



## Length of hemodialysis, fluid intake, and quality of life in patients with chronic kidney disease

Foulla Givfa Ranggini, Arie Krisnasary\*, Kamsiah

Bengkulu Ministry of Health Polytechnic, Jalan. Indragiri, Padang Harapan, Bengkulu, Indonesia

\*Correspondence: [ariegizibkl@gmail.com](mailto:ariegizibkl@gmail.com)

### ABSTRAK

**Latar Belakang:** Terapi hemodialisis jangka panjang mempengaruhi kualitas hidup pasien CKD. Mutu hidup pasien ginjal termasuk dampak dari lamanya menderita hemodialisis dan asupan cairan yang dikonsumsi. Asupan cairan untuk pasien hemodialisis dibatasi sekitar 500 ml ditambah pengeluaran urine agar tidak terjadi penumpukan cairan. Kualitas hidup pasien CKD dapat diketahui melalui kuesioner Kidney Disease Quality Of Life (KDQOL).

**Tujuan:** Tujuan dari penelitian tersebut termasuk supaya menemukan kaitan lama hemodialisis dan asupan cairan dengan mutu hidup pasien RSUD Bengkulu penderita gagal ginjal kronik dengan hemodialisis.

**Metode:** Penelitian tersebut memakai desain cross sectional. Sampel pada penelitian tersebut termasuk 42 pasien yang dipilih dengan purposive sampling yang memakai kriteria inklusi serta eksklusi. Hasil analisis data menggunakan uji chi-square.

**Hasil:** Hasil penelitian memaparkan jika ada kaitan antara lama menjalani hemodialisis dengan mutu hidup pasien RSUD Bengkulu yang menderita gagal ginjal kronik yang menjalani hemodialisis ( $p$  value = 0,046). Tidak ada hubungan asupan cairan dengan mutu hidup pasien RSUD Bengkulu yang menderita gagal ginjal kronik yang menjalani hemodialisis ( $p$  value = 0,68).

**Kesimpulan:** Ada kaitan antara Lama menderita Hemodialisis dengan mutu Hidup Pasien RSUD Bengkulu yang menderita Gagal Ginjal Kronik dengan Hemodialisis dan tidak ada hubungan asupan cairan dengan mutu hidup pasien gagal ginjal kronis dengan hemodialisis..

**KATA KUNCI:** KDQOL; hemodialisis; asupan cairan; kualitas hidup



## ABSTRACT

**Background:** Prolonged HD therapy affects the patient's quality of life. Renal patients' quality of life is influenced by the length of their HD and the volume of fluids they ingest. To prevent fluid buildup, HD patients are only permitted to drink about 500 ml of fluid daily in addition to their urine output. Patients with CKD can evaluate their quality of life using a questionnaire known as the Kidney Disease Quality of Life (KDQOL).

**Objectives:** This study aims to evaluate the efficacy of HD therapies, fluid intake, and clinical outcomes of patients with chronic kidney disease at General Hospital Bengkulu.

**Methods:** This study's design was cross-sectional. The inclusion and exclusion criteria were used to select the 42 patients who would make up its purposive sampling sample. The data were assessed using the chi-square test.

**Results:** The results show a long-standing association between HD therapy and patients with chronic kidney disease who receive HD at General Hospital Bengkulu ( $p$ -value = 0.030). In patients with chronic kidney disease receiving HD at General Hospital Bengkulu, fluid intake and quality of life are unrelated ( $p$ -value = 0.68).

**Conclusions:** The quantity of HD and the standard of living of people with chronic renal failure are correlated. Patients with Chronic Renal Failure Undergoing HD at General Hospital Bengkulu; No Relationship Between Fluid Intake and Quality of Life of Patients with Chronic Kidney Disease Undergoing HD at General Hospital Bengkulu.

**KEYWORD:** KDQOL; hemodialysis; fluid intake; quality of life

Article info:

Article submitted on August 12, 2023

Articles revised on November 14, 2023

Articles received on August 14, 2024

---

## INTRODUCTION

Chronic kidney disease (CKD) attacks the kidneys, damaging them and causing their function to decline for three months or more. An adult patient is defined as having CKD when he develops a glomerular filtration rate (GFR) of less than 60 ml/min/1.73 m<sup>2</sup> or exceeding 60 ml/min/1.73 m<sup>2</sup> over three months or more (1). Chronic kidney disease is included in the top 20 causes of death in the world and the top 10 causes of death in Indonesia. Riskesdas data shows CKD patients in Indonesia in 2018 were 3.8%, up from 2% in 2013 (2). The rate of CKD patients in Bengkulu province is relatively high at 0.43%. In 2017, CRF in Bengkulu Province ranked as the 9th leading cause of death in Bengkulu Province (3).

Hemodialysis (HD) is a therapy that can prevent death and extend the life expectancy of CKD sufferers. It removes certain elements from the blood by taking advantage of differences in diffusion across a semi-permeable membrane. HD is usually done two times a week and lasts four to five hours (5). HD held by CKD patients certainly has a holistic effect on the patient's life. One thing, for example, is the quality of life of the individual

patient. The quality of life of HD patients is affected by many factors, including the duration of suffering from HD and the patient's fluid intake.

The amount of fluid allowed for HD patients to consume is very limited, only about 500 ml every day. If the fluid intake is not restricted, the patient will become dehydrated, causing pulmonary edema and left ventricular failure (hypertrophy). This can increase the work of the heart and lungs, making the patient tired and short of breath (6). However, the fluid intake of Chronic renal failure patients should not be too little or less than needed because it will cause the patient's body to become dehydrated and hypotensive and worsen kidney function (7). This study aimed to determine the relationship between the duration of HD and fluid intake with the quality of life of CKD patients undergoing HD at Bengkulu General Hospital.

## MATERIALS AND METHODS

The research design used in this type of research includes cross-sectional and quantitative. This investigation took place in April

2023 at General Hospital Bengkulu. There were 42 people who became the research sample obtained using purposive sampling. The inclusion criteria were patients diagnosed with CRF, patients undergoing HD outpatient care at the HD unit of General Hospital Bengkulu, and patients with composmentis awareness. While the exclusion criteria were patients with psychiatric disorders and patients who were hospitalized. The length of time to undergo hemodialysis is the length of time a person has been undergoing hemodialysis therapy, which is categorized into two, namely recently ( $\leq 12$  months) and for a long time ( $> 12$  months). The research instrument used was the KDQOL (Kidney Disease Quality Of Life) quality of life questionnaire obtained from RAND Corporation, which is a standard tool for measuring the health-related quality of life (HRQOL) of patients with kidney disease. It has been translated and validated in many countries, including Indonesia (8).

Data was collected by interviewing the patients using the KDQOL questionnaire to measure their quality of life. Measuring cups are used to record the amount of fluid intake and urine output of the patients. The quality of life data was scored and divided into good and poor quality of life. The patient's fluid intake was categorized into three categories: adequate, insufficient, and excessive. After the data was collected, it was checked for accuracy and then entered into a master table for further processing using computerization. Data were analyzed using the chi-square test. This research passed ethical feasibility on April 11, 2023, with No.KEPK.BKL/137/04/2023.

## **RESULTS AND DISCUSSIONS**

The results (**Table 1**) of this study show that most patients with renal failure on dialysis are in the early elderly group, namely those aged 46 to 55. After age 30, the kidneys atrophy, and the renal cortex shrinks by about 20% every ten years. Other changes that occur with aging include thickening of the glomerular basement membrane, enlargement of the glomerular mesenchyme, and deposition of extracellular matrix proteins that lead to glomerulosclerosis (8).

Most (64.3%) CKD patients undergoing HD at General Hospital Bengkulu were female.

However, the progression of CKD in women is slower than in men because women produce more estrogen. Estrogen can affect calcium levels by forming osteoclast cytokines, preventing excessive bone resorption. Calcium can also prevent the absorption of oxalate, which is one of the causes of CKD (9). The study's results obtained data from 42 patients. The majority (59.5%) had been undergoing HD for a long time. The average duration of HD was 32.17 months, with the lowest range being 1 month and the longest being 120 months, or 10 years.

Similar research was conducted by Heni and Wahyuni (10) at Gatoel Mojokerto Hospital. The results showed that most patients underwent HD for over 12 months (61.2%). Another study conducted by Anita and Novitasari (11) at PKU Muhammadiyah Yogyakarta Hospital also found that most respondents were patients who had been undergoing HD for a long time. Based on the results of interviews with 42 patients using a 24 hour fluid recall form, it was found that most patients (90.5%) did not meet their requirements. The average amount of fluid consumed by CKD patients at Bengkulu General Hospital was 708.17 ml, with the lowest patient consuming 367 ml and the highest 2.000 ml. The results of this study are consistent with a study conducted by Intan (12) in Klungkung Hospital, which found that the majority (71.9%) of patients were less compliant with fluid restrictions. Another study conducted by Fidayanti (13) at Jemursari Surabaya Hospital showed that the majority (51.85%) of patients did not understand or comply with fluid restrictions.

The study results show that many patients do not know their daily fluid requirements. Fahmi and Hidayanti also explain this (14) in their study: Many HD patients do not understand how to manage their fluid status. Patients only know that fluid volume is needed, but because of the disease, People don't know how to determine their daily fluid volume demand. Insight into the patient's quality of life was received through interviews using the Kidney Disease Quality of Life (KDQOL) questionnaire. The majority of patients (59.5%) who suffer from HD at Bengkulu General Hospital obtain a positive quality of life. The average quality of life of patients based on the results of the kidney disease quality of life scale (KDQOL) was  $85.79 \pm 18.54$ , higher than that of

Adiningrum et al.,(15) at Dr. Loekmono Hadi Kudus Hospital; the results were  $63.20 \pm 17.05$ .

The KDQOL questionnaire was divided into 19 categories, namely symptoms, effects of kidney disease, burden of kidney disease, professional situation, mental acuity, sexual acuity, sleep, social interactions, encouragement

of dialysis staff, general health, physical functioning, role-physical limitations, pain, general health, emotional well-being, role-emotional limitations, social function, and energy. Of the 19 categories, it is further divided into two domains, namely, the domain of physical health and the domain of mental health.

**Table 1. Characteristics of Research Respondents**

Characteristics	Frequency	
	N	%
Age		
0 = Late teens (17-25)	1	2.4
1 = Early adulthood (26-35)	4	9.5
2 = Late adulthood(36 -45)	11	2.2
3 = Early elderly (46-55)	14	33.3
4 = Late elderly (56-65)	9	21.4
5 = Elderly (> 65)	3	7.1
Gender		
Men	15	35.7
Women	27	64.3
Length of Undergoing HD		
Recently ( $\leq 12$ Months)	17	40.5
Long (> 12 Months)	25	59.5
Fluid Intake		
Adequate	4	9.5
Less and excessive	38	90.5
Quality of Life		
Good Quality of Life	25	59.5
Poor Quality of Life	17	40.5

The results of the questionnaire scores that were filled in by the respondents obtained a symptom score of  $71.23 \pm 16.81$ , the effect of kidney disease was obtained a score of  $66.52 \pm 24.36$ , the burden of kidney disease was  $39.23 \pm 23.84$ , employment status  $33.33 \pm 36.07$ , cognitive function  $73.02 \pm 26.62$ , quality of social interaction  $79.05 \pm 16.10$ , sexual function  $75.00 \pm 26.52$ , sleep  $58.27 \pm 18.87$ , social support  $91.27 \pm 15.28$ , encouragement of dialysis staff  $86.61 \pm 14.18$ , patient satisfaction  $65.08 \pm 18.70$ , physical function  $48.93 \pm 25.12$ , physical condition  $34.52 \pm 39.80$ , body pain  $67, 50 \pm 26.05$ , general health  $59.64 \pm 16.58$ , mental health  $69.33 \pm 19.93$ , emotional state  $38.10 \pm 42.66$ , social function  $66.67 \pm 27.97$ , and energy  $63.10 \pm 20.29$ . Based on the study results, the highest score was in the mental health domain, with a score of  $47.40 \pm 10.29$ , and the lowest score in the physical health field was  $38.40 \pm 8.25$ . These results are the same as Adiningrum et al., (15) by receiving less value from the physical health domain than for the

mental health domain. Guerra Guero et al.,(16) in their study, stated that low physical health scores can affect an individual's ability to psychologically adapt to the conditions faced by the patient according to time because the duration is desired so that acclimatization can reduce the physical aspect of quality of life for patients with CKD (17).

Based on **Table 2**, the statistical tests using the chi-square test yield results if the relationship between the length of HD and the quality of life of HD patients is accepted. These results are the same as the results of the research by Sarastika et al.,(18)The results explain a significant relationship between the duration of HD and the quality of life of CKD patients undergoing HD therapy at RSU Royal Prima Medan in 2019 (p-value 0.001). This was also the case with the research conducted by Sari (19), which stated that there was a connection between the length of time undergoing HD and the quality of life of patients with CKD at Abdul Moeloek Hospital Bandar Lampung (p-value = 0.002).

**Table 2. Correlation between length of time undergoing HD and quality of life of HD patient**

Length of Undergoing HD	Quality of life				Total		OR (95% CI)	p-value
	Good		Poor		n	%		
	n	%	n	%				
Recently	3	17.6	14	82.4	17	100	0.17 (0.38-0.747)	0.030
Long	14	56	11	44	25	100		

The OR value (odds ratio) is 0.17, which means that new HD patients are 0.17 times more likely to have a poor quality of life, and the longer the HD patient, the better the patient's quality of life. Results of a similar study also conducted by Sofiana Nurcahyanti (20) at Fatimah Cilacap Hospital, found that new patients on dialysis had a 2.6 times lower risk of decreased quality of life compared with patients on HD. Long-term HD patients can affect their quality of life. If the patient has been on HD for more than 12 months because they have generally reached the stage of long-term adaptation (advanced acclimatization). After one year of HD treatment, patients often begin to get used to the limitations and possible complications that may arise (21). Wahyuni et al., (22) reported that the length of time undergoing.

HD affects the quality of life of CKD patients undergoing HD (p-value 0.022). Of patients who underwent HD <12 months, 41.9% had a poor quality of life, and 13% had a good quality of life, while >12 months, 29% had a good quality of life, and 16.1% had a bad quality of life. The patient's quality of life can change when the patient socializes with the disease, but this takes time. The majority of people who suffer from long-term HD have a positive quality of life because they have entered the acceptance phase and are aware of its characteristics and side effects. They may also have received health education from

their healthcare provider about their illness and how important routine HD is to them. Patients who are able to accept their condition will have a good quality of life because the quality of life is related to the patient's degree of acceptance of the condition they feel (20). Patient quality of life data were collected using the Kidney Disease Quality Of Life Short Form 1.3 questionnaire (KDQOL SFTM 1.3).

The survey explicitly concerns the quality of life of people with kidney disease. The validity and reliability of this survey have been examined via prolonged use (19). It can be seen from the results of the average score of HD patients at General Hospital Bengkulu that the patient's highest score is found on the social support indicator  $91.27 \pm 15.28$ . Family and surrounding support can affect patient adherence in undergoing HD which can improve the patient's quality of life as well (23). The results of the study found that the majority (90.5%) of patients consumed fluid intake that was not in accordance with their daily needs. Research conducted by Sulistianingsih (7) in Kotabaru Hospital also got similar results, namely that almost all (87.5%) patients were disobedient in controlling their fluid intake. Several factors can affect adherence to fluid intake restrictions: age, gender, education level, marital status, length of time undergoing HD, and social support (24).

**Table 3. The connection between HD fluid intake and the quality of life of HD patients**

Intake Fluid	Quality of life				Total	OR (95% CI)	P-value
	Good		Poor				
	n	%	n	%	n	%	
Adequate	24.8%	24.8%	49.5%			1.53 (0.19-12.09)	0.683
Less and excessive	2354.8%	1535.7%	3890.5%				

The chi-square test was used to analyze the study's results, which showed no correlation between fluid consumption and the patient's quality of life at General Hospital Bengkulu who were getting HD. The results of this study are in line with research conducted by Trisa Siregar (25) found that the average HD patient respondent at Dr Pringadi Medan Hospital had excess fluid. The results of bivariate analysis found that there was no connection between fluid management and the quality of life of HD patients with correlation analysis ( $p = 0.253$  and  $r = -0.120$ ).

Controlling fluid intake is one of the most important things that must be done by kidney patients undergoing HD therapy. Patients who cannot control their fluid intake are at risk of gaining weight between two times of dialysis (IDWG) (26), so this is one of the risks of decreasing the quality of life of patients with CKD.

Research conducted by Amrizal (27) in RSUP Dr M Djamil Padang, reported if a connection is obtained significant relationship between IDWG and quality of life of HD patients. Exactly similar research was conducted from Agus et al.,(28) at Ratu Zaleha Hospital. The results of the study explained that there is a relationship between IDWG and the quality of life of kidney failure patients suffering from HD therapy. The Pearson correlation value was  $-0.339$ , indicating an inverse correlation model with the assumption that an increase in IDWG causes decreased quality of life of patients on HD therapy.

## CONCLUSIONS AND RECOMMENDATIONS

Omega-3 fatty acid supplementation at 540 mg EPA and 360 mg DHA significantly decreased TNF- $\alpha$  levels and reduced pain intensity in subjects with osteoarthritis. These findings suggest that adding omega-3 fatty acids may benefit the management of pain and inflammation in osteoarthritis, contributing to a comprehensive therapeutic strategy for the condition.

## REFERENCES

1. Braun MM, Khayat M. Kidney Disease: Chronic Kidney Disease. *FP Essent.* 2021;509 Suppl 1:20–5.
2. Kementerian Kesehatan RI. Laporan Nasional Risetdas 2018. Jakarta; Badan Penelitian

- dan Pengembangan Kesehatan, Departemen Kesehatan RI. 2019;120.
3. Kementerian Kesehatan RI. Analisis Beban Penyakit Nasional dan Sub Nasional Indonesia. Analisis Beban Penyakit Nasional dan Sub Nasional Indonesia Tahun 2017. Jakarta; Badan Penelitian dan Pengembangan Kesehatan, Departemen Kesehatan RI. 2017.
4. Juwita L, Kartika IR. Pengalaman Menjalani Hemodialisa Pada Pasien Gagal Ginjal Kronis. *Jurnal Endurance.* 2019; 4(1):97.
5. Ipo A, Aryani T, Suri M. Hubungan Jenis Kelamin dan Frekuensi Hemodialisa dengan Kualitas Hidup Pasien Gagal Ginjal Kronik yang Menjalani Hemodialisa di Rumah Sakit Umum Daerah Raden Mattaher Jambi. *Jurnal Akademik Baiturrahim Jambi* 2016;5(2):46–55.
6. Lestari W, Asyrofi A, Prasetya HA. Manajemen Cairan Pada Pasien Penyakit Ginjal Kronis Yang Menjalani Hemodialisis. *Jurnal Manajemen Asuhan Keperawatan.* 2018;2(2):20–9.
7. Sulistianingsih. Pengaruh Edukasi Pembatasan Cairan Terhadap Kualitas Hidup Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Literatur Riview. 2021; Available from: <http://digilib.unisayogya.ac.id/5711/%0A>
8. Prasetyo A, Pranowo S, Handayani N. Karakteristik Pasien Gagal Ginjal Yang Menjalani Terapi Hemodialisa Di Rsud Cilacap | Prasetyo | Prosiding Seminar Nasional dan Penelitian Kesehatan 2018. *Pros Semin Nas dan Disem Penelit Kesehatan STIKes Bakti Tunas Husada Tasikmalaya* 2018;(April):1–6.[https://ejournal.stikes-bth.ac.id/index.php/P3M\\_PSNDPK/article/view/335/293](https://ejournal.stikes-bth.ac.id/index.php/P3M_PSNDPK/article/view/335/293)
9. Frengki, Budiharto I, Fauzan S. Gambaran Insomnia pada pasien yang menjalani terapi Hemodialisa di RSUD dr. Soedarso Pontianak. *Jurnal Proners.* 2019;4(1).
10. Heni, Wahyuni LS S. Hubungan Antara Lama Menjalani Hemodialisis Dengan Kualitas Hidup Pasien Gagal Ginjal Kronik Di Rs Gatoel Mojokerto. *Jurnal Keperawatan.* 2016;5(2):57–65.
11. Anita CA, Novitasari D. Kepatuhan Pembatasan Asupan Cairan Terhadap Lama Menjalani Hemodialisa. *Pros Semin Nas dan*

- Int LPPM Univ Muhammadiyah Semarang. 2017;104–12.
12. Intan Setya Dewi. Gambaran Kepatuhan Pembatasan Cairan Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rsd Klungkung Tahun 2022. 2022;1–23. Available From: [Http://Repository.Poltekkes-Denpasar.Ac.Id/Id/Eprint/8935](http://Repository.Poltekkes-Denpasar.Ac.Id/Id/Eprint/8935)
  13. Fidayanti A. Kepatuhan Pembatasan Cairan Pada Klien Gagal Ginjal Kronis Yang Menjalani Hemodialisa Di Rsi Jemursari Surabaya. Keperawatan [Internet]. 2018;6(1):1–8. Available From: [Http://Journals.Sagepub.Com/Doi/10.1177/1120700020921110%0a](http://Journals.Sagepub.Com/Doi/10.1177/1120700020921110%0a)
  14. Fahmi FY, Hidayati T. Gambaran Self Care Status Cairan Pada Pasien Hemodialisa (Literatur Review). Care : Jurnal Ilmiah Ilmu Kesehatan. 2016;4(2):53–63.
  15. Adiningrum N, Andayani TM, Kristina SA. Analisis Faktor Klinik terhadap Kualitas Hidup Pasien Hemodialisis di RSUD dr. Loekmono Hadi Kudus. Jurnal Farmasi dan Ilmu Kefarmasian Indonesia. 2021;8(1):29.
  16. Guerra-Guerrero V, Sanhueza-Alvarado O, Cáceres-Espina M. Quality of life in people with chronic hemodialysis: association with sociodemographic, medical-clinical and laboratory variables. Revista Latino-Americana de Enfermagem. 2012;20(5):838–46.
  17. Yusop NBM, Mun CY, Shariff ZM, Huat CB. Factors associated with quality of life among hemodialysis patients in Malaysia. PLoS One. 2013;8(12):1–11.
  18. Sarastika Y, Kisan K, Mendrofa O, Siahaan JV. Faktor-Faktor Yang Mempengaruhi Kualitas Hidup Pasien Gagal Ginjal Kronik (Ggk) Yang Menjalani Terapi Hemodialisa Di Rsu Royal Prima Medan. Jurnal Riset Hesti Medan Akper Kesdam I/BB Medan. 2019;4(1):53.
  19. Permata Sari S, AZ R, Maulani M. Hubungan Lama Hemodialisis dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik di Ruang Hemodialisa Rumah Sakit Bhayangkara Kota Jambi. Jurnal Ilmiah Ners Indonesia. 2022;3(2):54–62.
  20. Nurcahyati S, Karim D. Implementasi Self Care Model dalam Upaya Meningkatkan Kualitas Hidup Penderita Gagal Ginjal Kronik. Jurnal Keperawatan Sriwijaya. 2016;3(2):25–32.
  21. Bestari AW. Influence of Family Support and DM Status with Hemodialysis Patient's Quality of Life. Jurnal Berkala Epidemiologi. 2017;4(2):200.
  22. Wahyuni P, Miro S, Kurniawan E. Hubungan Lama Menjalani Hemodialisis dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik dengan Diabetes Melitus di RSUP Dr. M Djamil Padang. Jurnal Kesehatan Andalas. 2018;7(4):480.
  23. Jeremi C, Paath G, Masi G, Onibala F, Kedokteran F, Sam U, Et Al. Study Cross Sectional: Dukungan Keluarga Dengan Kepatuhan Hemodialisa Pada Pasien. 2020;8:106–12.
  24. Gultom ECV, Kariasa IM, Masfuri M. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Pembatasan Cairan Pasien Gagal Ginjal Terminal Yang Menjalani Hemodialisis Di Satu Rumah Sakit Swasta Di Indonesia Barat [Factors Associated With Adherence To Fluid Restriction Towards Patients With End Stag. Nurs Curr Jurnal Keperawatan. 2020;8(1):56.
  25. Trisa Siregar C, Siagian Y. Fluid Management Correlation with the Quality of Life in Hemodialysis Patients in Medan. 2017;1(February 2014):204–8.
  26. Fazriansyah, Putra F dan Pringgotomo G. 2018. Hubungan Antara Kepatuhan Mengontrol Intake (Asupan) Cairan Dengan Penambahan Nilai InterDialytic Weight Gain (IDWG) Pada Pasien yang Menjalani Terapi Hemodialisis di RSUD Kotabara. Dinamika Kesehatan, Vol. 9 No. 2 Desember 2018.
  27. Amrizal. Hubungan Penambahan Berat Badan Diantara Dua Waktu Dialysis (Idwg) Dengan Kualitas Hidup Pasien Yang Menjalani Hemodialisis Di Unit Hemodialisa Rsup Dr. M. Djamil Padang Tahun 2020. 2020;
  28. Agus Rahmadi A rizani, Rahmilah. Model Kualitas Hidup Pasien Gagal ginjal. Jurnal Citra Keperawatan. 2022;10(1):61–72..