doi:10.31674/mjn.2021.v12i03.007

MJN

ADHERENCE OF SELF-CARE MANAGEMENT AMONG HEMODIALYSIS PATIENTS

Rizki Muliani[1], R. Siti Jundiah[1], Nur Intan H H K[1], Sri Wulan Megawati[1], Faridah binti Mohd Said[2]

[1]*Faculty of Nursing, Bhakti Kencana University Bandung, Indonesia*
[2]*Faculty of Nursing, Lincoln University College, Malaysia*

**Corresponding Author's Email: rizki.muliani@bku.ac.id*

ABSTRACT

Chronic kidney disease (CKD) has a high prevalence and incidence so that it is a frequent global problem. CKD causes kidney tissue damage which is marked by the accumulation of metabolic waste in the blood so it is necessary to do kidney replacement therapy, one of which is hemodialysis. CKD has 5 stages based on the glomerular filtration rate, wherein each stage the patient must be responsible for managing his health such as diet and lifestyle modification, administering large amounts of medication, and complying with doctor's rules. Therefore, patients must increase their adherence to self-care management so that they can prevent the worsening of the disease. This study aims to determine adherence of self-care management among hemodialysis patients. The research design used a quantitative descriptive with a cross-sectional approach. The sample in this study was 84 patients who underwent hemodialysis at the Majalaya Hospital, and they were taken by consecutive sampling technique from a population of 145 people. The instrument used in this study was Morisky questionnaire, Body Mass Index, Hemodialysis Self-Management Instrument (HDSMI), IDWG (Interdialytic Weight Gain). Data analysis was done using statistical software to obtain frequency distribution. The results showed that the Adherence of hemodialysis patients in taking medication was still low, 50% (42 respondents), 72.6% (61 respondents) did not comply with the diet, 61.9% (52 respondents) did not comply with fluid intake, 53.6% (45 respondents) were not obedient in caring for AV fistula. This result can be influenced by several factors, namely education, gender, marital status, age, length of HD. Adherence to self-care management it is very important because it greatly influences the management of complications, controlling symptoms, minimizing negative effects, and delaying disease progression.

Keywords: Chronic Kidney Disease; Adherence; Hemodialysis; Self-Care Management

INTRODUCTION

Chronic kidney disease (CKD) has a high prevalence which is a global problem that often occurs in 10% of the adult population (Eckardt *et al.*, 2013; Welch *et al.*, 2015). Based on the WHO data of 2014, around 8.1 million people died from CKD in 2011, with a mortality rate of 12% per 100,000. The total death rate in 2030 is predicted to increase to 11.5 million and the death rate to 14% (Chen *et. al.*, 2018). Based on data from the Basic Health Research by Riskesdas, 2018, it was found that the prevalence and incidence of chronic kidney failure in Indonesia is around 3.8% or 3.8 per 1000 population with the highest prevalence of CKD sufferers aged 65-74 years of 8.23. % per mile. CKD is a chronic decline in kidney function that results in irreversible and progressive damage to kidney tissue and is characterized by the accumulation of metabolic waste (toxic uremic) in the blood. To overcome this, kidney replacement therapy such as dialysis or kidney transplantation is needed (Brunner & Suddarth, 2013). In 2010, 2.62 million people were on dialysis worldwide and the need for dialysis is projected to double by 2030 (Liyanage *et al.*, 2015). Based on research by Riskesdas (2018), the number of HD active patients in West Java in 2018 was 33828, an increase from 21051 patients in 2017. The number of HD drop outpatients in 2018 was 1941 (22%).

CKD is a progressive disease that is divided into 5 stages based on the glomerular filtration rate. In each of these stages, the patient persists with the disease and requires responsibility for managing his health such as modifying diet and lifestyle, administering large

amounts of medication, and complying with the doctor's rules. The development of CKD, if not properly managed, will be associated with high morbidity and mortality, and in turn, it can reduce the quality of life and lead to faster death (Chen *et al.*, 2011). To improve the quality of life for CKD patients, a comprehensive treatment effort is required including dietary adherence, fluid restrictions, medication, and treatment. In connection with the complexity of the disease and the routines that CKD patients must follow, patients must increase their adherence to self-care management (Welch *et al.*, 2015) so that they can prevent disease worsening (Walker, Marshall & Polaschek, 2013).

In Majalaya Hospital, there are still many patients who have not followed medical rules. Many patients who come with IDWG (Interdialytic Weight Gain) are increasing, complaining of weakness (fatigue), high blood pressure, malnutrition, have comorbidities. Therefore, researchers are interested to find out the Adherence of hemodialysis patients undergoing self-care management.

METHODOLOGY

The research method used was descriptive with a cross-sectional approach, in which the researcher only described the compliance of hemodialysis patients to self-care management. The population in this study were all 145 patients undergoing hemodialysis at Majalaya Hospital. A sample of 84 people was taken using a consecutive sampling technique. The sample inclusion criteria in this study were adult clients over 18 years of age, clients who underwent routine hemodialysis twice a week, and patients who had undergone hemodialysis for at least 3 months. While the exclusion criteria in this study were patients with a critical illness, patients with hemodialysis for the first time or patients undergoing emergency hemodialysis, patients with uncontrolled complications.

The instruments used in the study were the Morisky questionnaire to collect data related to medication adherence, Hemodialysis Self-Management Instrument (HDSMI) to collect data related to dietary Adherence, fluid intake and treating AV fistula, BMI (Body Mass Index), IDWG (Interdialytic Weight Gain) which is measured in kilograms per day or percentage of dry weight to collect data related to dietary compliance, fluid intake. The study was conducted by distributing questionnaires to patients who came while undergoing hemodialysis. Data were analyzed using SPSS statistical software to obtain frequency distribution.

RESULTS AND DISCUSSION

Table 1: Frequency Distribution Characteristics of Hemodialysis Patients

No.	Characteristic	Frequency	Percentage
1	**Sex**		
	Female	40	47.6
	Male	44	52.4
2	Marital Status		
	Single	5	6.0
	Marry	69	82.1
	Widow	6	7.1
	Widower	4	4.8
3	Level of Education		
	Primary School	25	29.8
	Junior High School	16	19.0
	Senior High School	35	41.2
	College	8	9.6

Based on the data in table 1, it is found that half of the gender of patients who experience hemodialysis (52.4%) or 44 respondents are male and have the most education is high school, namely 35 respondents (41.2%) and most of the marital status is married as much as 69 respondents (82.1%). In this study, it was found that half of the gender of patients who experienced hemodialysis (52.4%) or 44 respondents were male, this is following the research of Aini & Wahyuni (2018) which states that most of the patients with kidney failure who experience hemodialysis are male. Gender has a role in the differences in behavior between men and women in maintaining their health, men have irregular eating patterns and most men like to drink alcohol, and also have higher creatinine levels than women. (Sumigar *et al.*, 2015). Also, the percentage of men who suffer from chronic kidney disease (CKD) with hemodialysis is greater than women, because more men have a smoking habit. This is following the results of the research by Hidayati & Sitorus (2014) where active smokers have 7 times the risk of suffering from CKD compared to non-smokers. Meanwhile, passive smokers have a 2 times greater risk of getting CKD than non-smokers. Research of Susmita & Supadmi (2016) shows that a history of smoking has a 2 times greater risk of developing CRF.

Kazancioğlu (2013) states that the male gender is included in the five risk factors for CKD that cannot be modified. Several factors that cause CKD in men are due to an enlarged prostate which can lead to kidney

failure. Also, the formation of renal stones is more common in men because the urinary tract in men is longer. Men also have more habits that can affect health, such as smoking, drinking coffee, alcohol, and drinking supplements that can trigger systemic diseases and can lead to decreased kidney function and have an impact on the quality of life.

In this study, it was found that the highest education level was SMA, namely 35 respondents (41.2%), this is by the research of Aini & Wahyuni (2018) which states that the highest education level of hemodialysis patients was SMA, namely 24 people (30.8%). It is also supported by research by Melastuti, Nafsiah & Fachrudin (2018) whose research results show that hemodialysis patients at Sultan Agung Islamic Hospital Semarang have high school education (46.7%). Adherence is strongly influenced by the level of education. If a person's education level is high, it affects the level of knowledge, thought patterns, attitudes, and behavior of the individual. Whereas with low education, the level of individual knowledge is lacking, so that it can affect the individual's attitudes and behavior (Ayunda & Priyantini, 2017). According to Notoatmojo (2010), education is an activity, a human effort to improve personality or the process of changing behavior towards maturity and perfecting human life by fostering and developing the potential for his personality, which is in the form of spiritual (creativity, taste, intention) and physical. Adnan, Dania & Supadmi (2018) state that CKD patients who have higher education will have broader knowledge that allows patients to control themselves in overcoming the problems they face, have high self-confidence, experience, and have the right estimates to overcome incidents, easily understand what is recommended by health workers, and this can reduce anxiety and help the individual in making decisions.

In the study it was also found that most of the marital status was married as many as 69 respondents (82.1%). This is following the research of Ayunda & Priyantini (2017) which stated that all hemodialysis patients in their study were married (100%). Kazancioğlu (2013) states that role tension changes the healthy role of illness due to kidney failure. Changes in shape and physical appearance due to stress can be minimized with support from partners. This increases self-confidence, optimism, and motivation which can improve the quality of life. Respondents who are married are more likely to get good support from their spouses, children, or their extended family. Good support will increase the patient's enthusiasm for undergoing treatment. This marital status is also closely related to the client's responsibilities with his family which can then affect the client's unhealthy lifestyle, such as not being selective in choosing food and working overtime. This condition of course will affect the self-care management of hemodialysis patients. (Nugraha, Rahmah & Bhudiaji, 2020).

Table 2: Frequency Distribution of Adherence to Medication in Hemodialysis Patients

No.	Adherence to medication	Frequency	Percentage
1	Low	42	50 %
2	Moderate	32	38.1 %
3	High	10	11.9 %
	Total	84	100 %

Based on the data in table 2, it was found that half of the patients (50%) or 42 patients who underwent hemodialysis at Majalaya General Hospital had low adherence to taking medication. The amount of medicine obtained by the patient is adjusted to the conditions and needs. The presence of other diseases will also affect the amount of medicine. Adherence with medication rules is very important to achieve optimal health. Adherence behavior can be in the form of obedient and disobedient behavior which can be measured through the dimensions of ease, duration of treatment, quality, distance, and regularity of treatment. Compliance seems simple but it is a difficult and complex problem (Kadambi *et al.*, 2012). However, it has been considered to be of utmost importance in end-stage kidney disease or ESRD. Emphasis on adherence confirms that treatment is worthless, if the patient chooses not to adhere to treatment in hemodialysis (Kalogianni *et al.*, 2011).

In the study it was also found that most of the marital status was married as many as 69 respondents (82.1%). The research of Ayunda & Priyantini (2017) states that all hemodialysis patients in their study were married (100%). Siagian & Habeahan, (2019) state that the role tension in the form of changes in the healthy role of illness due to kidney failure, changes in shape and physical appearance due to stress can be minimized with support from partners. This increases self-confidence, optimism, and motivation which can improve the quality of life. Respondents who are married are more likely to get good support from their spouses, children, or their extended family so that good support will increase the patient's enthusiasm for undergoing treatment.

Senior, Marteau & Weinman (2004) state that adherence is categorized into two types, namely passive non-adherence that occurs due to misunderstanding of treatment and active non-compliance of patients deliberately not following a treatment setting. Also, several factors that influence treatment adherence are differences in socio-demographic factors (such as socioeconomic status) (Sackett & Haynes, 1976). According to research by Karuniawati & Supadmi (2016), antihypertensive drugs usually use a combination of 2 to 4 for patients undergoing hemodialysis. Anaemia is a problem in chronic kidney disease (Senior, Marteau & Weinman, 2004). Iron deficiency is a major cause of anaemia. Iron supplements are needed by almost every CKD patient to meet their iron needs (Siagian & Habeahan, 2019). Treatment of HD patients is needed because HD patients usually have comorbid diseases. From the research results, almost all (84.5%) had comorbid with the most comorbid type, namely hypertension.

Hypertension comorbid is the most common comorbid among clients undergoing hemodialysis. Hypertension and kidney disease influence each other. Hypertension can cause kidney disease and vice versa. Prolonged hypertension can result in changes to the structure of the arterioles throughout the body, characterized by fibrosis and hyalinization of blood vessel walls. The main target organs are heart, brain, kidneys, and eyes. In the kidneys, arteriosclerosis due to old hypertension causes nephrosclerosis. This disorder is a direct result of ischemia due to the narrowing of the lumen of the intrarenal blood vessels. Blockage of the arteries and arterioles will cause damage to the glomerulus and tubular atrophy so that all nephrons are damaged which can lead to CKD (Walker, Marshall & Polaschek, 2013). From the results of this study, it was found that in addition to hypertension, there are comorbid diabetes mellitus and cardiovascular disease in clients undergoing hemodialysis. Diabetes mellitus occurs starting from a decrease in GFR in CKD clients characterized by the occurrence of microalbuminuria. When the body digests the protein it consumes, it produces waste products. In the kidneys, there are many capillaries to filter these waste products. When blood flows through the blood vessels, small molecules that act as waste products are excreted in the form of urine. The presence of diabetes mellitus can damage this system. About 20-30% of clients with Diabetes Mellitus (DM) type 1 will experience microalbuminuria and will experience nephropathy. After experiencing nephropathy, within a matter of years, a progression from microalbuminuria to macroalbuminuria, and from macroalbuminuria to increased plasma creatinine concentrations or renal replacement therapy (Nugraha, Rahmah & Bhudiaji, 2020).

Besides, the results of this study also show that some clients have cardiovascular comorbidities. This occurs because of Cardiorenal Syndrome (CRS), which is the interaction between the heart and kidneys and has a strong relationship in cases of heart failure. The relationship process is a hemodynamic process. Meanwhile, clients with chronic kidney disease (CKD) experience disturbances in the hemodynamic process, in this case fluids and electrolytes. If this hemodynamic process is disrupted due to CKD and HD, there will be a hemodynamic imbalance and an impact on cardiac ischemia. (Nugraha, Rahmah & Bhudiaji, 2020). In line with research conducted by Nugraha, Rahmah & Bhudiaji, (2020) that almost all hemodialysis clients (87.3%) have hypertensive comorbidities. Clients who previously had the chronic disease as a comorbid and taking drugs for a long time can cause a person's kidney damage which is getting heavier. Because most clients who undergo hemodialysis say that they have previously had comorbid / etiological diseases such as hypertension and diabetes mellitus and have taken drugs for these diseases for a long time. Low adherence to taking this medicine can be caused by the length of time on HD. From the results of the study, it was found that the average length of time for HD patients at Majalaya Hospital in undergoing HD was 4 years. The longer the patient undergoes HD, the patient will be more adapted to the condition he is experiencing so that he / she often does not feel any complaints with the disease he is suffering from.

DISCUSSION

Table 3: Frequency Distribution of Dietary Adherence in Hemodialysis Patients

No.	Dietary adherence	Frequency	Percentage
1	No Adherence	61	72.6%
2	Adherence	23	27.4%
	Total	84	100%

Based on the data in table 3, it was found that most of the patients (72.6%) or 61 patients who underwent hemodialysis at the Majalaya Hospital were not obedient to dieting. This is the following research by Mailani & Andriani (2017) which states that more than half, namely 39 people (62.9%) of chronic kidney

failure patients who undergo HD, have poor dietary adherence. Likewise, the research of Ayunda & Priyantini (2017) stated that the level of dietary adherence in patients in the hemodialysis room of the Sidoarjo area general hospital where 11 patients (50.0%) was quite obedient, 7 patients (31.8%) were not compliant and 4 patients (18.2%) compliant. This is different from the research conducted by Susatyo (2016), the results of which show that chronic kidney disease sufferers whose dietary adherence is in the obedient category (75%). The patient's non-adherence to the diet can endanger the patient's health such as anorexia, nausea, and vomiting. This is following Hartono, Funakawa & Kosaki (2006) which states that a proper diet will slow down the occurrence of urea poisoning. Non-adherence of kidney patients to a low sodium diet can endanger the health of patients such as fluid retention, peripheral edema, pulmonary edema, hypertension, and congestive heart failure. This is supported by the research of Ayunda & Priyantini (2017) which found that patients who do not adhere to the diet tend to gain weight than they should, whereas patients with chronic kidney failure who are quite adherent and adhere to dieting do not experience other complications.

Adherence to the potassium diet includes peeling fruit, washing, and soaking in warm water, eating less citrus fruits and apples, choosing low-potassium fruits such as fruit, watermelon, and rambutan, and eating bananas. From the results of this study, it was found that patients were less able to choose foods in the form of vegetables and fruits that were low in potassium. The non-compliance of chronic kidney patients on a potassium diet was due to the patient's lack of understanding of the instructions given by the nurse to the patient. Lack of understanding leads to non-compliance in carrying out the diet so it is necessary to do diet counseling and can involve family participation. Non-adherence to the diet causes the hemodialysis process to be hampered so that the nurse collaborates with the nutrition team in providing information about dietary arrangements by involving the family.

Table 4: Frequency Distribution of Fluid Intake Adherence in Hemodialysis Patients

No.	Fluid Intake Adherence	Frequency	Per centage
1	No Adherence	52	61.9 %
2	Adherence	32	38.1 %
	Total	84	100 %

Based on the data in table 4, it is found that the majority of the patients (61.9%) or 52 patients who underwent hemodialysis at the Majalaya Hospital did not comply with fluid intake. This is by the research of Kadambi *et al.*, 2012) which states that the prevalence of fluid non-compliance is between 10% and 60% in hemodialysis patients. Research conducted by Başer & Mollaoğlu (2019) shows that the majority of respondents did not comply with fluid restrictions, namely 76%, with the indicator that respondents experienced an increase in body weight before hemodialysis. However, this is different from the research of Kamaluddin & Rahayu (2009) which states that from 51 respondents, 67.3% of patients were obedient and 32.7% of patients were non-compliant in reducing fluid intake at Regional General Hospital Prof. Dr. Margono Soekarjo. The amount of fluid intake is limited according to the amount of urine available and insensible water loss, which is around 200-250 cc/day. Hemodialysis patients who do not comply with fluid restrictions will experience fluid build-up. The accumulation of fluids in the body causes the work function of the heart and lungs to be heavy resulting in the patient's fatigue and shortness of breath, and even the risk of experiencing sudden death (Denhaerynck *et al.*, 2007).

The high percentage of non-compliant patients results in long-term losses, namely damage to the cardiovascular system, heart failure, hypertension and pulmonary edema as well as short-term losses, namely edema, bone pain and shortness of breath (Morton, *et al.*, 2012). This can be seen from the results of the study, where almost half (27.4%) of hemodialysis patients had moderate IDWG (inter-dialytic weight gain) (4-6%) and almost half (34.5%) of hemodialysis patients had severe IDWG (>6%). Interdialytic weight gain causes problems such as shortness of breath, muscle cramps, anxiety, pulmonary edema, and hypertension in individuals (Denhaerynck *et al.*, 2007). The recommended interdialytic weight gain for patients undergoing HD is 2.5 kg (Molaison & Yadrick, 2003). Kugler *et al.*, (2005) state that patients undergoing HD with high interdialytic weight gain are due to non-adherence to diet and fluid restriction, as in this study. The fluids taken by a patient undergoing hemodialysis should be closely monitored. Some patients have difficulty in limiting the intake of fluids, but they do not get an understanding of how strategies can help them in fluid restriction (Tovazzi & Mazzoni, 2012). Several studies have shown that 60-80% of the patients die from non-adherence to fluid

restriction resulting in excess fluid and food intake in the interdialytic period (Denhaerynck *et al.*, 2007). Another study states that fluid restriction is very difficult for patients that 60.7% do not comply with fluid restrictions, so they need to receive regular and ongoing education and counseling (Muchtar & Marlian, 2019).

The condition of non-compliance with fluid intake can be influenced by several things, according to research by Kamaluddin & Rahayu (2009) which states that one of the factors that influence adherence is the level of education with a value (sig) or $\alpha = 0.000$, which means there is an influence between patient education and adherence. Patients who have higher education will have broader knowledge that also allows the patient to control himself in overcoming the problems at hand, have high self-confidence, experience, and having a precise estimate of how to cope with the incident and easily understanding what the health worker recommends, will reduce anxiety so that it can help the individual make decisions. In the results of the study, it was found that almost half (48.8%) of hemodialysis patients had elementary and junior high school education. This is in line with the research conducted by Badariah *et al.*, (2017) that on average hemodialysis clients have elementary education (44%). Another research conducted by Ayunda & Priyantini (2017) presents the facts that most of the hemodialysis clients have low education (63.0%). A person's formal education will affect one's knowledge of chronic kidney disease (Badariah *et al.*, 2017). This is also supported in the opinion of Nugraha, Rahmah & Bhudiaji, (2020) that the level of education can influence a person's behavior to seek care and treatment for a disease, as well as choosing and deciding what actions to take to overcome their health problems. Therefore, the higher a person's education level, the awareness to seek treatment and care about the health problems they experience will also be higher in a directly proportional sense. Therefore, the higher a person's education, he will tend to behave positively because the education obtained can lay the foundations for understanding and behavior in a person (Nugraha, Rahmah & Bhudiaji, 2020). In line with research conducted by Molaison & Yadrick, 2003), clients with lower levels of education tend to behave and have unhealthy lifestyles compared to highly educated clients, because the level of education affects a person's level of awareness of health. The research by Kamaluddin & Rahayu (2009) states that the level of education is associated with positive behavior in individuals which affects healthy living behavior. It is often assumed that the higher the education, the easier a person can absorb information.

Non-Adherence in limiting fluid intake can lead to excessive IDWG. This can be prevented by proper fluid intake regulation to prevent excessive IDWG. The involvement of health workers is also very necessary for providing health services and health-related information for patients and treatment plans to the families. (Sapri, 2008; Hidayati & Sitorus, 2009). For this reason, it is important to provide information related to the regulation of fluid intake that involves health workers and families. Patients are expected to be obedient in maintaining their intake.

Table 5: Frequency Distribution of Adherence in Treating AV Fistula in Hemodialysis Patients

No.	Adherence in treating AV fistula	Frequency	Percentage
1	Non-adherence	45	53.6 %
2	Adherence	39	46.4 %
	Total	84	100 %

Based on the data in table 5, it is found that the majority of the patients (53.6%) or 45 patients undergoing hemodialysis at the Majalaya Hospital were not obedient in treating AV fistula. Arteriovenous fistula (AV fistula) is the best vascular access to choose from, because of its long-life span and lower risk of complications compared to arteriovenous grafts and catheters. AV fistulas are still the preferred vascular access option for hemodialysis because of their lower risk of infection and death. However, the primary failure rate of AV fistulas is still quite high (Ravani *et al.*, 2003).

Several factors can affect the patency rate of AV fistula, namely DM, blood pressure, body mass index, blood flow rate, and stabbing technique at the anastomosis site. (Sumadi *et al.*, 2018). AV fistula care is important because it can inhibit the dialysis process, AV fistulas are prone to complications such as thrombosis, aneurysms, infections, hand ischemia, and edema, so that routine care is needed which is the responsibility of the nurse and hemodialysis client itself (Pessoa & Linhares, 2015).

In the study, it was found that 53.6% of the patients at Majakaya Hospital were not compliant to do this because of ignorance or lack of understanding of the importance of AV fistula treatment. This is in line with a study conducted by Pessoa & Linhares (2015) which

states that hemodialysis clients did not know this important aspect in performing AV fistula treatment. Hemodialysis patients' knowledge can be built through educational programs.

Timely education can improve patient outcomes for end-stage renal failure and reduce medical costs. This education is also given to family members and carers. Patients who received education had a significantly higher initiation rate of planned dialysis and a better life expectancy 1 year after dialysis initiation than the other two groups (Ravani *et al.*, 2003). Therefore, it is important to provide information through education by involving the caring family.

CONCLUSION

Several factors were identified and these factors contribute to the communication barrier between expatriate nurse and patients such as personnel demographic, personal and social characteristic, job specifications, clinical situation of patients and environment factors, nurse's perceptions, impact of culture on life activities and client's cultural norms. These difficulties can be a major obstacle for expatriate nurses and can lead to an insufficient exchange of information and poor-quality nursing care. Lacking of self-awareness, training, education, simulation and practicing form expatriate nurses will have effects on communication process and it can also reduce patient satisfaction and safety.

Conflict of Interests

The authors declare that they have no conflict of interest.

ACKNOWLEDGEMENT

The authors are thankful to the institutional authority for completion of the work.

REFERENCES

Adnan, A., Dania, H. & Supadmi, W. (2018). Evaluation of erythropoietin therapy in hemodialysis patients at PKU Muhammadiyah Hospital Yogyakarta. *Pharmaciana*, 8(2).

Aini, N., & Wahyuni, E.S. (2018). Hubungan Dukungan Keluarga Dengan Kepatuhan Diet Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rsud Dr. H. Abdul Moeloek. *Holistik Jurnal Kesehatan*, 12(1), pp 1-9.

Ayunda, A.R. & Priyantini, D. (2017). Hubungan Kepatuhan Diet Dan Kualitas Hidup Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rumah Sakit Umum Daerah Sidoarjo. Prosiding HEFA (Health Events for All), 1(1). Retrieved from: http://prosiding.stikescendekiautamakudus.ac.id/index.php/pros/article/view/222/2

Badariah, B., Kusuma, F.H.D. & Dewi, N. (2017). Karakteristik Pasien Penyakit Ginjal Kronik yang Menjalani Hemodialisis di RSUD Kabupaten Kotabaru. *Nursing News: Journal Ilmiah Keperawatan*, 2(2).

Başer, E. & Mollaoğlu, M. (2019). The effect of a hemodialysis patient education program on fluid control and dietary compliance. *Hemodialysis International*, 23(3), pp 392-401.

Brunner, L.S. & Suddarth, D.S. (2013). *Buku Ajar Keperawatan Medikal Bedah*, 8th ed. EGC kedokteran; Indonesia.

Chen, S.H., Tsai, Y.F., Sun, C.Y., Wu, I. W., Lee, C.C. & Wu, M.S. (2011). The impact of self-management support on the progression of chronic kidney disease - A prospective randomized controlled trial. *Nephrology Dialysis Transplantation*, 26(11), pp 3560–3566.

Chen, Y. C., Chang, L. C., Liu, C. Y., Ho, Y. F., Weng, S. C. & Tsai, T. I. (2018). The Roles of Social Support and Health Literacy in Self-Management Among Patients with Chronic Kidney Disease. *Journal of Nursing Scholarship*, 50(3), pp 265–275.

Denhaerynck, K., Manhaeve, D., Dobbels, F., Garzoni, D., Nolte, C. & De Geest, S. (2007). Prevalence and consequences of nonadherence to hemodialysis regimens. *American Journal of Critical Care*, 16(3), pp 222-235.

Eckardt, K.U., Coresh, J., Devuyst, O., Johnson, R.J., Köttgen, A., Levey, A.S. & Levin, A. (2013). Evolving importance of kidney disease: from subspecialty to global health burden. *The Lancet*, 382(9887), pp 158-169.

Hartono, A., Funakawa, S. & Kosaki, T. (2006). Transformation of added phosphorus to acid upland soils with different soil properties in Indonesia. *Soil Science & Plant Nutrition*, 53(1).

Hidayati, S. & Sitorus, R. (2014). Efektifitas Konseling Analisis Transaksional Tentang Diet Cairan Terhadap Penurunan Interdialytic Weight Gain (Idwg) Pasien Gagal Ginjal Kronis Yang Menjalani Hemodialisa Di Rumah Sakit Umum Daerah Kardinah. Universitas Muhammadiyah Semarang. Retrieved from: https://jurnal.unimus.ac.id/index. php/psn12012010/article/view/1225/1278

Hidayati, S. & Sitorus, R. (2014). Efektifitas Konseling Analisis Transaksional tentang Diet Cairan terhadap Penurunan Interdialytic Weight Gain (IDWG) Pasien Gagal Ginjal Kronis yang Menjalani Hemodialisa di Rumah Sakit Umum Daerah Kardinah. Prosiding Seminar Nasional & Internasional. Retrieved from: https://jurnal.unimus.ac.id/ index.php/psn12012010/article/view/1225

Kadambi, A., Leipold, R. J., Kansal, A. R., Sorensen, S. & Getsios, D. (2012). Inclusion of compliance and persistence in economic models. *Applied health economics and health policy*, 10(6), pp 365-379.

Kalogianni, A. (2011). Factors affect in patient adherence to medication regimen. *Health Science Journal*, 5(3), pp 157.

Kamaluddin, R. & Rahayu, E. (2009). Analisis faktor-faktor yang mempengaruhi kepatuhan asupan cairan pada pasien gagal ginjal kronik dengan hemodialisis di RSUD Prof. Dr. Margono Soekarjo Purwokerto. *Journal Keperawatan Soedirman*, 4(1).

Karuniawati, E. & Supadmi, W. (2016). Kepatuhan penggunaan obat dan kualitas hidup pasien hemodialisa di RS PKU Muhammadiyah Yogyakarta periode Maret 2015. *Journal Farmasi Sains dan Komunitas (Journal of Pharmaceutical Sciences and Community)*, 13(2), pp 73-80.

Kazancioğlu, R. (2013). Risk Factors for Chronic Kidney Disease: An Update. *Kidney International Supplements*, 3(4), pp 368–371.

Kugler, C., Vlaminck, H., Haverich, A. & Maes, B. (2005). Nonadherence with diet and fluid restrictions among adults having hemodialysis. *Journal of Nursing Scholarship*, 37(1), pp 25-29.

Liyanage, T., Ninomiya, T., Jha, V., Neal, B., Patrice, H. M., Okpechi, I., Zhao, M. H., Lv, J., Garg, A. X., Knight, J., Rodgers, A., Gallagher, M., Kotwal, S., Cass, A. & Perkovic, V. (2015). Worldwide access to treatment for end-stage kidney disease: A systematic review. *The Lancet*, 385(9981), pp 1975–1982.

Mailani, F. & Andriani, R. (2017). Hubungan Dukungan Keluarga Dengan Kepatuhan Diet Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisis. *Journal Endurance*, 2(3), pp 416.

Melastuti, E., Nafsiah, H. & Fachrudin, A. (2018). Gambaran Karakteristik Pasien Hemodialisis Di Rumah Sakit Islam Sultan Agung Semarang. *Journal Ilmiah Kesehatan Rustida*, 4(2), pp 518-525.

Molaison, E.F. & Yadrick, M.K. (2003). Stages of change in fluid intake in dialysis patients. *Patient Education and Counseling*, 49(1), pp 5–12.

Morton, R.L., Snelling, P., Webster, A.C, Rose, J., Masterson, R., Johnson D.W. & Howard, K. (2012). Factors influencing patient choice of dialysis versus conservative care to treat end-stage kidney disease. *Canadian Medical Association Journal*, 184(5), pp E277-E283.

Muchtar, R.S.U. & Marlian, M. (2019). Effect of Progressive Muscle Relaxation on The Level of Anxiety of Haemodialysis Patients at Muhammad Sani Hospital in Karimun. *International Journal of Education & Curriculum Application*, 2(1), pp 31-37.

Notoatmojo, S. (2010). *Pendidikan dan Perilaku Kesehatan*. Rineka Cipta; Jakarta.

Nugraha, A., Rahmah, G.U. & Bhudiaji, P. (2020). Effect of Family Support Towards Elderly Hemodialysis Patients' Anxiety Level. *Basic and Applied Nursing Research Journal*, 1(1), pp 20-24.

Pessoa, N. & Linhares, F. (2015). Hemodialysis patients with arteriovenous fistula: knowledge, attitude and practice. EEAN - Nursing Anna Nery. Retrieved from: https://www.scielo.br/pdf/ean/v19n1/en_1414-8145-ean-19-01-0073.pdf

Rai, D., Deenan, A. & Krungkraipetch, N. (2019). Factors Influencing Self-management of End-stage Renal Disease (ESRD) Patients Undergoing Hemodialysis in Bhutan. *Thai Pharmaceutical and Health Science Journal*, 14(1), pp 26-34.

Ravani, P., Marinangeli, G., Tancredi, M. & Malberti, F. (2003). Multidisciplinary chronic kidney disease management improves survival on dialysis. *Journal of nephrology*, 16(6), pp 870-877.

Riskesdas, K. (2018). Hasil Utama Riset Kesehata Dasar (RISKESDAS). *Journal of Physics A: Mathematical and Theoretical*., 44(8), pp 1–200.

Sackett, D.L. & Haynes, R.B. (1976). Compliance with Therapeutic Regimens. Georgetown University. Retrieved from: http://hdl.handle.net/10822/772693

Sapri, A. (2008). Asuhan Gagal Ginjal Kronik Faktor-faktor yang Mempengaruhi Kepatuhan dalam Mengurangi Asupan Cairan pada Gagal Ginjal Kronik yang Menjalani Hemodialisa di RSUD Dr. H. Abdul Moeloek Bandar Lampung. Fakultas Kedokteran Universitas Sumatra Utara. Retrieved from: http://lontar.ui.ac.id/file?file=digital/20281994-T%20Nita%20Syamsiah.pdf

Senior, V., Marteau, T.M. & Weinman, J. (2004). Self-reported adherence to cholesterol-lowering medication in patients with familial hypercholesterolaemia: the role of illness perceptions. *Cardiovascular Drugs and Therapy*, 18(6), pp 475481.

Siagian, E. & Habeahan, E.J. (2019). The Life Experience of Patient Chronic Kidney Under Hemodialysis Treatment at Bandar Lampung Adventist Hospital. *Abstract Proceedings, International Scholars Conference*, 7(1), pp 99-115.

Sumadi, G. J., Pandelaki, P. A., Wijaya, C. N., Antoni, M., & Tjang, Y. S. (2018). Fistula Arteriovenosa untuk Hemodialisis pada Penderita Gagal Ginjal Kronik. *Journal Kedokteran Meditek*, 24 (66).

Sumigar, G., Rompas, S. S. & Pondaag, L. (2015). Hubungan Dukungan Keluarga Dengan Kepatuhan Diet Pada Pasien Gagal Ginjal Kronik Di IRINA C2 Dan C4 RSUP Prof. Dr. RD Kandou Manado. *Journal Keperawatan*, 3(1).

Susatyo, B. (2016). Gambaran Kepatuhan Diet Pasien Gagal Ginjal Kronik yang Menjalani Hemodialisa Rawat Jalan di RSUD Kayen Kabupaten Pati Tahun 2015 The Description of The Dietary Pursuance Cronical Renal Failure Patients Undergoing Hemodialysis Outp. *Journal Kesehatan Masyarakat (e-Journal)*, 4(3), pp 168-176.

Susmita, P.R. & Supadmi, N.L. (2016). Pengaruh Kualitas Pelayanan, Sanksi Perpajakan, Biaya Kepatuhan Pajak, Dan Penerapan E-Filing Pada Kepatuhan Wajib Pajak. *E-Journal Akuntansi*, 14(2).

Tovazzi, M.E. & Mazzoni, V. (2012). Personal paths of fluid restriction in patients on hemodialysis. *Nephrology Nursing Journal*, 39(3), pp 207-215.

Walker, R., Marshall, M.R & Polaschek, N. (2013). Improving self-management in chronic kidney disease: A pilot study. *Renal Society of Australasia Journal*, 9(3), pp 116–125.

Welch, J.L., Johnson, M., Zimmerman, L., Russell, C.L., Perkins, S.M. & Decker, B.S. (2015). Self-Management Interventions in Stages 1 to 4 Chronic Kidney Disease: An Integrative Review. *Western Journal of Nursing Research*, 37(5), pp 652–678.