

Relationship between length of undergoing hemodialysis therapy with insomnia in chronic renal failure patients

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Abstract

BACKGROUND: Complications that are often experienced by patients with chronic kidney failure undergoing hemodialysis are sleep disturbances. Sleep disturbances are experienced by at least 50-80% of patients undergoing hemodialysis > 12 months. The purpose of this study was to determine the relationship between the duration of hemodialysis therapy and insomnia in patients with chronic kidney failure at Arifin Achmad Hospital, Riau Province.

METHOD: The research method icross-sectional approach. The population of this study was all 58 patients undergoing hemodialysis at Arifin Achmad Hospital. The sampling method was purposive sampling. The measuring instrument used in this research is the Insomnia Severity Index (ISI) questionnaire. Statistical test using Cchi-Square test.

RESULTS: Most of the levels of mild insomnia 26 respondents (44.8%), moderate insomnia was 21 respondents (36.2%), not clinically significant as many as 8 respondents (13.8%), and severe insomnia was 3 respondents (5.2%). The results of statistical tests obtained p -value.487 > (0.05). It can be concluded that there is no relationship between undergoing hemodialysis therapy with insomnia in patients with chronic kidney failure at Arifin Achmad Hospital, Riau Province.

CONCLUSION: Suggestions for further research that can be expected to examine the factors associated with insomnia in patients with chronic kidney failure.

Keywords: Insomnia, Chronic Renal Failure, Hemodialysis

INTRODUCTION

When the condition of the kidneys decreases gradually due to damage to the kidney tissue and is disrupted in carrying out its functions, it causes kidney failure (Flourishing & Ginja, 2019). According to the National Kidney Foundation (2018) Chronic kidney failure (CKD) is progressive and irreversible damage to kidney function, in which the body is unable to maintain metabolism, fails to maintain fluid and electrolyte balance which results in worsening and characterized by uremia (urea and nitrogenous waste). other circulating in the blood and complications if not done dialysis or kidney transplant.

The World Health Organization (WHO) in 2018 stated that the incidence of CRF worldwide experienced an increase in CRF patients from 1995-2025 by 41.4% of the population. Chronic kidney failure is one of the 12 common causes of death in the world, accounting for 1.1 million deaths due to chronic kidney failure which has increased by 31.7% from 2010 to 2015 (Neuen et al., 2017).

The United States Renal Data System (USRDS) records that the number of patients treated for End Stage Renal Disease (ESRD) globally is estimated at 3,010,000 in 2012 with a growth rate of 7% and an increase of 3,200,000 in 2013 with a growth rate of 6%. According to the National Chronic Kidney Disease Fact Sheet (2017), 30 million adults (about 15%) have chronic kidney disease and it is predicted that by 2030 more than 2 million people will need a kidney transplant renal replacement therapy or dialysis.

Data from the RISKESDAS national report (2018) found that the rate of chronic kidney failure sufferers in Indonesia was 3.8%, namely 713,783 people and according to Indonesian Renal Registry data (2018) that every year there is an increase in the number of patients undergoing hemodialysis therapy. There were 13,214 active patients undergoing hemodialysis therapy in 2018 (PERNEFRI, 2018). The prevalence in Riau Province according to the RISKESDAS National Report (2018) is 2.6%, namely 17,258 people.

CRF patients in Riau, especially Arifin Achmad Pekanbaru Hospital, patients who visited hemodialysis services were 136 people and a total of 7,915 patients underwent hemodialysis therapy and the average time needed was around 3-4 hours (Medical Records of Arifin Achmad Hospital, 2021). Patients with chronic kidney disease have kidney damage or a decrease in glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² for 3 months or more which is irreversible and is based on many factors. Hemodialysis (HD) is a process of renal replacement therapy that uses a semipermeable membrane (dialyzer) that functions like a nephron which is useful for removing metabolic waste and correcting fluid and electrolyte balance disturbances in patients with kidney failure (Myer, 2014).

Patients with chronic kidney failure must undergo hemodialysis therapy which is carried out routinely (2-3 times a week) for 3-4 hours. Hemodialysis therapy has complications that cause symptoms including body weakness, muscle cramps, hypotension, hypertension, sleep disturbances and others (Kamil & Setiyono, 2018). One of the sleep disorders, namely insomnia, is often complained by patients on hemodialysis therapy and causes poor sleep quality. Insomnia is a symptom in which a person has difficulty initiating and maintaining adequate sleep, both in quality and quantity, which can be temporary or permanent (Herdman & Shigemi, 2015).

The causes of insomnia in patients with chronic renal failure are often multifactorial including biological and psychological factors. Several studies have suggested that changes in melatonin secretion, anxiety or depression, old age, dialysis shift times, and female sex can be risk factors for insomnia in hemodialysis patients (Chu et al., 2018).

Nurhayati research (2021) states that almost all CRF patients undergoing hemodialysis experience a negative impact on their sleep quality, with a range of 53.8% - 97.5% of respondents. The causes of poor sleep in CRF patients are due to several factors, including age, work and fatigue, hemodialysis shifts and length of time undergoing hemodialysis, comorbidities, psychological factors, lifestyle and environment.

Based on the results of interviews conducted with 10 patients in the hemodialysis room at Arifin Achmad Hospital Pekanbaru, stated that 10 patients suffering from chronic kidney failure experienced sleep disturbances such as insomnia, among them consisting of 8

patients said they had difficulty getting to sleep at night, felt tired when they woke up and were sick. headaches in the morning and decreased concentration with the criteria of having hemodialysis therapy for 2 years. And 2 patients said they did not experience symptoms of insomnia. This study aims to determine the relationship between prolonged hemodialysis therapy and insomnia in patients with chronic kidney failure at Arifin Achmad Hospital, Riau Province.

METHODS

This type of research used is quantitative research. The design of this study was a cross-sectional analytic research design, the research instrument for insomnia used the Insomnia Severity Index (ISI) questionnaire. This research was conducted for three days according to the schedule in the HD room. Previously this research had passed the ethical test with number 0033STIKES PN/KEPK/VI/2022.

RESULT AND DISCUSSION

Analisa Univariat

Table 1. Age

Age	Frequency	Presentation (%)
Early teen	1	1,7
Early adulthood	3	5,2
Late adulthood	16	27,6
Early elderly	29	50
Late elderly	9	15,5
Total	58	100

Based on table 1, it can be seen that the majority of respondents, namely early elderly, were 29 respondents (50%) and the lowest was early youth, namely 1 respondent (1.7%).

Table 2. Gender

Gender	Frequency	Presentation (%)
Male	30	51.7
Man	28	48.3
Total	58	100

Based on table 2, it can be seen that the majority of respondents were female, totaling 30 respondents (51.7%) and male, 28 respondents (48.3%).

Table 3. Education

Education	Frequency	Presentation (%)
Primary	14	24.1
Junior high school	8	13.8
Senior high school	24	41.4
College	12	20.7
Total	58	100

Based on table 3 it can be seen that the majority of respondents with high school education were 24 people (41.4%) and the lowest with junior high school education were 8 respondents (13.8%).

Table 4. Professional

Profession	Frequency	Presentation (%)
Entrepreneur	14	24.1
Entrepreneur	11	19.0
Police	3	5.2
Pensionary	3	5.2
Non-job	27	46.6
Total	58	100

Based on table 4 it can be seen that the majority of respondents did not work, namely as many as 27 people (46.6%).

Table 5. Insomnia

Insomnia	Frequency	Presentation (%)
Not Clinically Significant	8	13.8
Mild Insomnia	26	44.8
Moderate Insomnia	21	36.2
Severe Insomnia	3	5.2
Total	58	100

Based on table 5 it can be seen that the distribution of respondents is based on insomnia. It was found that most of the respondents experienced mild insomnia, namely 26 respondents (44.8%) and the lowest experienced severe insomnia, namely 3

respondents (5.2%).

Table 6. Hemodialysis therapy in a week

Hemodialysis therapy in a week	Frequency	Persentation (%)
2 times	55	94.8
3 times	3	5.2
Total	58	100

Based on table 5, it can be seen that the majority of respondents had hemodialysis therapy 2 times/week, namely 55 respondents (94.8%) and the lowest was 3 times/week, namely 3 respondents (5.2%).

Table 7. Long time undergoing hemodialysis therapy

Long time undergoing hemodialysis therapy	Frequency	Persentation (%)
< 12 month	12	20.7
> 13- 24 month	13	22.4
> 24 month	33	56.9
Amount	58	100

Based on table 6 it can be seen that the majority of the distribution of respondents was based on the length of time undergoing hemodialysis therapy > 24 months, namely 33 respondents (56.9%) and the lowest <12 months, namely 12 respondents (20.7%).

Table 8. Analisa Bivariate

	Insomnia				Total	p-Value
	Not Clinically Significant	Mild Insomnia	Moderate Insomnia	Severe Insomnia		
< 12 month	1(8.3%)	5(41.7%)	6(50.0%)	0(0.0%)	12(100%)	0.487
> 13-24 month	1(7.7%)	6(46.2%)	4(30.8%)	2(15.4%)	13(100%)	
> 24 month	6(18.2%)	15(45.5%)	11(33.3%)	1 (3.0%)	33(100%)	
Total	8(13.8%)	26(44.8%)	21(36.2%)	3(5.2%)	58(100%)	

The results of the analysis of the long-term relationship of undergoing hemodialysis therapy with insomnia in patients with chronic kidney failure at Arifin Achmad Hospital in Riau Province obtained results from 58 respondents, a chi square p value test was carried out of 0.487 > (0.05). It was concluded that there was no relationship between length of time undergoing hemodialysis therapy with insomnia

in patients with chronic kidney failure at Arifin Achmad Hospital, Riau Province.

The results of this study are in line with research (Asmara, 2018); (Kusuma et al., 2018) the results obtained were a p value of 0.776 > (0.05) that there was no relationship between patients who had just been on hemodialysis and who had been on hemodialysis for a long time, had insomnia or not experiencing

insomnia. The factors that most influence are other factors from respondents such as psychological factors, which are related to the incidence of insomnia in patients undergoing hemodialysis such as anxiety (Kusuma et al., 2018).

The results of this study are not in line with research conducted by (Lufiyani et al., 2019) which states that there is a relationship with the results. $p < 0.001 > (0.05)$ length of time undergoing hemodialysis with the incidence of insomnia, especially for patients who have undergone hemodialysis therapy for under five years, and psychological factors such as depression have a very significant relationship with the incidence of insomnia. The results of a study conducted by (Nejad & Qlich, 2022) stated that the high incidence of insomnia in patients undergoing hemodialysis therapy for a long time was related to the increasingly progressive symptoms and diseases underlying dialysis therapy, or the emergence of complications, such as cardiovascular and neurological problems that often arise in long-term dialysis patients. And the results of this study are in line with research (Dwi et al., 2017) whereby 50% of respondents complained that they had no energy, with details of 60% of respondents with a mild insomnia scale, 77.8%, of respondents with moderate insomnia scale and all respondents with severe insomnia scale. This is influenced by several factors, namely co-morbidities, age, muscle cramps, quality of life, cognitive function scores, sexual function, and duration of hospital stay.

Based on the results of a study conducted by (Sabbatini et al., 2016) stated that insomnia in patients on Hemodialysis therapy can occur as a result of the mechanism of increasing the incidence of renal osteodystrophy associated with bone pain and pruritus due to increased serum parathyroid hormone (PTH) levels. By decreasing filtration through the glomeruli of the kidneys, patients with chronic renal failure can experience an increase in serum phosphate and conversely a decrease in serum calcium levels, hypocalcemia can stimulate parotid hormone (PTH) secretion. In this case there may also be decreased production of calcitriol by the kidneys, which can decrease intestinal calcium absorption leading to hypocalcemia and consequently, stimulation of parathyroid hormone (PTH) secretion. High serum phosphate levels also have a direct stimulating effect on PTH secretion. Patients with hyperparathyroidism have various symptoms that can disturb the patient's sleep, such as bone pain, and pruritus occurs in advanced renal failure, especially in dialysis patients, and

may be related to calcium and phosphorus deposition in the skin. Long time undergoing Hemodialysis also causes an increase in parathyroid hormone (PTH) (Frengki et al., 2019).

According to the researchers' assumption, there is no significant relationship between the length of time undergoing hemodialysis therapy and insomnia in patients with chronic kidney failure at Arifin Achmad Hospital, Riau Province, caused by several factors, such as the length of time undergoing hemodialysis therapy, which is > 24 months, namely 33 respondents (56.9%). There is no relationship, possibly because it was influenced by Other factors from the respondents such as not caring about sleep disorders such as insomnia because they have a habit of having difficulty getting to sleep, difficulty maintaining sleep, waking up too early, not being able to go back to sleep, and sleeping with poor quality which is followed by the length of time undergoing hemodialysis therapy and work. the majority of respondents did not work, namely as many as 27 people (46.6%), patients who were still working had a lot of busyness so they tended to lack time to rest otherwise patients who were not too busy or did not work could fulfill their basic needs and get enough rest.

CONCLUSION

Based on the results of research that has been conducted regarding the relationship between prolonged hemodialysis therapy and insomnia in patients with chronic renal failure at Arifin Achmad Hospital, Riau Province, which was conducted from 04 July to 06 July 2022, the following conclusions can be drawn: Most of the respondents had hemodialysis therapy for > 24 months, 33 respondents (56.9%), $> 13-24$ months, 13 respondents (22.4%), and < 12 months, 12 respondents (20.7%). Most the levels of mild insomnia were 26 respondents (44.8%), moderate insomnia were 21 respondents (36.2%), clinically insignificant were 8 respondents (13.8%), and severe insomnia were 3 respondents (5.2%). There is no relationship between undergoing hemodialysis therapy and insomnia in patients with chronic renal failure at Arifin Achmad Hospital, Riau Province with a P value of $0.487 > (0.05)$.

SUGGESTION

Suggestions for future research are expected to examine the factors associated with insomnia in patients with chronic renal failure.

REFERENCES

1. Ahyar, H., Maret, U. S., Andriani, H.,

- Sukmana, D. J., Mada, U. G., Hardani, S.Pd., M. S., Nur Hikmatul Auliya, G. C. B., Helmina Andriani, M. S., Fardani, R. A., Ustiawaty, J., Utami, E. F., Sukmana, D. J., & Istiqomah, R. R. (2020). *Buku Metode Penelitian Kualitatif & Kuantitatif* (Issue March).
- Anita, D. C., & Husada, I. S. (2020). Depresi pada Pasien Hemodialisa Perempuan Lebih Tinggi. *Proceeding of The URECOL*, 2, 277–288.
 - Asmara, R. (2018). Hubungan Lama Hemodialisa Dengan Insomnia Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rst. Dr Asmir Salatiga. *JURNAL NERS Research & Learning in Nursing Science*, 3(2), 80–91.
 - Aini, N. N., & Maliya, A. (2020). Management of Insomnia in Hemodialysis Patients: A Literature Review. *Jurnal Berita Ilmu Keperawatan*, 13(2), 93–99. <https://doi.org/10.23917/bik.v13i2.11602>
 - Cheng, E., Evangelidis, N., Guha, C., Hanson, C. S., Unruh, M., Wilkie, M., Schell, J., Hecking, M., Gonzalez, A. M., Ju, A., Eckert, D. J., Craig, J. C., & Tong, A. (2021). Patient experiences of sleep in dialysis: systematic review of qualitative studies. *Sleep Medicine*, 80, 66–76. <https://doi.org/10.1016/j.sleep.2021.01.019>
 - Chu, G., Szymanski, K., Tomlins, M., Yates, N., & McDonald, V. M. (2018). Nursing care considerations for dialysis patients with a sleep disorder. *Renal Society of Australasia Journal*, 14(2), 52–58.
 - Danielle, F. M. E. H., Mahamat, M., Francois, K. F., Marie-Patrice, H., & Gloria, A. (2017). Sleep Quality on Maintenance Hemodialysis Patients in Douala General Hospital in Cameroon. *Open Journal of Nephrology*, 07(03), 61–68. <https://doi.org/10.4236/ojneph.2017.73008>
 - Dwi, A., Putri, S., Harjanto, T., Nurjannah, I., & Mada, U. G. (2017). Gambaran Indikator Klinis Diagnosis Keperawatan Insomnia Menggunakan Insomnia Severity Index pada Pasien Hemodialisis. *Jurnal Keperawatan Klinis dan Komunitas*, 1(3), 131–139.
 - Edalat-Nejad, M., & Qlich-Khani, M. (2013). Quality of life and sleep in hemodialysis patients. *Saudi journal of kidney diseases and transplantation: an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, 24(3), 514–518. <https://doi.org/10.4103/1319-2442.11103>
 - Fitriani, D., Pratiwi, R. D., Saputra, R., & Haningrum, K. S. (2020). Hubungan Lama Menjalani Terapi Hemodialisis Dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik Di Ruang Hemodialisa Rumah Sakit Dr Sitanala Tangerang. *Edu Dharma Journal: Jurnal penelitian dan pengabdian masyarakat*, 4(1), 70. <https://doi.org/10.52031/edj.v4i1.44>
 - Flourishing, U. P., & Ginja, P. G. (2019). *Psikoterapi Positif Untuk Peningkatan Flourishing Penderita Gagal Ginjal* (D. R. A. E. K. Latipun & N. Hasanati (ed.); edisi pert). psychology forum, universitas muhammadiyah malang.
 - Frengki, Budiharto, I., & Fauzan, S. (2019). Gambaran Insomnia pada pasien yang menjalani terapi Hemodialisa di RSUD dr. Soedarso Pontianak. *Jurnal Proners*, 4(1).
 - Ghaddafi, M. (2013). Tatalaksana Insomnia Dengan Farmakologi Atau Non-Farmakologi. *E-Jurnal Universitas Udayana*, 1–17.
 - Heryana, A. (2020). Analisis Data Penelitian Kuantitatif. *Penerbit Erlangga, Jakarta, June*, 1–11. <https://doi.org/10.13140/RG.2.2.31268.91529>
 - Horenstein, A., Morrison, A. S., Goldin, P., ten Brink, M., Gross, J. J., & Heimberg, R. G. (2019). Sleep quality and treatment of social anxiety disorder. *Anxiety, Stress and Coping*, 32(4), 387–398. <https://doi.org/10.1080/10615806.2019.1617854>
 - Huda Al Husna, C., Ika Nur Rohmah, A., Ayu Pramesti, A., Muhammadiyah Malang, U., Jl Bendungan Sutami No, I., Lowokwaru, K., Malang, K., & Timur, J. (2021). Hubungan Lama Menjalani Hemodialisis Dengan Kecemasan Pasien. *Indonesian Journal of Nursing Health Science ISSN*, 6(1), 31–38.
 - Indonesian Renal Registry.(2018). Annual Report Of Indonesian Renal Registry. Diakses pada tanggal 04 Maret 2022 dari <http://www.indonesianrenalregistry.org/>.
 - Isro'in, L., & Rosjidi, C. H. (2014). *Prevalensi Faktor Risiko Gagal Ginjal Kronik*, 2 No IV, 49.
 - Kusuma, H., Ropyanto, C. B., Widyaningsih, S., & Sujianto, U. (2018). Relating Factors of Insomnia among Haemodialysis Patients. *Nurse Media Journal of Nursing*, 8(1), 44. <https://doi.org/10.14710/nmjn.v8i1.15741>
 - Lufiyani, I., Zahra, A. N., & Yona, S.

- (2019). Factors related to insomnia among end-stage renal disease patients on hemodialysis in Jakarta, Indonesia. *Enfermeria Clinica*, 29, 331–335. <https://doi.org/10.1016/j.enfcli.2019.04.141>
21. Liaveri, P. G., Dikeos, D., Ilias, I., Lygkoni, E. P., Boletis, I. N., Skalioti, C., & Paparrigopoulos, T. (2017). Quality of sleep in renal transplant recipients and patients on hemodialysis. *Journal of Psychosomatic Research*, 93, 96–101. <https://doi.org/10.1016/j.jpsychores.2016.12.013>
22. Lemone, Priscila, Burke, Karen M, Bauldoff, Gerene. (2015). Buku Ajar Keperawatan Medikal Bedah. Jakarta : EGC
23. Lufiyani, I., Zahra, A. N., & Yona, S. (2019). Factors related to insomnia among end-stage renal disease patients on hemodialysis in Jakarta, Indonesia. *Enfermeria Clinica*, 29, 331–335. <https://doi.org/10.1016/j.enfcli.2019.04.141>
24. Masturoh & Anggita. (2018). *Metodologi Penelitian Kesehatan*.
25. Mandel, J. R., Barker, M. S., Bayer, R. J., Dikow, R. B., Gao, T. G., Jones, K. E., Keeley, S., Kilian, N., Ma, H., Siniscalchi, C. M., Susanna, A., Thapa, R., Watson, L., & Funk, V. A. (2017). The Compositae Tree of Life in the age of phylogenomics. *Journal of Systematics and Evolution*, 55(4), 405–410. <https://doi.org/10.1111/jse.12265>
26. Muz, G., Erdoğan Yüce, G., Yıldırım, C., & Dağdelen, M. (2021). The effect of sleep hygiene training applied to hemodialysis patients on sleep quality and quality of life: randomized controlled trial. *Sleep and Biological Rhythms*, 19(3), 227–236. <https://doi.org/10.1007/s41105-020-00293-7>
27. Nasution, M. H. (2020). JURNAL ILMIAH KOHESI Vol. 4 No. 1 Januari 2020. *Jurnal Ilmiah Kohesi*, 4(1), 1–14.
28. Ni Putu Diah Parwita Sari, Bian Dwi Cahyo, Noor Erma Nasution Sugijanto, S. (2021). Jurnal Farmasi Dan Ilmu Kefarmasian Indonesia Vol. 8 No.1 April 2021. *Faktor-Faktor yang Berhubungan dengan Kualitas Hidup Pasien Penyakit Ginjal Kronis yang Menjalani Hemodialisis*, 8(1), 10–15.
29. Nurchayati, S., Sansuwito, T. Bin, & Rahmalia, S. (2019). Gambaran Deteksi Dini Penyakit Gagal Ginjal Kronik Pada Masyarakat Kecamatan Tambang, Kabupaten Kampar. *Jurnal Ners Indonesia*, 9(1), 11. <https://doi.org/10.31258/jni.9.1.11-18>
30. Pralisa, K., Dewi, D. A. K., & Ilmiawan, M. I. (2021). Gambaran etiologi penyakit ginjal kronik stadium V pada pasien rawat inap di RSUD Dokter Soedarso Pontianak tahun 2017-2018. *Jurnal Cerebellum*, 6(3), 59. <https://doi.org/10.26418/jc.v6i3.45308>
31. Pearce C, E. (2017). *Anatomi Dan Fisiologi Untuk Paramedis* (cetakan ke). cv prima grafika, jakarta.
32. Pius, E. S., & Herlina, S. (2019). Faktor-Faktor Yang Berhubungan Dengan Kualitas Tidur Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisis Di Rumah Sakit Tarakan Jakarta. *Jurnal Keperawatan Widya Gantari Indonesia*, 3(1). <https://doi.org/10.52020/jkwgi.v3i1.1081>
33. Riset Kesehatan Dasar. (2018). Laporan hasil riset kesehatan dasar (RISKESDAS) Tahun 2018. Diakses pada tanggal 04 Maret 2022 dari <http://www.depkes.go.id/>
34. Sabbatini, M., Bosetti, M., Borrone, A., Moalem, L., Taveggia, A., Verna, G., & Cannas, M. (2016). Erythropoietin stimulation of human adipose tissue for therapeutic refilling releases protective cytokines. *Journal of Tissue Engineering*, 7. <https://doi.org/10.1177/2041731416671278>
35. SARI, D. K. (2018). Hubungan Lama Menjalani Terapi Hemodialisis Dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik Di Instalasi Hemodialisis Rsud Abdul Moeloek. *Angewandte Chemie International Edition*, 6(11), 951–952., 1–62.
36. Scherer, J. S., Combs, S. A., & Brennan, F. (2017). Sleep Disorders, Restless Legs Syndrome, and Uremic Pruritus: Diagnosis and Treatment of Common Symptoms in Dialysis Patients. *American Journal of Kidney Diseases*, 69(1), 117–128. <https://doi.org/10.1053/j.ajkd.2016.07.031>
37. Siagian, Y. D. N. A. S. (2021). Analisis Faktor Yang Berhubungan Dengan Kepatuhan Pembatasan Asupan Cairan Pasien Hemodialisa. *Menara Medika*, 4(1), 71–80.
38. Syahfitri, A. N. (2020). Tingkat Kelelahan dan Kualitas Tidur pada Pasien Gagal Ginjal Kronik yang Menjalani Hemodialisis di Medan. *Skripsi*.
39. Siregar, T. C. (2020). Buku Ajar Manajemen Komplikasi Pasien Hemodialisa. In R. A. Ariga (Ed.), *Depublish Publisher*. Deepublish Publisher.

40. Unruh, M. L., Buysse, D. J., Dew, M. A., Evans, I. V., Wu, A. W., Fink, N. E., Powe, N. R., & Meyer, K. B. (2006). Sleep quality and its correlates in the first year of dialysis. *Clinical Journal of the American Society of Nephrology*, 1(4), 802–810. <https://doi.org/10.2215/CJN.00710206>
41. Utoyo, D. B., Jaya, E. S., Arjadi, R., Hanum, L., Astri, K., & Putri, M. D. D. (2013). Preliminary study on the effectiveness of short group cognitive behavioral therapy (GCBT) on Indonesian older adults. *PLoS ONE*, 8(2), e57198. <https://doi.org/10.1371/journal.pone.0057198>
42. Yamamoto, R., Shinzawa, M., Isaka, Y., Yamakoshi, E., Imai, E., Ohashi, Y., & Hishida, A. (2018). Sleep quality and sleep duration with CKD are associated with progression to ESKD. *Clinical Journal of the American Society of Nephrology*, 13(12), 1825–1832. <https://doi.org/10.2215/CJN.01340118>