JNK

JURNAL NERS DAN KEBIDANAN
(JOURNAL OF NERS AND MIDWIFERY)
http://jnk.phb.ac.id/index.php/jnk

Intradialytic Complication and Associated Factors Among Patients Undergoing Hemodialysis

Yeni Kartika Sari[1], Ning Arti Wulandari[2], Sandi Alfa Wiga Arsa[3], Iwit Ratna Ari Dewi[4]
[1,2,3]Nursing Department, STIKes Patria Husada Blitar, Indonesia
[4]Nursing Practitioner, RSK Budi Rahayu Blitar, Indonesia

Article Information

History Article:
Received, 24/11/2021
Accepted, 23/12/2021
Published, 26/12/2021

Keywords:
CKD, Intradialytic Complication, Hemodialysis

Abstract

Hemodialysis is one of the vital management options for end-stage renal disease (ERDS) patients. Adequate hemodialysis can make a good quality of patient life. Hemodialysis patient commonly has experienced intradialytic complications, and it can be life-threatening. ESRD patients who are not compliant with fluid and dietary restrictions raised Intradialytic weight gain (IDWG), and blood pressure leads to intradialytic complications. This study aimed to determine factors associated with intradialytic complications among undergoing hemodialytic patients in Blitar. The data analysis used Multiple linear regression analysis to ascertain the possible factors that influence intradialytic complications. The sample was 55 hemodialysis patients with intradialytic complications. Based on this study, the Spearman Rank correlation test results, the factor that correlated with intradialytic complications was patient compliance with a Sig (2-tailed) value of 0.016 with a correlation coefficient value of -0.26. The correlation coefficient in the results above was negative, namely -0.263 so that the correlation between the two variables was not unidirectional. The higher compliance showed, the lower the intradialytic complications. The odds ratio (OR) value between adherence and the occurrence of intradialytic complications was 3,229. That value meant that patients with kidney failure who do not comply with the diet will have a 3-fold risk of intradialytic complications compared to patients with renal failure who comply. This result emphasizes the need for constant motivation and education at frequent intervals to ensure better adherence.

© 2021 Journal of Ners and Midwifery

✉Correspondence Address:
STIKes Patria Husada Blitar – East Java, Indonesia
Email: ulfamaria845@gmail.com
P-ISSN : 2355-052X
E-ISSN : 2548-3811
DOI: 10.26699/jnk.v8i3.ART.p378–385
This is an Open Access article under the CC BY-SA license (http://creativecommons.org/licenses/by-sa/4.0/)

INTRODUCTION

Chronic Kidney Disease (CKD) is one of the health problems in Indonesian society, which has an increased incidece of kidney failure with an unfavorable prognosis and high cost. Chronic Kidney Failure (CKD) in Indonesia ranks second in terms of financing after heart disease Hemodialysis is one of the actions for CKD patients with ERDS (End-Stage Renal Disease). Hemodialysis measures are increasing from year to year. In 2017 there was a drastic increase in line with the rise in population participating in the BPJS Health or JKN program so that they had full access and financing for hemodialysis. According to the Indonesian Renal Registry, in 2017, there were 77,892 people currently living on regular hemodialysis, while in 2018, HD procedures in Indonesia reached 132,142 active patients (Increased 70%).

One of the big problems that contribute to failure in the hemodialysis process is the problem of non-compliance. Patients should follow dietary rules, change lifestyles, take medicines recommended by health care providers and regularly perform hemodialysis therapy. The Patient's non-compliance harms the patient's health (Nita Samsyah, 2011). The study results Marfuah, n.d, (2018.) show that compliance with fluid intake restrictions in hemodialysis patients in the non-adherent category was 43.9% in the obedient class, 19.3%, and the less compliant 36.8%. The impact of non-adherence to fluid restriction is weight gain.

Bodyweight is the most critical indicator in patients undergoing hemodialysis. Significant weight gain in the span of a few days indicates excess fluid in the Patient's body. A study from Astuti and Endang in 2018 showed that excess fluid could lead to intradialytic complications, which is intradialytic hypertension. Intradialytic hypertension is associated with significant interdialytic fluid overload. It is also related to high ultrafiltration during dialysis sessions. Several reports have shown that intradialytic hypertension is related to hyperactivity of the sympathetic nervous system, impaired endothelial function, and increased cardiac output due to fluid expenditure (ultrafiltration) (Wibowo, 2020). Another study shows that during 4 hours of hemodialysis, all respondents reported one or more intradialytic complications. The most common complications were hypertension (85.7%), muscle cramps (55.4%), nausea (51.8%), headache (46.4%), chest pain (12.5%), fever (8.9%), and hypotension (5.4%), (Suparti, 2019).

According to Daugirdas, J. T., Blake, P. G., & Ing (2015), complications of hemodialysis include imbalance syndrome, dialysis reactions, hemolysis, air embolism, arrhythmias, cardiac tamponade, seizures, and intracerebral hemorrhage. (Yunie Armiyati, 2009) at PKU Muhammadiyah Hospital Yogyakarta from fifty hemodialysis patients showed that 96% of patients experienced intradialytic complications in the form of hypertension (70%), headache (40%), hypotension (26%), muscle cramps (18%), arrhythmia (12%), nausea and vomiting (10%), shortness of breath (10%), fever and chills (2%). The IRR.tim (2018)IRR in 2018, with a total number of 30554 patients, noted that the most frequent complications during hemodialysis were hypertension (38%), followed by hypotension (15%). The etiology of the two complications above was closely related to the amount of ultrafiltration

According to Landry, observations during data collection showed that most patients had excess predialysis fluid with an increase in body weight of 3-5 kg. Excess predialysis fluid will increase vascular resistance and cardiac pumping. Patients with intradialytic hypertension experienced a significant increase in peripheral vascular resistance in the final hours of dialysis(Ferdinan et al., 2019).

In addition to intradialytic hypertension, other intradialytic complications are nausea and vomiting; the incidence of nausea and vomiting during hemodialysis is a gastrointestinal symptom commonly experienced by clients and an adaptation to clients who have just undergone hemodialysis. Many clients experience nausea and vomiting due to changes in blood pressure, UFR that is too fast, anxiety, and overeating during hemodialysis. Nausea and vomiting may occur in patients with intradialytic hypotension. The most frequent complication of hemodialysis is Intradialytic hypotension, accounting for 20-30% of hemodialysis complications. Intradialytic hypotension was a significant clinical problem disturbing the quality of hemodialysis patients because of the symptoms of nausea and cramps (Chaidir & Putri, 2014). Hypotension in diabetic nephropathy patients and the elderly are often dangerous because it can trigger ischemic heart disease and heart rhythm disorders (Chaidir & Putri, 2014).

Complications of intradialytic hypotension lead to obstruction of the adequate dose of dialysis (adequate dose of dialysis), where episodes of hypotension cause compartmental effects and produce suboptimal Kt/Vera. In episodes of intradialytic hypotension, ultrafiltration should discontinue to prevent further blood volume reduction and facilitate refilling blood volume from the interstitial compartment. We treat dialytic hypotension by resetting the dialytic machine by slowing the blood flow rate (Chaidir & Putri, 2014). In addition, according to Kobrin, S.M. & Berns, J.S (2007), high ultrafiltration withdrawals can cause cramping. The incidence of muscle cramps at around 24-86%, especially in the first year of hemodialysis. Cramping is mainly seen in the lower extremities and rarely occurs in the abdomen, arms, and hands (Nasution et al., 2014). Low blood volume due to the withdrawal of large amounts of fluid during dialysis, changes in osmolarity, high ultrafiltration, and intracellular or extracellular potassium and calcium balance led to muscle cramps during dialysis (Marcel Brass, Perrine Ruby, 2009). Muscle cramps can occur near the end of a dialysis session. An uncontrollable increase in the speed of contraction or thinning of the muscle causes muscle cramps and occurs within seconds to minutes, causing pain. Intradialytic muscle cramping usually occurs in the lower extremities (Padoli & Ayunda Bella, 2017).

Based on the results of observations in July 2020 in the Hemodialysis Room of the Budi Rahayu Catholic Hospital (RSK) and the Mardi Waluya Blitar General Hospital (RSU) it was obtained that from 40 hemodialysis patients who did not obey to diet and fluid restriction were 25 patients or about 60%, and they often come with shortness of breath (due to excess body fluid volume, namely weight gain exceeding 5% of the Patient's dry body weight and uremic symptoms (nausea, vomiting, and anorexia). Moreover, as a result, these patients experience complications, which often occur, namely hypotension and hypertension.

Fluid restriction and dietary regulation are some of the programs applied to patients with chronic kidney failure to maintain a nutritional state so that the quality of life and rehabilitation to achieve as much as possible, prevent and reduce uremic syndrome, and reduce the risk of diminishing kidney function. After running hemodialysis therapy, the patient is given medication by the doctor. Adherence to treatment adherence is the success factor. The success of treatment lies in the facilities or facilities in the hospital, medical personnel skills, and the patient's lifestyle and medication adherence. The results of therapy will not be optimal without the awareness of the Patientpatient to maintain his life, and can also cause therapy failure or complications that are detrimental and fatal (Rahma, 2017).

Non-adherence to patients with chronic kidney failure caused by the thirst felt by the patient, and the patient admitted that he did not comply with the diet recommended by health workers. Dietary non-compliance includes fluid and nutritional intake because of boredom with the menu. The family has warned about the diet, but the patient is not obedient to the diet. In addition, patients also do not maintain nutrition and fluid intake shortly after hemodialysis because they feel refreshed after eating and drinking (Firmansyah, 2016).

METHOD

This research was a correlation study with a cross-sectional approach where the dependent and independent variables was observed at one time. The dependent variable in this study was intradialytic complications. At the same time, the independent variables were IDWG, Blood Pressure, and Intradialysis Patient Compliance. This research was conducted in the Hemodialysis Room at two Blitar City Hospitals, namely RSK Budi Rahayu and RSUD Mardi Waluyo. The population in this study was hemodialysis patients in both hospitals, as many as 90 patients. The sample was part of the population which met the inclusion criteria of 83 patients. The criteria set was patients who could read and write, patients who routinely did hemodialysis twice a week, and patients who were not in critical condition or had decreased consciousness. The instrument used in this study was a hemodialysis patient compliance questionnaire and observation sheets regarding intradialytic complications, blood pressure, and patient weight. The collected data will be analyzed using Spearman Rank correlation analysis with a significance value of 0.05.

RESULT

Information obtained that from a total of 83 respondents, most of them aged > 50 years (63.9%), female was 51.8%, high school education/equivalent was 38.6% and 56.6% did not work.

Table 1 The Charactheristic of Respondents

No	Charactheristic	f	%
1	Age		
	< 35 years	4	4,8
	35 - 50 years	26	31,3
	> 50 years	53	63,9
2	Genders		
	Male	40	48,2
	Female	43	51,8
3	Education		
	Elementary	7	8,4
	Junior High	16	19,3
	Senior High	32	38,6
	Diploma	7	8,4
	Bachelor	21	25,3
5	Work		
	Working	36	43,4
	Employe	47	56,6

Table 2 The Respondent's Complaint before Dialysis 25 February – 12 Marc 2021

No	Complaint	F	%
1	No	16	19,3
2	Dypsnea	15	18,1
3	Nausea	8	9,6
5	Headache	15	18,1
6	Oedem	22	26,5
7	Chest pain	7	8,4

Based on Table 2, information is obtained that the most common complaint experienced by respondents is oedem (26.5%)

Table 3 Correlation between Adherence and Intradyalitic Complications

			Intradialytic Complications		Total	
			Present	No		
Adherence	Obey	f	24	20	44	$\alpha \leq 0,05$ Spearman rho p = 0,016 rs= -0,263 or: 3,229
		%	54,5	45,5	100,0	
	Not Obey	f	31	8	39	
		%	79,5	20,5	100,0	
Total		f	55	28	83	
		%	66,3	33,7	100,0	

Table 4 Correlation between IDWG and Intradialytic Complications

			Intradialytic Complications		Total	
			Present	Not Present		
IDWG	Normal	f	11	15	26	$\alpha \leq 0,05$ Spearman rho p = 0,265
		%	13	18	31	
	Abnormal	f	17	40	57	
		%	20	48	69	
Total		f	28	57	83	
		%	33	67	100,0	

Table 5 Correlation between blood pressure and Intradialytic Complications

			Intradialytic Complications		Total	
			Present	Not Present		
TD	Normal	f	12	27	39	$\alpha \leq 0,05$ Spearman rho p = 0,591
		%	14,4	32,6	47	
	HT	f	16	28	44	
		%	19,2	33,8	53	
Total		f	28	55	83	
		%	33,6	66,4	100	

DISCUSSION

Hemodialysis is a vital management option for end-stage renal disease (ERDS) patients (IRR.tim, 2018), patient can have a good quality of life with adequate hemodialysis. However, complications during dialysis can be life-threatening (Alfikrie et al., 2020).

Hemodialysis can prevent death but cannot cure the disease or restore the Patient'spatient's condition to its original state, causing the Patient patient to adhere to hemodialysis therapy. Adherence is crucial in the management of ESRD patients. WHO describes adherence as the extent to which a person's behavior (taking medications, following a recommended diet, and executing lifestyle changes) correspondents with the agreed recommendations of health care providers (WHO, 2003). IDWG and adherence to dietary and fluid restrictions are determinants of intradialytic complications among undergoing hemodialysis patients

Based on this study, the Rank Spearman correlation test showed that a factor correlated with intradialytic complications was patient compliance with a Sig (2-tailed) value of 0.016 with a correlation coefficient value of -0.26. The correlation coefficient in the results above is negative, namely -0.263 so that the correlation between the two variables is not unidirectional, meaning that the higher the compliance, the lower the intradialytic complications. At the same time, the OR value between compliance with the occurrence of intradialytic complications is 3.229, which means that patients with kidney failure who are not compliant with the diet will have a 3-fold risk of intradialytic complications compared to patients with renal failure who are obedient. Meanwhile, blood pressure and IDWG did not correlate with intradialytic complications, with a sig (2-tailed) value > 0.05. The most common intradialytic complications were time limitation in dealing with excessive dialytic weight gain and achieving a dry weight target on a three-times-weekly schedule, supported by age. Elderly CKD patients accompanied by the comorbid disease will increase the risk of dialysis complications (Andrew Davenport, 2006).

This study's results follow the theory that patients with chronic kidney disease (CKD) in maintaining their quality of life must comply with hemodialysis therapy and its recommendation to limit fluid intake. However, in subsequent hemodialysis therapy, patients often complain of shortness of breath due to increased volume. body fluids (Bare, 2002). Compliance with therapy in hemodialysis patients is an important thing to note because if the Patientpatient does not comply, there will be a buildup of harmful substances from the body due to metabolism in the blood. So that the Patientpatient feels pain throughout the body and if this is allowed to cause death (Patimah et al., 2015). Non-adherence of hemodialysis patients to therapy (diet, fluid restriction, medication, and hemodialysis) is common in patients with end-stage renal disease (ESRD) undergoing hemodialysis. The patient must adapt to dietary and fluid restrictions, medications, and renal replacement therapy as routinely administered.

The fact shows that the respondents who experienced an increase in body weight between two hemodialysis sessions (IDWG) abormal were 17 respondents (20%). Of this number of respondents who did not comply, as many as 11 people (13%). According to the theory (Wahyuni et al., 2014) regarding the compliance of chronic renal failure patients in maintaining body weight between two dialysis times which states that IDWG that exceeds

5% of dry body weight can cause shortness of breath, pulmonary edema, and peripheral edema. Interdialysis weight gain in patients occurs due to non-adherence to therapy and reasonable control of fluid intake.

This study on IDWG shows a positive coefficient value caused by poor volume control and can harm the cardiovascular system. The initial risk is due to excessive sodium and water content (Lolyta et al., 2012). Based on field observations, researchers saw that patients who came with Mild and Moderate IDWG could undergo HD safely and comfortably without experiencing complications. On the other hand, in patients with moderate to severe IDWG, the majority experienced complications, either showing clinical manifestations or not.

The study results obtained pre-hypertensive blood pressure before HD as many as 27 people (32.5%). From this result, 15 respondents obeyed (18.1%). PUDIASTUTI (2011) revealed that an increase in diastolic blood pressure was a more critical factor than an increase in systolic, but now it is known that systolic hypertension in people over 50 years of age represents a greater risk. From this study, the results of pre-HD blood pressure for systolic pressure: 120 - 139 and diastolic pressure: 80 - 89 as many as 27 people or 32.5%. According to the Joint National Committee on Prevention, Detection, Evaluation, and Treatment on High Blood Pressure (JNC VII), classification is included in prehypertension. According to the researchers, because patients routinely take hypertension medication, systolic and diastolic blood pressure tends to be stable.

The results showed that from 66.3% (55 respondents) who had complications, 39.8% (33 respondents) experienced an increase in weight (Intra Dialytic Weight Gain-IDWG) >3. The most common complications are cramps, hypotension, and hypertension. (Kamil et al., 2018). Mustikasari & Noorratri, Erika Dewi (2017) from the Center for Kidney Disease Research in California found that 86% of hemodialysis patients had an interdialytic weight of more than than one 1.5 kg. The addition of IDWG values that are too high can cause harmful effects on the body, including hypotension, muscle cramps, shortness of breath, nausea, and vomiting (Ulrich Moissl, Marta Arias-Guilent,Petter Wabel, Nestor Fontsere, Montserrat Carrera, José Maria Campistol, 2013). A high IDWG will lead to high ultrafiltration as well.

Cramps and hypotension are the most common complications. Complications of cramps as many as 28 people (33.7%), while for hypotension complications, as many as 20 people (24.1%). Several theories state that intradialytic hypotension is the most common complication and complication experienced by clients during hemodialysis (Daugirdas et al., 2015). The primary factor causing intradialytic hypotension is a decrease in blood volume. They are beginning hemodialysis, a sudden decrease in blood volume because of blood movement from the intravascular into the dialyzer.

The decrease in blood volume triggers the activation of the cardiopressure reflex, causing an increase in parasympathetic nerve activity, decreasing cardiac output and blood pressure. While muscle cramps during hemodialysis because of the low blood volume due to the withdrawal of large amounts of fluid during dialysis, changes in osmolarity, high ultrafiltration, and changes in the balance of potassium and calcium intracellular or extracellularly (Ferdinan, D., Suwito, J., 2019). According to researchers, the incidence of hypotension and cramps in this study led by the majority of respondents with fluid withdrawal (UFG) > 3 liters or > 10 ml/kg BW/ hour due to weight gain between two HD sessions as well as high > 3 kg. If the ultrafiltration is too high even though it is not following the increase in body weight (increase in body fluids in liters), then the Patient will experience symptoms of intradialytic hypotension, cold sweats, dizziness, and yawning, BP can drop to < 90/60 mmHg and can cause muscle cramps. Due to 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 been over. To prevent hypotension/ intradialytic cramps, recommended for clients to consume healthy foods and an appropriate diet outside of dialysis time.

CONCLUSION

Based on the study, the Rank Spearman correlation test showed that the adherence correlated with intradialytic complications with a Sig (2-tailed) value of 0.016 with a correlation coefficient value of -0.26. The correlation coefficient in the results above was negative, namely -0.263 so that the correlation between the two variables was not unidirectional, meaning that the higher the compliance, the lower the intradialytic complications. Meanwhile, the OR value between adherence and the occur-

rence of intradialytic complications was 3,229, which meant that patients with kidney failure who did not comply with the diet had a 3-fold risk of intradialytic complications compared to patients with renal failure who comply.

SUGGESTION

Patients need constant motivation and education at frequent intervals to ensure better adherence.

REFERENCES

Alfikrie, F., Sari, L., & Akbar, A. (2020). Factors associated with anxiety in patients with chronic kidney disease undergoing hemodialysis: a crossectional study. *International Journal of Nursing, Health and Medicine*, *2*(2), 1–6.

Andrew Davenport. (2006). Intradialytic complications during hemodialysis. *Hemodialisys International*, *10*(2), 162–167. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1542-4758.2006.00088.x

Bare, & S. (2002). *Buku Ajar Keperawatan Medikal Bedah Brunner & Suddart* (A. Waluyo (ed.)). EGC.

Chaidir, R., & Putri, M. E. (2014). *Faktor-faktor yang Berhubungan dengan Intradialisis Hipotensi Pada Pasien Gagal Ginjal Kronik Yang Menjalani Terapi Hemodialisis*. STIKES YARSI SUMBAR BUKITTINGGI.

Daugirdas, J. T., Blake, P. G., & Ing, T. S. (2015). *Handbook of dialysis: Fifth edition. In J. T. Daugirdas (Ed.) Handbook of Dialysis* (Fifth Edit).

Daugirdas, J. T., Blake, P. G., & Ing, T. S. (2015). Handbook of dialysis: Fifth edition. In J. T. Daugirdas (Ed.), *Handbook of Dialysis: Fifth Edition* (fifth).

Ferdinan, D., Suwito, J., & P. (2019). Faktor-Faktor Yang Mempengaruhi Hipertensi Intradialitik Pada Klien Gagal Ginjal Kronik Yang Menjalani Terapi Hemodialisis Di RSI Jemursari Surabaya. *Jurnal Keperawatan*, *22*(1), 30–39. http://journal.poltekkesdepkes-sby.ac.id/index.php/KEP/article/view/1487

Ferdinan, D., Suwito, J., & Padoli. (2019). FAKTOR-FAKTOR YANG MEMPENGARUHI HIPERTENSI INTRADIALITIK PADA KLIEN GAGAL GINJAL KRONIK YANG MENJALANI TERAPI HEMODIALISIS DI RSI JEMURSARI SURABAYA. *Jurnal Keperawatan*, *XII*(1), 30–39.

Firmansyah, F. (2016). *FAKTOR-FAKTOR YANG MEMPENGARUHI KETIDAKPATUHAN DIIT PADA PASIEN GAGAL GINJAL KRONIK DI RUANG HEMODIALISA RSUD KRT SETJONEGORO WONOSOBO*. SEKOLAH TINGGI ILMU KESEHATAN MUHAMMADIYAH GOMBONG.

IRR.tim. (2018). *10 th Report Of Indonesian Renal Registry 2017* (pp. 1–40).

Kamil, I., Agustina, R., & Wahid, A. (2018). Gambaran Tingkat Kecemasan Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisis Di RSUD Ulin Banjarmasin. *Dinamika Kesehatan*, *9*(2), 366–377. https://ojs.dinamikakesehatan.unism.ac.id/index.php/dksm/article/view/350

Lolyta, Ismonah, & Solechan. (2012). Analisis Faktor yang Mempengaruhi Tekanan Darah Hemodialisis pada Klien Gagal Ginjal Kronis. *Jurnal Ilmu Keperawatan Dan Kebidanan (JIKK)*, *1*, 58–70.

Marcel Brass, Perrine Ruby, S. spengler. (2009). Inhibition of imitative behaviour and social cognition. *Philosophical Transactions Of The Royal Society B*, *364*(1528), 2359–2367. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2865080/

Marfuah, U. (n.d.). Hubungan Kepatuhan Pembatasan Asupan Cairan Dengan Kejadian Asites PAda Pasien Gagal Ginjal Kronik yang Mnejalani Hemodialisis di RS PKU Muhammadiah Unit II Yogyakarta. In *2018*. http://digilib.unisayogya.ac.id/3975/

Mustikasari, I., & Noorratri, Erika Dewi, S. A. (2017). *Weight Gain Pasien Hemodialisa DI RSUD Panembahan Surakarta*. *XV*(1), 78–85.

Nasution, A. T., Tarigan, R. R., & Patrick, J. (2014). Komplikasi Akut Intradialisis. In *Universitas Sumatera Utara*.

Nita Samsyah. (2011). *FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN KEPATUHAN PASIEN CKD YANG MENJALANI HEMODIALISA DI RSPAU Dr ESNAWAN ANTARIKSA HALIM PERDANA KUSUMA JAKARTA* [Universitas Indonesia]. http://lontar.ui.ac.id/file?file=digital/20281994-T Nita Syamsiah.pdf

Padoli, & Ayunda Bella, R. (2017). Kejadian Komplikasi Intradialisis Klien Gagal Ginjal Kronik Di Ruang Instalasi Hemodialisis RSUD Dr. M Soewandhi Surabaya. *Jurnal Keperawatan Indonesia*, *X*, 26–32.

Patimah, I., S, S., & Nuraeni, A. (2015). Pengaruh Relaksasi Dzikir terhadap Tingkat Kecemasan Pasien Gagal Ginjal Kronis yang Menjalani Hemodialisa. *Jurnal Keperawatan Padjadjaran*, *3*(1), 18–24. https://doi.org/10.24198/jkp.v3i1.95

PUDIASTUTI, R. D. (2011). *Cerebrovascular Disease*. Nuha Medika.

Rahma, shela febrianti ainur. (2017). *HUBUNGAN KEPATUHAN PEMBATASAN CAIRAN TERHADAP TERJADINYA HIPERVOLEMIA PADA PASIEN GAGAL GINJAL KRONIK DI RUANG HEMODIALISA RSUD Dr. HARJONO PONOROGO Oleh:* STIKES BHAKTI HUSADA MULIA MADIUN.

Sri Suparti, H. F. (2019). IS THERE ANYCORRELATION BETWEEN INTRADIALYTIC COMPLICATIONS AND INTERDIALYTIC WEIGHT GAIN (IDWG)? *The Annals of Tropical Medicine and Public*

Health, *11*. https://www.journal.atmph-specialissues.org/uploads/179/6970_pdf.pdf

Ulrich Moissl, Marta Arias-Guilent,Petter Wabel, Nestor Fontsere, Montserrat Carrera, José Maria Campistol, F. M. (2013). Bioimpedance-guided fluid management in hemodialysis patients. *Clinical Journal Of The American Society of Nephrology*, *8*(9). https://pubmed.ncbi.nlm.nih.gov/23949235/

Wahyuni1, Irwanti2, W., & Sofyan Indrayana3. (2014). Korelasi Penambahan Berat Badan Diantara Dua Waktu Dialisis dengan Kualitas Hidup Pasien Menjalani Hemodialisa. *JOURNAL NERS AND MIDWIFERY INDONESIA*, *2*(2), 51–56.

WHO. (2003). *Adherence to long-term therapies/ : evidence for action* (Eduardo Sabateì (ed.)). World Health Organization. https://apps.who.int/iris/handle/10665/42682

Wibowo, H. P. (2020). Hubungan Inter Dialitic Weight Gains (Idwg) Dengan Terjadinya Komplikasi Durante Hemodialisis Pada Pasien Ginjal Kronik. *Jurnal Keperawatan Priority*, *3*(1). https://doi.org/10.34012/jukep.v3i1.806

Yunie Armiyati. (2009). *The intradialysis complications on CKD patients during hemodialysis at PKU Muhammadiyah Yogyakarta Hospital* [Universitas Indonesia]. https://library.ui.ac.id/detail?id=125548&lokasi=lokal.