

Original Research Paper

## Stress level and interdialytic weight gain (IDWG) in hemodialysis patients

I Made Cahyadi Agastiya<sup>1\*</sup> , I Made Rismawan<sup>2</sup>

<sup>1</sup> Department of Medical Surgical Nursing, School of Nursing, STIKES Bina Usaha Bali, Kuta Utara, Badung, Bali, Indonesia

<sup>2</sup> Nurses, RSD Mangusada, Badung, Bali, Indonesia

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

Submitted: November 1, 2023

Revised: February 3, 2024

Accepted: June 5, 2024

### Abstract

Stress has various impacts on hemodialysis patients. Stress in hemodialysis patients can cause physical symptoms (fatigue, muscle cramps, nausea, and vomiting), a decrease in quality of life, and non-compliance with self-management, one of which is compliance related to limiting fluid intake, thus adversely affecting on the patient's IDWG. IDWG is an important indicator for fluid monitoring in hemodialysis patients. Increasing IDWG that exceeds the tolerance limit can have a negative impact and can even cause mortality. This study aimed to determine the correlation between stress level and IDWG among hemodialysis patients. This study was conducted in the hemodialysis unit of RSD Mangusada, involving 95 respondents. This study was quantitative, with non-experimental research using a cross-sectional approach. Data collection was carried out with DASS questionnaires for stress and observation sheets for the IDWG. The data was analyzed using Pearson's Spearman Rank ( $\alpha < 0.05$ ). Respondents with IDWG within tolerance limits were the majority unstressed, and none experienced severe stress or very severe stress. There is a positive and weak correlation between stress and IDWG among patients undergoing hemodialysis. The findings from this study may provide useful information in reviewing existing nursing care and standards of care provided in hemodialysis units, including the need to consider psychological assistance services in the care of hemodialysis patients. Qualitative research is needed to explore the in-depth experience of stress in hemodialysis patients and the factors associated with it.

**Keywords:** hemodialysis; interdialytic weight gain; stress

## 1. Introduction

Chronic kidney disease (CKD) patients need long-term care. Treatment of CKD is prioritized to reduce the progression of kidney function decline (The Ministry of Health The Republic of Indonesia, 2018). Hemodialysis (HD) is a lifelong therapy to replace some kidney function with the help of a dialysis machine (Lee, 2017). The prevalence of patients diagnosed with CKD and undergoing hemodialysis in Bali Province exceeds the national average. The prevalence of patients undergoing hemodialysis in Bali is 38.5%, ranked second nationally after DKI Jakarta, above the national prevalence of 19.3% (Indonesian Society of Nephrology, 2018).

Patients undergoing hemodialysis should monitor interdialytic weight gain (IDWG). IDWG is one of the important indicators of patient compliance in regulating the fluids of patients undergoing hemodialysis and determining the amount of fluid entering during the interdialytic period (Kahraman et al., 2015). The higher the IDWG, the greater the amount of fluid in the patient's body and the greater the risk of complications (Bossola et al., 2018). An increase in IDWG that exceeds the tolerance limit can have a negative impact (Ozen et al., 2019). Increased predialysis blood pressure, greater intradialytic reductions in blood pressure due to higher ultrafiltration rates, and elevated mortality are all linked to a higher IDWG (Ipema et al., 2016). As many as 60%–80% of patients die from excess fluid intake during the interdialytic period. Excess fluid intake during the interdialytic period can result

in edema, ascites, and even lung congestion, so monitoring fluid intake in hemodialysis patients is the main action that must be considered by the nurses (Indonesian Society of Nephrology, 2018).

There are various factors that affect IDWG in patients undergoing hemodialysis (Maimani et al., 2021). Stress is one of the psychological problems that can have an impact on the patient's condition. Patients who undergo hemodialysis in addition to experiencing problems related to physical health and mental problems, including stress and anxiety (Zibaei et al., 2020). The prevalence of stress in hemodialysis patients is quite high. The prevalence of moderate stress and severe stress in hemodialysis patients ranges from 14% to 69.49% and 37.5% to 56%, respectively (Dhungana et al., 2023; George et al., 2022; Zibaei et al., 2020). Stress in hemodialysis patients can be caused by physical and psychological factors. Physical factors that can cause stress are physical dependence on hemodialysis equipment, limited physical function, changes in sexual function and diet, fluid restriction, use of various drugs, loss of appetite and energy, fatigue (Camelia et al., 2016). Psychological factors that can cause stress are not having enough time to do dialysis, losing a job, losing independence, changes in self-perception, and fear of death (Parvan et al., 2015).

Stress can cause various repercussions for hemodialysis patients. Hemodialysis patients who experience stress may experience physical symptoms such as fatigue, diarrhea, muscle cramps, nausea, and vomiting (Hintistan & Terzi, 2018; Moledina & Perry Wilson, 2015). In addition, stress can also cause hemodialysis patients to experience decreased quality of life and non-compliance with self-management (Lim & Lee, 2022; Sulistni et al., 2021). Non-compliance with self-management, one of which is fluid intake restrictions, can have a negative impact on the patient's IDWG (Angraini & Putri, 2016). Although there have been many studies related to hemodialysis patients, there have not been many studies that highlight the psychological conditions of patients, especially those related to IDWG. Previous study have recommended examining factors that influence IDWG, one of which is stress (Murdaningsih et al., 2023). Psychological problems such as stress are important to study because it related to self-management among hemodialysis patient. This study aimed to determine the correlation between stress level and IDWG among hemodialysis patients.

## 2. Research Methods

This study was a quantitative study with a type of non-experimental research using a cross-sectional approach. The population of this study was patients undergoing hemodialysis at RSD Mangusada, which amounted to 123 patients. The sample was 95 patients undergoing hemodialysis, selected by purposive sampling. The criteria for inclusion in the study were patients aged 18–65 years, undergoing hemodialysis for at least six months, and being able to understand Bahasa. The criteria for exclusion from the study were patients who experienced congestive disorders based on hospital medical records.

Data collection was carried out for approximately 7 days (8-14 October 2023), using DASS (Depression Anxiety and Stress Scale) questionnaires to measure stress and observation sheets to measure patient IDWG. DASS consists of 14 statement items consisting of four Likert scales, namely 0 = never, 1 = sometimes, 2 = often, and 3 = very often. The scores obtained will be totaled and categorized according to the stress level of the respondents. The stress level response was categorized into 5, namely 0–14 = normal, 15–18 = mild stress, 19–25 = moderate stress, 26–33 = severe stress, and >34 = very severe stress. The validity and reliability test of the DASS was done by Marsidi (2021). The validity test of the DASS instrument has a positive Pearson correlation value of more than 0,532 and a Cronbach alpha value of 0.951. It is all indicated that the DASS has proven reliable. IDWG is obtained by using the formula that includes the body weight of the respondent using the weight scales, calibrated regularly in the hemodialysis unit. The results were written down on the observation sheet. IDWG was measured using the IDWG formula in percentase units (%).

The collected data was then analyzed as univariate and bivariate data. A univariate analysis was conducted to provide an overview of stress and IDWG. Bivariate analysis began with a data normality test with Kolmogorov-Smirnov. Test analysis using Spearman rank is necessary because stress data and IDWG are not normally distributed. The level of significance of the study ( $\alpha < 0.05$ ) to analyze whether there is a correlation between stress and IDWG among patients undergoing hemodialysis. This study was conducted by upholding the ethical principle of maintaining the confidentiality of the respondent by using the initials (confidentiality), not harming respondents (non-maleficence), and being voluntary without any coercion from any party. Respondents can refuse and withdraw from research at any stage (autonomy). This study has received ethical clearance from the Health Research Ethics Committee, Rumah Sakit Daerah Mangusada, with the ethical approval number 070/8025/RSDM/2023.

In this study, the lead researcher was assisted by 1 research member and 2 enumerators, namely hemodialysis nurses at RSD Mangusada. The chief researcher has the task of fully controlling the research process and is directly involved in data collection, as well as accounting for research results until they are published. Co-researchers are tasked with assisting researchers in obtaining research permits, data collection, and data analysis. The enumerator is assigned to be a facilitator during the data collection process.

### 3. Results and Discussion

#### 3.1. Descriptive of Stress and IDWG

This research carried out at the Hemodialysis Unit of RSD Mangusada in October 2023. The number of samples in this study was 95 respondents. The results of the study were presented in the tables and explained in the narratives form.

**Tabel 1.** Category Stres and IDWG Respondents (n=95)

Variable		f	%
Stres Category	No Stress	40	42.1
	Mild Stress	24	25.3
	Moderate stress	25	26.3
	Severe stress	6	6.3
	Very Severe Stress	0	0
IDWG Category	Within tolerance limits	73	76.8
	Exceeding tolerance limits	22	23.2

Source: Primary Data, 2023

Table 1 showed that most respondents do not experience stress (42.1%). In contrast to the results of previous research by George et al. (2022), who reported that the majority of hemodialysis patients had severe stress (56%). One factor that may influence this condition is social support. Judging from the characteristics of the respondents, most of whom are married and all of whom live with their families, it is likely that they get a lot of support from their spouses and families. Social support was very important to help patients carry out self-management during hemodialysis (Jo et al., 2020; Noviana & Zahra, 2021; Song et al., 2022). Additionally, social support for dialysis patients can give them access to a network of people based on their own needs, enhancing their sense of self-worth, shielding them from pathological symptoms caused by stress, and having a positive impact on their social, mental, and physical well-being (Stevenson et al., 2018). Previous studies showed that there were several other things that cause stress in hemodialysis patients, namely feeling uncomfortable, fatigue, health problems that will be faced, and a long duration of hemodialysis (Gedara et al., 2022; D. Pratiwi, 2015; Tu et al., 2014). In this study, based on interviews, patients mostly feel comfortable during hemodialysis, rarely have serious complications, and have long experience in hemodialysis, so they are well prepared before hemodialysis and manage themselves at home.

We found that the IDWG category was within the tolerance limit (76.8%), showing that the respondents' IDWG was within the normal range. The length of time on hemodialysis was assumed by researchers to contribute to respondents' stress levels and IDWG results. This may occur because the average respondent has undergone hemodialysis for 4 years, so they have experience controlling fluids. Increasing the duration of hemodialysis may allow patients to adapt to hemodialysis. Patients who have been on hemodialysis for more than three years have become accustomed to the symptoms (Nurdina & Anggraeni, 2022). According to Indramayu et al. (2016), younger patients usually have a larger appetite accompanied by greater sodium and water intake, which impacts IDWG. The higher the IDWG, the greater the amount of excess fluid in the patient's body and the higher the risk of complications (Bossola et al., 2018). In this study, the average age of the patients was 63 years old, and they had a good IDWG (within tolerance). Based on this, we assume that the elderly have more experience in fluid control and integrating self-care behaviours, so they have a good IDWG compared to younger patients.

### 3.2. Correlation between stress and IDWG

**Tabel 2.** Cross Tabulation Stres with IDWG (n=95)

IDWG Category		Stres Category				
		No Stress	Mild stress	Moderate Stress	Severe Stress	Very Severe Stress
IDWG Category	Within tolerance limits	39	21	13	0	0
	Exceeding tolerance limits	1	3	12	6	0

Source: Primery Data, 2023

Table 2 showed that respondents with IDWG within tolerance limits were mostly unstressed, and none experienced severe stress or very severe stress. Meanwhile, respondents with IDWG exceeding the tolerance limit mostly experienced moderate stress. The main stressors experienced by patients undergoing hemodialysis were related to fluid restriction (Efe & Kocaöz, 2015; Novitasari, 2015). Stress was a depressed and anxious mood that has a negative impact on physical and emotional (Dennick et al., 2017). Hemodialysis patients who experience stress will have an impact on emotional, motivational and behavioral disorders (Hong et al., 2017). Symptoms of depression and dietary non-adherence are particularly prevalent in patients with end-stage kidney disease receiving hemodialysis therapy (Gebrie & Ford, 2019). The stress experienced by patients will affect their health behaviour. stress can also cause hemodialysis patients to experience decreased quality of life and non-compliance with self-management (Lim & Lee, 2022; Sulistni et al., 2021). The success or failure of hemodialysis therapy greatly depends on the patient's compliance with the prescribed course of action and any health advice.

The results of this study showed that respondents with IDWG within tolerance limits mostly did not experience stress, and none experienced severe stress or very severe stress. We assumed that patients who are not stressed can follow self-management well, so that they can achieve IDWG targets within tolerance limits. The respondents' education level, which was mostly SMA/SMK, may also have contributed to this condition. Gela & Mengistu (2018) found that a higher level of education can assist patients in increasing awareness and concern for individual health.

**Tabel 3.** Spearman Rank Analysis Results (n=95)

Variable	p-value	r	r (%)
Correlation stress with IDWG	0.001	0.341	11.6

Source: Primery Data, 2023

Table 3 showed a positive and weak correlation between stress and IDWG in hemodialysis patients. The lower the respondent's stress, the lower the respondent's IDWG. The results of this study were also supported study by Gebrie and Ford (2019) which explains that there was a significant correlation between depressive symptoms and dietary non-compliance (Gebrie & Ford, 2019). Previous study showed that depression was associated with an increased risk of poor outcomes in CKD patients such as poor quality of life, increase hospitalization, major cardiovascular adverse events, mortality, and poor treatment compliance (Bautovich et al., 2014; Zhu et al., 2023).

Stress was also related to the each person's coping strategies in hemodialysis patients (Ahmad & Al Nazly, 2015; Camelia et al., 2016; Ghaffari et al., 2019). Every person had a unique way of handling stress and a unique set of strategies for coping. The results of this study showed a weak strength of association between stress and IDWG, with a r of 0.341. This is because there are many factors that influence IDWG that were not studied. The results also showed an R of 11.6%, which means that stress affects IDWG by 11.6% and the rest is influenced by other factors. In addition to psychological factors, IDWG is also strongly influenced by physical factors such as fluid diet, duration of hemodialysis, complications during HD, physical activity management, and nutrition (Mosleh et al., 2020).

Psychological factors can influence the self-management behavior of hemodialysis patients, such as not restricting fluids and nutrition, not doing physical activity, and not routinely or completely undergoing hemodialysis therapy (Ma et al., 2022; S. H. Pratiwi et al., 2019). This can have an impact on poor treatment outcomes in hemodialysis patients, one of which is an increase in IDWG. Increased IDWG beyond the normal range can increase the risk of complications and even death in hemodialysis patients. (Dantas et al., 2019) found that in patients receiving conventional HD, IDWG  $\geq 4\%$  of DW was found to be a borderline outcome for cardiovascular death and an independent predictor of mortality from all causes.

#### 4. Conclusion

Based on the results of the study, it can be concluded that there is a positive and weak relationship between stress and IDWG in patients undergoing hemodialysis, with p-value 0,001 ( $<0,05$ ). This study also had limitations. We conducted this study cannot control other factors related to IDWG. In addition, data collection was in the form of self-report, which can be a major limitation. Researchers are then expected to examine other factors that affect IDWG so as to determine the most dominant factor affecting IDWG in hemodialysis patients and also qualitative research on stress among hemodialysis patient with its related factor. This study can be a basic literature for nurses to pay attention on psychological aspect and also for the stakeholder.

#### Acknowledgements

We would like to express our gratitude to the RSD Mangusada Bali and relevant authorities for their financial and moral support of this study and we would like to thank the STIKES Bina Usada Bali. Also, we would like to show our appreciation to all the participating hemodialysis patients.

#### Reference

- Ahmad, M. M., & Al Nazly, E. K. (2015). Hemodialysis: Stressors and coping strategies. *Psychology, Health & Medicine*, 20(4), 477–487. <https://doi.org/10.1080/13548506.2014.952239>
- Angraini, 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. <https://doi.org/10.7454/jki.v19i3.475>
- Bautovich, A., Katz, I., Smith, M., Loo, C. K., & Harvey, S. B. (2014). Depression and chronic kidney

- disease: A review for clinicians. *Australian & New Zealand Journal of Psychiatry*, 48(6), 530–541. <https://doi.org/10.1177/0004867414528589>
- Bossola, M., Pepe, G., & Vulpio, C. (2018). The Frustrating Attempt to Limit the Interdialytic Weight Gain in Patients on Chronic Hemodialysis: New Insights Into an Old Problem. *Journal of Renal Nutrition*, 28(5), 293–301. <https://doi.org/10.1053/j.jrn.2018.01.015>
- Camelia, S., Păduraru, A., & Iorga, M. (2016). Stress, coping mechanisms and quality of life in hemodialysis patients. *Archives of Medical Science - Civilization Diseases*, 1, 16–23. <https://doi.org/10.5114/amscd.2016.59601>
- Dantas, L. G. G., de Seixas Rocha, M., Junior, J. A. M., Paschoalin, E. L., Paschoalin, S. R. K. P., & Sampaio Cruz, C. M. (2019). Non-adherence to Haemodialysis, Interdialytic weight gain and cardiovascular mortality: A cohort study. *BMC Nephrology*, 20, 402. <https://doi.org/10.1186/s12882-019-1573-x>
- Dennick, K., Sturt, J., & Speight, J. (2017). What is diabetes distress and how can we measure it? A narrative review and conceptual model. *Journal of Diabetes and Its Complications*, 31(5), 898–911. <https://doi.org/10.1016/j.jdiacomp.2016.12.018>
- Dhungana, M., Shrestha, P., Pandey, S., Paudyal, S., & Agrawal, K. K. (2023). Moderate Stress Level among Patients Undergoing Hemodialysis in a Tertiary Care Centre. *JNMA: Journal of the Nepal Medical Association*, 61(264), 651–653. <https://doi.org/10.31729/jnma.8231>
- Efe, D., & Kocaöz, S. (2015). Adherence to diet and fluid restriction of individuals on hemodialysis treatment and affecting factors in Turkey. *Japan Journal of Nursing Science: JJNS*, 12(2), 113–123. <https://doi.org/10.1111/jjns.12055>
- Gebrie, M. H., & Ford, J. (2019). Depressive symptoms and dietary non-adherence among end stage renal disease patients undergoing hemodialysis therapy: Systematic review. *BMC Nephrology*, 20(1), 429. <https://doi.org/10.1186/s12882-019-1622-5>
- Gedara, T., Gunarathne, T. N., Tang, L., Khatijah, L. A., Nanayakkara, N., Lim, S., & Mohajer, S. (2022). Factors Influencing Stress Perception among Hemodialysis Patients: A Systematic Review. *Iranian Red Crescent Medical Journal*, 24. <https://doi.org/10.32592/ircmj.2022.24.6.2074>
- Gela, D., & Mengistu, D. (2018). Self-management and associated factors among patients with end-stage renal disease undergoing hemodialysis at health facilities in Addis Ababa, Ethiopia. *International Journal of Nephrology and Renovascular Disease*, 11, 329–336. <https://doi.org/10.2147/IJNRD.S184671>
- George, S., Zaidi, S. Z. H., & Kazmi, S. (2022). Stress, anxiety and perceived social support among hemodialysis patients with chronic kidney disease. *International Journal of Health Sciences*. <https://doi.org/10.53730/ijhs.v6nS1.7184>
- Ghaffari, M., Morowatisharifabad, M. A., Mehrabi, Y., Zare, S., Askari, J., & Alizadeh, S. (2019). What Are the Hemodialysis Patients' Style in Coping with Stress? A Directed Content Analysis. *International Journal of Community Based Nursing and Midwifery*, 7(4), 309–318. <https://doi.org/10.30476/IJCBNM.2019.81324.0>
- Hintistan, S., & Terzi, A. (2018). Evaluation of Symptoms in Patients Undergoing Hemodialysis. *Bezmialem Science*, 6, 112–118. <https://doi.org/10.14235/bs.2018.1530>
- Hong, L. I., Wang, W., Chan, E. Y., Mohamed, F., & Chen, H. (2017). Dietary and fluid restriction perceptions of patients undergoing haemodialysis: An exploratory study. *Journal of Clinical Nursing*, 26(21–22), 3664–3676. <https://doi.org/10.1111/jocn.13739>
- Indonesian Society of Nephrology. (2018). 11th Report Of Indonesian Renal Registry 2018. *Irr*, 1–46.
- Indramayu, D. I. R., Saefulloh, M., & Nuraeni, W. (2016). Efficacy dan Menurunkan IDWG Pasien Hemodialisa. *Pendidikan Keperawatan Indonesia*, 2(1).

- Ipema, K. J. R., Kuipers, J., Westerhuis, R., Gaillard, C. A. J. M., van der Schans, C. P., Krijnen, W. P., & Franssen, C. F. M. (2016). Causes and Consequences of Interdialytic weight gain. *Kidney and Blood Pressure Research*, 41(5), 710–720. <https://doi.org/10.1159/000450560>
- Jo, A., Ji Seo, E., & Son, Y. (2020). The roles of health literacy and social support in improving adherence to self-care behaviours among older adults with heart failure. *Nursing Open*, 7(6), 2039–2046. <https://doi.org/10.1002/nop2.599>
- Kahraman, A., Akdam, H., Alp, A., Huyut, M. A., Akgullu, C., Balaban, T., Dinleyen, F., Topcu, A., Gelmez, H., Atakan, N., Akar, H., & Yenicierioglu, Y. (2015). Impact of Interdialytic Weight Gain (IDWG) on Nutritional Parameters, Cardiovascular Risk Factors and Quality of Life in Hemodialysis Patients. *BANTAO Journal*, 13(1), 25–33. <https://doi.org/10.1515/bj-2015-0006>
- Lee, K. Y. (2017). A unified pathogenesis for kidney diseases, including genetic diseases and cancers, by the protein-homeostasis-system hypothesis. *Kidney Research and Clinical Practice*, 36(2), 132–144. <https://doi.org/10.23876/j.krcp.2017.36.2.132>
- Lim, K. A., & Lee, J. H. (2022). Factors Affecting Quality of Life in Patients Receiving Hemodialysis. *Iranian Journal of Public Health*. <https://doi.org/10.18502/ijph.v51i2.8688>
- Ma, L.-C., Liu, Y.-M., Lin, Y.-C., Liao, C.-T., Hung, K.-C., Chen, R., Lu, K.-C., Ho, K.-F., & Zheng, C.-M. (2022). Factors Influencing Self-Management Behaviors among Hemodialysis Patients. *Journal of Personalized Medicine*, 12(11), 1816. <https://doi.org/10.3390/jpm12111816>
- Maimani, Y. Al, Elias, F., Salmi, I. Al, Aboshakra, A., Alla, M. A., & Hannawi, S. (2021). Interdialytic Weight Gain in Hemodialysis Patients: Worse Hospital Admissions and Intradialytic Hypotension. *Open Journal of Nephrology*, 11(02), 156–170. <https://doi.org/10.4236/ojneph.2021.112013>
- Marsidi, S. R. (2021). Identification of Stress, Anxiety, and Depression Levels of Students in Preparation for the Exit Exam Competency Test. *Journal of Vocational Health Studies*, 5(2), 87. <https://doi.org/10.20473/jvhs.v5.i2.2021.87-93>
- Moledina, D. G., & Perry Wilson, F. (2015). Pharmacologic Treatment of Common Symptoms in Dialysis Patients: A Narrative Review. *Seminars in Dialysis*, 28(4), 377–383. <https://doi.org/10.1111/sdi.12378>
- Mosleh, H., Alenezi, M., Al johani, S., Alsani, A., Fairaq, G., & Bedaiwi, R. (2020). Prevalence and Factors of Anxiety and Depression in Chronic Kidney Disease Patients Undergoing Hemodialysis: A Cross-sectional Single-Center Study in Saudi Arabia. *Cureus*. <https://doi.org/10.7759/cureus.6668>
- Murdaningsih, L., Indriyawati, N., & Trisnaningtyas, W. (2023). Factors Affecting Interdialytic Weight Gain (IDWG) in Kidney Failure. *Jendela Nursing Journal*, 7(1), 20–29.
- Noviana, C. M., & Zahra, A. N. (2021). Social support and self-management among end-stage renal disease patients undergoing hemodialysis in Indonesia. *Journal of Public Health Research*, 11(2), 2733. <https://doi.org/10.4081/jphr.2021.2733>
- Novitasari, I. (2015). *Gambaran Tingkat Kecemasan, Stres, Depresi Dan Mekanisme Koping Pasien Penyakit Ginjal Kronik Yang Menjalani Hemodialisis di RSUD dr. Moewardi*. FK Universitas Diponegoro.
- Nurdina, G., & Anggraeni, D. (2022). Interdialytic Body Weight Gain, Anxiety, Fatigue and Quality of Life in Hemodialysis Patients During the COVID-19 Pandemic. *KnE Life Sciences*. <https://doi.org/10.18502/cls.v7i2.10348>
- Ozen, N., Cinar, F. I., Askin, D., Mut, D., & Turker, T. (2019). Nonadherence in Hemodialysis Patients and Related Factors: A Multicenter Study. *Journal of Nursing Research*, 27(4), e36. <https://doi.org/10.1097/jnr.0000000000000309>
- Parvan, K., Ahangar, R., Hosseini, F. A., Abdollahzadeh, F., Ghojzadeh, M., & Jasemi, M. (2015).

- Coping methods to stress among patients on hemodialysis and peritoneal dialysis. *Saudi Journal of Kidney Diseases and Transplantation: An Official Publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, 26(2), 255–262. <https://doi.org/10.4103/1319-2442.152409>
- Pratiwi, D. (2015). *Hubungan Dukungan Keluarga dengan Tingkat Depresi Pasien Gagal Ginjal Kronik dengan Hemodialisis di RS PKU Muhammadiyah Yogyakarta*. STIKES Aisyiyah Yogyakarta.
- Pratiwi, S. H., Sari, E. A., & Kurniawan, T. (2019). Kepatuhan Menjalankan Manajemen Diri Pada Pasien Hemodialisis. *Jurnal Perawat Indonesia*, 3(2), 131. <https://doi.org/10.32584/jpi.v3i2.308>
- Song, Y., Chen, L., Wang, W., Yang, D., & Jiang, X. (2022). Social Support, Sense of Coherence, and Self-Management among Hemodialysis Patients. *Western Journal of Nursing Research*, 44(4), 367–374. <https://doi.org/10.1177/0193945921996648>
- Stevenson, J., Tong, A., Campbell, K. L., Craig, J. C., & Lee, V. W. (2018). Perspectives of healthcare providers on the nutritional management of patients on haemodialysis in Australia: An interview study. *BMJ Open*, 8(3), e020023. <https://doi.org/10.1136/bmjopen-2017-020023>
- Sulistni, R., Damanik, H. D., & Lukman. (2021). *Anxiety Stress and Fatigue in Hemodialysis Patient*. <https://doi.org/10.2991/assehr.k.210415.020>
- The Ministry of Health The Republic of Indonesia. (2018). *Hasil Utama Riskesdas 2018*. Badan Penelitian Dan Pengembangan Kesehatan. <http://www.depkes.go.id/resouces/download/info-terkini/hasil-riskesdas-2018.pdf>
- Tu, H.-Y., Shao, J.-H., Wu, F.-J., Chen, S.-H., & Chuang, Y.-H. (2014). Stressors and coping strategies of 20–45-year-old hemodialysis patients. *Collegian*, 21(3), 185–192. <https://doi.org/10.1016/j.colegn.2013.02.003>
- Zhu, N., Virtanen, S., Xu, H., Carrero, J. J., & Chang, Z. (2023). Association between incident depression and clinical outcomes in patients with chronic kidney disease. *Clinical Kidney Journal*, 16(11), 2243–2253. <https://doi.org/10.1093/ckj/sfad127>
- Zibaei, M., Nobahar, M., & Ghorbani, R. (2020). Association of stress and anxiety with self-care in hemodialysis patients. *Journal of Renal Injury Prevention*, 9(2), Article 2. <https://doi.org/10.34172/jrip.2020.14>