Fluid Management in Hemodialysis Patients. *Clin J Am Soc Nephrol* diakses 3 Januari 2016 dari <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3805085/>
- [5] Thomas. (2003). *Renal Nursing*. Bailliere Tindall. London
- [6] Istanti, Y. P. (2014). Hubungan Antara Masukan Cairan Dengan Interdialytic Weight Gain (IDWG) Pada Pasien Chronic Kidney Disease Di Unit Hemodialisis RS PKU Muhammadiyah Yogyakarta. *Jurnal PROFESI*. Volume 10/September 2013-Februari 2014
- [7] Mirta & Sri Handayani, Ririn. 2015. *Hubungan Kenaikan Berat Badan Interdialisis dengan Kejadian Hipotensi Interdialisis pada Pasien Cronic Kidney Desease di Ruang Hemodialisa RSUD Dr.H.Abdul Moelek Provinsi Lampung tahun 2014*.Lampung: Jurnal Kesehatan Holistik
- [8] Widiyanto, P., Hadi, H., & Wibowo, T. (2014). Korelasi positif perubahan berat badan interdialisis dengan perubahan tekanan darah pasien pos5 hemodialisa. *Jurnal Ners dan Kebidanan Indonesia*, 2(1), 1-8.
- [9] Sulistini, R., Sari, I.P., Hamid N.A., & Palembang, J.K.P.K (2015). Hubungan antara tekanan darah pre hemodialysis dan lama menjalani hemodialysis dengan penambahan berat badan interdialitik di ruang hemodialysis RS. Moh. Hoesin Palembang. Poltekkes kemenkes Palembang: Palembang.
- [10] Smeltzer, S.C., Bare, B.G. (2008). *Textbook of Medical Surgical Nursing*. 12ed. Philadelphia. Lippincott Williams Wilkins
- [11] Istanti, Y.P. (2013). Hubungan antara masukan cairan interdialytic weight gains (IDWG) pada pasien chronic kidney diseases di unit hemodialysis RS PKU Muhammadiyah Yogyakarta. *Profesi*, 10(01).
- [12] Inrig J.K., 2011, Antihypertensive Agents in Hemodialysis Patients: A Current Perspective, *National Institute of Health*, i (3), 290–297.