ISSN 2715 - 6060
Padjadjaran Acute Care Nursing Journal Vol 3 No 2 August 2022 Page |

Case Report

Management of Hypervolemia In Chronic Kidney Disease Stage 5 At Sumedang Hospital: A Case Study

Annisa Nurbaiti Rahmah[1], Eka Afrima Sari[2], Nita Fitria[3]

[1]Faculty of Nursing, Universitas Padjadjaran, Indonesia
[2]Departement Medical Surgical Nursing, Faculty of Nursing, Universitas Padjadjaran, Indonesia
[3]Departement Fundamental of Nursing, Faculty of Nursing, Universitas Padjadjaran, Indonesia

ARTICLE INFO
Article history:
Received 29-03-2023
Revised 10-05-2023
Accepted 15-05-2023

Keyword:
Stage 5 Chronic Renal Failure, Hypervolemia, Management of Hypervolemia

Other information:
Email of Author:
Annisa1735@mail.unpad.ac.id
Corresponding Author:
Eka Afrima Sari

Website:
https://jurnal.unpad.ac.id/pacnj/

E-ISSN: 2715-6060

ABSTRACT

Kidney failure results in the body being unable to remove metabolic wastes and accumulate in the body. Decreased kidney function results in sodium retention, where high sodium will cause water to be retained to maintain balance. This can lead to hypervolemia. Patient M came to the hospital with complaints of shortness of breath, during the study, there was edema in both lower extremities with degree 2 and in both upper extremities with degree 1, the patient also appeared to have ascites. Previously, patient M was diagnosed with stage 5 chronic kidney failure and did not complete the 4th hemodialysis cycle because the patient's condition worsened. Hypervolemia in patients with kidney failure will have adverse effects including pulmonary edema, hypertension, and even heart disease. Therefore it is necessary to manage hypervolemia to prevent complications in patients. The general aim of writing this case study is to address the management of hypervolemia in stage 5 chronic kidney failure patients at the Sumedang Regional General Hospital. The results of the case study found that the nursing problem that arose in patients was hypervolemia. The interventions provided are managing hypervolemia in the form of examining signs and symptoms of hypervolemia, monitoring the patient's hemodynamic status, monitoring the patient's fluid intake and output, teaching the patient to limit fluid and salt intake, and collaborating with Lasix 1x40 mg. Evaluation results after managing hypervolemia for 3 days, decreased tightness, degree of edema remained at degree 2 in the lower extremities and upper extremities, increased abdominal circumference by 1 cm, and increased bodyweight from 0.5 Kg to 68.5 kg, it can be concluded that hypervolemia nursing problem has not been resolved.

Introduction

The kidney is one of the organs that plays an important role in maintaining fluid and electrolyte balance in the body. Kidneys can filter about 200 liters of fluid a day and remove toxins, metabolic waste products, and excess ions (Ogobuiro & Tuma, 2022). One of the common problems with the kidneys is chronic kidney failure. Chronic kidney failure is a condition in which there is a progressive and irreversible decline in kidney function (Harding, 2021). In 2017 around 1.2 million people died from chronic kidney disease. Globally, there has been an increase in patients with chronic kidney failure at all ages by 29.2% (GDB Chronic Kidney Disease, 2020) and the greatest prevalence occurs in countries with low to moderate income (Kovesdy, 2022). In Indonesia, there has been an increase in sufferers of chronic kidney failure to 3.8% (Riskesdas, 2019). This figure increased almost 2 times from the 2013 Riskesdas of 2%. The most common causes of chronic kidney failure in Indonesia are hypertensive kidney disease (39%) and diabetic nephropathy (22%) Other causes of acute and chronic kidney disease include obstructive nephropathy, Systemic Lupus Erythematosus (SLE), primary glomerulopathy, chronic pyelonephritis, uric acid nephropathy, and polycystic kidneys (11 th Report Of Indonesian Renal Registry, 2018).

Chronic kidney failure is a term that describes damage to the kidneys that has occurred for more than 3 months (Hinkle & Cheever, 2018). When there is damage to the kidney, the kidney will activate an initial homeostatic response involving hyperfiltration of the nephrons, so that patients with mild renal impairment are asymptomatic. Although nephron hyperfiltration and hypertrophy are beneficial for maintaining the Glomerular Filtration Rate (GFR), they can be the main cause of progressive renal dysfunction (Hashmi, Benjamin, & Lappin., 2022).

According to Kidney Disease Improving Global Outcomes (KDIGO, 2013) chronic kidney failure can be classified based on the cause, glomerular filtration rate category, and albuminuria category. Based on the Glomelurus Filtration Rate (GFR), chronic kidney failure is divided into stage 1 (GFR: ≥ 90 ml/minute/1.73 m2); Stage 2 (60-89 ml/minute/1.73 m2); Stage 3a (GFR: 45-59 ml/min/1.73 m2); Stage 3b (GFR: 30-44 ml/minute/1.73 m2), stage 4 (GFR: 15-29 ml/minute/1.73 m2); Stage 5 (GFR: < 15 ml/minute/1.73 m2). Meanwhile, based on albuminuria, chronic renal failure is classified into A1 (albuminuria <30 mg/g or <3 mg/mmol), A2 (albuminuria 30-300 mg/g or 3-30 mg/mmol) and A3 (albuminuria >300 mg/g). or >30 mg/mmol) (KDIGO, 2013). Stage 5 chronic kidney failure is generally referred to as the end stage of kidney disease. The development of kidney failure to the final stage significantly results in a decrease in quality of life and increased mortality (Hashmi, Benjamin, & Lappin., 2022). At this stage, the kidneys are unable to remove metabolic wastes, so it is necessary to carry out therapy that can replace kidney function, such as hemodialysis and kidney transplantation (Hinkle & Cheever, 2018).

Deteriorating kidney function will affect all body systems. Clinical manifestations in the body arise due to the retention of urea, creatinine, phenols, hormones, electrolytes and water in the body. Uremia is a syndrome in which kidney function decreases to the point where symptoms can develop in many body systems, uremia often occurs when the GFR is 15 mL/minute or less (Harding, 2021). In addition, one of the common clinical manifestations in patients with kidney failure is fluid overload or hypervolemia. Hypervolemia can occur because the kidneys experience a decrease in function which results in interference with sodium excretion (Khan, Sarrif, Adnan, Khan, & Mallhi, 2016). A high amount of sodium in the body causes the body to retain water to balance it, so sodium retention will cause the body to be overly fluid. Excess fluid in the body can cause edema, hypertension, and even heart failure (Harding, 2021).

With the increasing prevalence of chronic kidney failure in Indonesia, as well as the poor prognosis of chronic kidney failure, the role of health workers, especially nurses, is expected to be able to provide holistic nursing care to reduce the symptoms experienced by patients with chronic

kidney failure. The role of the nurse in providing nursing care includes a promotive role, namely the nurse provides education related to chronic kidney failure, a preventive role, namely the nurse recommends avoiding things that can worsen health conditions, the curative role, namely the nurse collaborates with other health workers in providing medicines needed by the patient and a diet according to the patient's needs , and a rehabilitative role, namely nurses can advise patients to carry out hemodialysis routinely, limit fluid and salt intake, and have a low protein diet.

The general objective of writing this case study is to convey the management of fluid volume excess or hypervolemia that can be performed in Stage 5 Chronic Kidney Failure patients at the Sumedang Regional General Hospital.

Method

This study uses a case study with a nursing care approach including assessment, analyzing assessment data and nursing diagnoses, nursing intervention plans, implementation and nursing evaluations. Case study is a descriptive qualitative research method that aims to understand individuals more deeply by practicing it in an integrative and comprehensive manner. The sample in this study was a patient with stage 5 chronic kidney failure in the internal medicine room of Sumedang Hospital. This research was conducted for 3 days starting from 2 July to 4 July 2022. Data collection was carried out through interviews and observation of clients. The data obtained isanalyzed and grouped into nursing diagnoses as the basis for arrange nursing intervention that will be carried out during the implementation to clients.

Results

Patient "M" aged 52 years entered the hospital with the main complaint of shortness of breath, shortness of breath is felt all the time both during rest and activities, shortness of breath is felt as if a heavy object is pressed down, tightness is felt to get worse over time, apart from shortness the patient also complains of pain in the abdominal area . The pain is felt like being stabbed with a pain scale of 4 out of 10, the pain is felt most severely in the solar plexus area and can spread to all quadrants of the abdomen, the pain is felt continuously and gets worse when changing positions. In addition, the patient has edema in the lower extremities with grade 2 and upper extremities with grade 1.Patient M was diagnosed with stage 5 chronic kidney failure and underwent treatment in the internal medicine room of Sumedang Hospital in June 2022. Previously the patient had a history of hypertension for more than 2 years. The client does not take routine treatment for hypertension and only takes treatment when she feels head and neck pain. Among the patient's family, none had previous kidney failure, but the patient's family had a history of hypertension.

The client has carried out hemodialysis therapy since he was first diagnosed with stage 5 chronic kidney failure for 3 cycles. The patient's condition worsened during the 4th hemodialysis cycle so that the 4th hemodialysis cycle was not carried out completely. The general condition of the patient looks weak with GCS: E4M6V5 (Compos mentis). Laboratory examination results obtainedHb 8.5 g/dL, Sodium 124 mmol/L, potassium 5.4 mmol/L, calcium 7.30 mg/dL, urea 321.2 mg/dL, creatinine 5.91 mg/dL. The results of the physical examination showed BP 110/60 mmHg, HR: 116 x/minute, RR 24 x/minute, SPO2: 90% with 3 LPM oxygen therapy, Temperature: 36.9°C, Weight: 68 kg, TB: 155 cm conjunctiva looks anemic , lips look pale, there is use of accessory muscles for breathing. The therapies received by patient “M” during treatment included Folic Acid 1x1 mg, Lasix 1x40 mg, Ca Gluconas, Omeprazole 1x40 mg, Bicnat 3x1 tablets. Most of the daily activities of patients need help. Patient M has decreased appetite so she eats less than half a portion. Patient M only drinks about 750 ml of water in 24 hours, and patient M still urinates a little bit using a diaper.

This case study took place in Sumedang Hospital,which was held on 2-4 July 2022. Nursing care is carried out by carrying out assessments, analyzing assessment data and formulating nursing

diagnoses, compiling nursing intervention plans, carrying out nursing implementations and carrying out nursing evaluation.

After the management of hypervolemia was carried out in the form of examining signs and symptoms of hypervolemia, monitoring the patient's hemodynamic status, monitoring the patient's fluid intake and output, teaching the patient to limit fluid and salt intake, and collaborating in the administration of diuretic class drugs, it was found that the patient had not shown any improvementin his condition. This can be seen from the edema in the patient's extremities that has not reduced, there is still ascites, the client still complains of shortness of breath. Further patient progress per day is shown in the table.

Table 1. Patient Progress

	Day-1	Day-2	Day-3
Fluid Intake			
Drink Water	800 ml	750 ml	650 ml
Metabolism Water	340 ml	340 ml	340 ml
Fluid Output			
Urine	200 ml	240 ml	240 ml
IWL	680 ml	680 ml	680 ml
Grade Edema			
Upper Extremity	Grade 1	Grade 1	Grade 2
Lower Extremity	Grade 2	Grade 3	Grade 2
Blood Pressure	110/60	120/80	120/80
Respiration Rate	24 x/minute	20 x/ minute	20x/ minute
Abdominal Distension	94 cm	95 cm	95 cm
Weight	68 Kg (H+2 HD)	68,2 Kg (H+3 HD)	68,5 Kg (H+4 HD)
SPO2	92%	94%	94%

The evaluation showed that the nursing problem of excess fluid volume or hypervolemia in patient M with stage 5 chronic kidney failure in the internal medicine room of Sumedang Hospital had not been resolved.

Discussion (font size 12, 1 space)

In patients with stage 5 chronic renal failure, excess fluid volume or hypervolemia is a common complication. The results of the study in South China stated that the prevalence of kidney failure patients who experienced hypervolemia was 66.8% (Guo, et al., 2013). Hypervolemia can occur due to failure of kidney function in maintaining fluid balance in the body. Chronic kidney disease can cause sodium and fluid retention so that extracellular fluid increases and causes capillary pressure to increase then interstitial volume increases and edema occurs. Due to the gravitational force, excess liquid volume tends to occur in the as in the extremities compared to other symptoms (Aisara, Azmi, & Yanni, 2018). The occurrence of hypervolemia in patients with chronic renal failure can be

influenced by several things including wastage of protein energy, old age, high systolic blood pressure, hypokalemia, and decreased urine output (Guo, et al., 2013). Risk factors for hypervolemia in patient M include having stage 5 kidney failure, the client has a history of hypertension, the client does not comply with limiting fluid intake and does not maintain nutritional intake between the two hemodialysis times.

Fluid accumulation can be exacerbated if patients with chronic kidney disease do not control their intake of sodium and vitamins, because sodium and vitamins bind fluids (Kurnia, 2021). Because of this, fluid restrictions and an appropriate food diet are needed for people with chronic kidney disease so as not to exacerbate fluid buildup in patients (Kurnia, 2021). The results of the study regarding fluid restriction in patients with kidney failure for 4 days found that there was no excess fluid volume in patients as evidenced by fluid balance, vital signs, and daily body weight (Darni & Sasmita, 2021). Patient M underwent fluid restriction therapy. The amount of fluids that can be consumed by Patient M is 500 ml plus the amount of urine production in 24 hours (Ramdhani, et al., 2020), so that on the first day patient M gets a fluid restriction of 700 ml, the second day is 740 ml, and day 3 as much as 740 ml. The effectiveness of fluid restriction in patients with chronic kidney failure is influenced by knowledge of the amount of fluid intake that may be consumed and the patient's motivation to undergo fluid restriction (Ajeng, Agustina, & Lumadi, 2022).

In addition, interventions to monitor fluid intake and output in patients with chronic kidney failure also need to be done. The study (Ajeng, Agustina, & Lumadi, 2022) was conducted on CKD patients who had undergone hemodialysis at least once and found that there was a significant correlation between monitoring fluid intake and output and the incidence of fluid accumulation in patients with chronic kidney failure, where the risk of fluid accumulation in CKD patients can be reduced with good monitoring of fluid intake and output (Ajeng, Agustina, & Lumadi, 2022). This is supported by research (Anggraini & Putri, 2016) where monitoring of fluid intake and output was carried out using a fluid intake output chart, monitoring blood pressure, mental status, JVP distension, and observing lung auscultation in patients with chronic kidney failure. The findings showed a decrease in the degree of edema in patients with chronic kidney failure, which was originally edema at degree 3, improved to degree 1 (Anggraini & Putri, 2016). However, after monitoring fluid intake and output for 3 days, there was no significant change in the grade edema or ascites in the patient, where the grade edema of both upper and lower extremities was grade 2.

In patients, monitoring of fluid intake and output has been carried out, one of which is monitoring urine output. Under normal conditions, human urine output is 0.5 cc/KgBB/hour (Ramdhani, et al., 2020), so in normal condition, the patient urine production in 24 hours is 816 cc. However, due to kidney damage, the patient's urine output on the first day was around 200 cc / 24 hours, the second day was 240 cc / 24 hours, and the third day was 240 cc / 24 hours. Pharmacological use furosemide which is a class of strong diuretic drugs can help increase urine production. The results showed that the use of furosemide was effective in helping to reduce hypervolemia by increasing urine production (Alamsyah, Ulfa, & Sugiarto, 2018).

Another intervention that has been carried out in patient M is to monitor blood pressure. Hypertension is common in patients with chronic kidney disease and is one of the most important modifiable risk factors for cardiovascular morbidity and mortality in this population (Mayeda & Rivara, 2022). In patients with chronic renal failure, decreased blood flow to the glomerulus results in renin hypersecretion, thereby increasing angiotensin II levels. Angiotensin II has a direct vasoconstrictor effect that can increase systemic vascular resistance and

blood pressure. In addition, extracellular volume expansion can lead to increased ouabain production which will induce vasoconstriction and increase blood pressure (Elaine Ku, 2019). High blood pressure in patients with chronic kidney failure can cause various complications related to the cardiovascular system (Elaine Ku, 2019). Patients with high blood pressure is given furosemide to help control blood pressure, so the patient's blood pressure is within the normal range of 120/80 mmHg. Furosemide can be used as a second line in patients with symptoms of hypertension and advanced kidney disease who have a GFR value of less than 30 ml/minute (Khan, Sarrif, Adnan, Khan, & Mallhi, 2016).

Furthermore, another thing that needs to be monitored in patients with stage 5 chronic kidney failure undergoing hemodialysis is interdialysis weight or Interdialysis Weigh Giant (IDWG). The IDWG measurement aims to determine the level success of hemodialysis, namely the increase in body weight that occurs during the interdialytic period. IDWG is an indicator of an increase fluid volume in the body which is presented with weight gain. The IDWG measurement aims to determine the success rate of carrying out hemodialysis (Pujiastuti, 2018). The increase in IDWG in patients with kidney failure can be influenced by several factors including gender, adherence to restrictions on fluid intake and diet according to recommendations (Sepdianto, Suprajitno, & Usmiati, 2017). During the 3 day treatment period, the patient experienced a relatively rapid increase in body weight, where the client experienced an increase of 68 kg on the first day of the meeting and 68.5 kg on the third day of the meeting. This shows that the patient experienced an increase in body weight of 0.5kg in 3 days.

Fluid accumulation that occurs in patients with chronic renal failure can cause pulmonary edema and hypertrophy of the left ventricle. In addition, the accumulation of fluid that occurs in the abdominal cavity will suppress the diaphragm which has an impact on reducing lung expansion space. Both of these can cause patients with chronic kidney failure to experience shortness of breath (Kurnia, 2021). One of the interventions that has been carried out during the treatment period in patient M is to train the patient to perform deep breathing relaxation techniques. Physiologically, when performing breathing techniques the parasympathetic nervous system will be stimulated so thatthere will be an increase in endorphin production, a decrease in heart rate, and an increase in lung expansion until it is fully developed (Jafar, 2019). Deep breathing techniques can also make the body get the maximum supply of oxygen that result amount of oxygen used to supply the tissues will be maximized (Jafar, 2019). Deep breathing technique exercises are carried out on the patient simultaneously with semi-Fowler's position adjustment, monitoring of respiratory frequency, and monitoring of oxygen saturation. In addition, deep breathing exercises given to patients are carried out simultaneously with the management of hypervolemia because the tightness that occurs in patients is the result of hypervolemia.

Based on the intervention that has been carried out, including practicing deep breathing techniques for 3 days, deep breathing technique exercises are carried out 10 times per session. On thefirst day there were 2 sessions, the next day 1 session. The client experienced a decrease in shortness of breath and the patient's respiratory rate was within the normal range of 20 x/minute and 94% oxygen saturation.

Conclusions

The nursing problem that occurs in patient with stage 5 chronic kidney failure in the internal medicine ward of Sumedang Hospital is hypervolemia. Interventions carried out to address these nursing problems include managing hypervolemia including examining signs and symptoms of hypervolemia, monitoring the patient's hemodynamic status, monitoring the patient's fluid intake andoutput, teaching patients to limit fluid and salt intake, and collaborating in the administration of diuretic class drugs. After the implementation, hypervolemia did not indicate significant changes, where tightness

decreased, the degree of edema remained at degree 2 in the lower extremities and degree 2 in the upper extremities, there was increase in ascites in patients with an increase in abdominal circumference by 1 cm to 95 cm, and an increase in body weight to 68.5 kg.

Referensi

Aisara, S., Azmi, S., & Yanni, M. (2018). Gambaran Klinis Penderita Penyakit Ginjal Kronik yang Menjalani Hemodialisis di RSUP Dr. M. Djamil Padang . *Jurnal Kesehatan Andalas*, 7(1); 42-50.

Ajeng, Agustina, W., & Lumadi, S. A. (2022). Hubungan Antara Pemantauan Intake Output Cairan Penderita CKD dengan Terjadinya Overload Cairan. *Media Husada Journal of Nursing Science*, Vol 3 (No 2),164-174.

Alamsyah, A. S., Ulfa, N. M., & Sugiarto, L. (2018). Profil Penggunaan Loop Diuretik (Furosemide) Injeksi pada Pasien Penyakit Gagal Ginjal Kronik (PGK) Dengan Hemodialisis Di Rumah Sakit x Surabaya.

Aliakbari, F., Safei, F., Deriss, F., & Salehitali, S. (2021). Breathing Exercise and Respiratory Parameters inChronic Kidney Disease Patients With Hemodialysis. *Int J Epidemiol Health Sci*, 2(10): e21.

Anggraini, F., & Putri, A. F. (2016). Pemantauan Intake Output Cairan pada Pasien Gagal Ginjal Kronik Dapat mencegah Overload Cairan. *Jurnal Keperawatan Indonesia*, 19(3), 152-160.

Berman, A., & Synder, S. J. (2012). *Kozier & Erb's Fundamentals of Nursing: Concepts, Process, and Practice. 10th ed.* New Jersey: Pearson Education.

Darni, Z., & Sasmita, M. E. (2021). Liquid Restriction for Patients With Chronic Kidney Disease to Prevent The Risk of Fluid Overload. *Jurnak Ilmiah Keperawatan Orthopedi*, 5(1), 17-25.

Elaine Ku, B. J. (2019). Hypertension in CKD: Core Curriculum 2019. *AJKD*, 74(1), 120-131.

Fadli, Resky, & Sastria, A. (2019). Pengaruh Terapi Dzikir terhadap Intensitas Nyeri pada Pasien Gastritis. *JurnalKesehatan*, 10(2), 169-175.

GDB Chronic Kidney Disease. (2020). Global, regional, and national burden of chronic kidney. *Lancet*, 395: 709–33.

Guo, Q., Yi, C., Li, J., Wu, X., Yang, X., & Yu, X. (2013). Prevalence and Risk Factors of Fluid Overload in Southern Chinese Continuous Ambulatory Peritoneal Dialysis Patients. *PLoS One*, 8(1): e53294.

Harding, M. M. (2021). *Lewis's Medical Surgical Nursing* Assessment *and Management of Clinical ProblemsEleventh Edition.* Philadelphia: Elsevier.

Hashmi, M. F., Benjamin, O., & Lappin., S. L. (2022, November 22). *End-Stage Renal Disease*. Retrieved from National Library of Medicine: https://www.ncbi.nlm.nih.gov/books/NBK499861/

Hinkle, J. L., & Cheever, K. H. (2018). *Brunner&suddarth's Textbook Of Medical Surgical Nursing 14 Th Edition .* Philadelphia: Wolters Kluwer.

Jafar, S. R. (2019). Penurunan Tingkat Kelelahan Pasien Gagal Ginjal yang Menjalani Hemodialisis Melalui Promosi Kesehatan Teknik Relaksasi Nafas Dalam. *Jurnal Keperawatan Terpadu*, 1(1), 22-28.

KDIGO. (2013). KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney International Suplements*, 3(1). http://www.kidney-international.org.

Khan, T. M., Patel, R., & Siddiqui, A. H. (2022). *Furosemide.* StatPearls [Internet].

Khan, Y. H., Sarrif, A., Adnan, A. S., Khan, A. H., & Mallhi, T. H. (2016). Chronic Kidney Disease, Fluid Overload and Diuretics: A Complicated Triangle. *PLos One*, 11(7): e0159335.

Kovesdy, C. P. (2022). Epidemiology of Chronic Kidney Disease: An Update 2022. *Kidney International Supplements*, 12(1): 7–11.

Kurnia, E. (2021). Kelebihan Volume Cairan pada Pasien Gagal Ginjal Kronis yang Menjalani HHemodialisa. *Jurnal Penelitian Keperawatan*, 7(1), 32-39.

Mayeda, L., & Rivara, M. B. (2022). Nighttime Hypertension in Chronic Kidney Disease—Are We in the Dark Without Ambulatory Blood Pressure Monitoring? *Jama Network Open*, 5(5):e2214469. doi:10.1001/jamanetworkopen.2022.14469.

Mehmood, Y., Ashraf, U., & Ali, I. (2019). Hemodialysis: Acute Intradialytic Complications Found On Maintenance Hemodialysis In Patients at A Public Hospital Lahore. *Professioneal Medical Journal*, 26(1), 45-50.

Nurjanah, D. A., & Yuniartika, W. (2020). Teknik Relaksasi Nafas Dalam Pada Pasien Gagal Ginjal : Kajian Literatur. *SEMNASKEP*, 62-71. URL : https://publikasiilmiah.ums.ac.id/handle/11617/12261.

Ogobuiro, I., & Tuma, F. (2022, Januari). *Physiology, Renal*. Retrieved from In: StatPearls [Internet]: https://www.ncbi.nlm.nih.gov/*books*/NBK538339/

PPNI. (2016). *Standar Diagnosis Keperawatan Indonesia: Definisi dan Indikator Diagnostik, Edisi 1.* Jakarta: DPPPPNI.

Pujiastuti, T. (2018). Faktor yang Berhubungan dengan IDWG dan Tekanan Darah Pasien Hemodialisa Di Rumah Sakit Swasta Yogyakarta. *Media Ilmu Kesehatan*, 7(3), 223-231.

Ramdhani, A. R., Rahayu, M. P., Istikarini, i. F., Susiyanti, R., Asih, S. R., & Hanjari, T. R. (2020). *Buku Saku Praktik Klinik Keperawatan Edisi 3.* Jakarta: Penerbit Salemba Medika.

Riskesdas. (2019). *Laporan Nasional Riskesdas 2018.* Jakarta: Balitbangkes.

Safi'i, M., Samiyanto, & Suryaningsih, Y. (2020). Pengaruh Teknik Relaksasi Nafas Dalam Terhadap Penurunan Nyeri Perut Pasien Gastroernteritis Akut Di IGD RS Bina Sehat Jember. *Universitas Muhammadiyah Jember* .

Santoso, B. R., E, Y. M., & Asbullah. (2016). Hubungan Lama Hemodialisis Dengan Penurunan Nafsu Makan Pada Pasien Gagal Ginjal Kronik Di Unit Hemodialisa RSUD Ulin Banjarmasin. *Dinamika Kesehatan*, 7(1), 139-151.

Sepdianto, T. C., Suprajitno, & Usmiati, E. (2017). Penambahan Berat Badan Antara Dua Waktu Hemodialisa Pada Pasien Gagal Ginjal Kronik yan gMenjalani Hemodialisa Di RSD Mardi Waluyo Kota Blitar. *Jurnal Ners dan Kebidanan*, 4(1), 64-69.

Understanding Hypervolemia and Fluid Overload. (2021). Retrieved from Fresenius Kidney Care: https://www.freseniuskidneycare.com/thrive-central/hypervolemia