doi: 10.31674/mjmr.2018.v02i04.002

MJMR

THE EFFECT OF EDUCATION ON INTERDIALYTIC WEIGHT GAIN IN PATIENTS UNDERGOING HEMODIALYSIS

Ida Rosdiana*, Yanti Cahyati, Dudi Hartono
Tasikmalaya Health Polytechnics, Ministry of Health Republic of Indonesia
Corresponding author's email: idarosdiana 27@yahoo.co.id

ABSTRACT

Interdialytic weight gain (IDWG) is one of such problems that are often experienced by hemodialysis patients worldwide. This problem is basically caused by the inability of the kidney excretory function, so that regardless of the patient's fluid intake, weight gain will always be there. High IDWG is associated with high blood pressure before dialysis and increased mortality. One of the causes of the high IDWG in hemodialysis patients is due to the inability of the patient to perform *self-care*, so an action is needed to support educational nursing. The study aimed to explain the effect of education on IDWG. The research design used a quasi-experimental method, with a pretest and posttest group design without a control group. The sampling technique was purposive sampling. Respondents were given 3 sessions of education with different material at each session and observed weight for two weeks after the education session ended. The results of the study indicate that education in hemodialysis patients can have a positive influence on IDWG. The average IDWG decreased after being given education (*p*-value = 0.0001). This study recommends the need for further research on factors that influence IDWG and the need for programmed education to hemodialysis patients.

Keywords: Hemodialysis, IDWG (Interdialytic Weight Gain)

INTRODUCTION

Patients with end-stage renal failure or ESRD will experience loss of kidney function up to 90% or more, so that the body's ability to maintain fluid and electrolyte balance is impaired, excretory function becomes inadequate, hormonal function is impaired and the occurrence of uremia or azotemia (Parsons *et al*, 2006; Johnson, 2008) starts taking place. This condition causes patients with chronic renal failure to face kidney replacement therapy. Hemodialysis is one of the most widely used kidney replacement therapies and the number continues to increase from year to year.

Among the problems often faced by hemodialysis patients are weight gain between two hemodialysis sessions (Interdialytic Weight Gain = IDWG*)*. The addition of IDWG values that are too high can cause hypotension, muscle cramps, hypertension, shortness of breath, nausea, and vomiting, and others that can worsen the patient's condition. This IDWG is basically caused by the inability of the kidney's excretion function so that regardless of the patient's fluid intake, weight gain will always be there. In other words, zero weight gain is not possible (Era, 2008).

The addition of IDWG to hemodialysis patients is also influenced by many factors and is often caused by a lack of patient compliance with the restriction of fluid intake and salt diet (Nerbas, 2011; Sarkar *et al.*, 2006). Lack of patient compliance is often related to a patient's lack of abilities for self-care, and this is often related to a patient's lack of knowledge. Education is expected to improve patients' knowledge about diet and complications of hemodialysis so that it is ultimately expected to improve the ability of patient's self-care (Atashpeikar *et al*, 2012).

Hemodialysis nurses have a role in helping patients develop self-care behavior to avoid complications due to IDWG ≥ 5%. The fulfillment of hemodialysis patients' needs for information regarding their health condition is a task that must be done by using all the professional abilities of nurses.

In Tasikmalaya City Hospital, more than 30% of patients had IDWG ≥ 5% which caused them to be at risk of developing over fluid. Education about complications of weight gain was given by the Hemodialysis Unit nurses but they did not use certain specific guidelines in conducting education, so

evaluation of the patient's independent abilities could not be carried out.

RESEARCH METHODOLOGY

Study Design

The research design used was pre-experimental with one group pretest-posttest approach. The number of research samples is 34 respondents with purposive sampling technique. The study was conducted in the Unit Hemodialysis of the Tasikmalaya City Hospital.

Criteria Study

The study inclusion criteria are based on patients undergoing HD continuously in the age group between 25 - 65 years with a written informed consent, has undergone HD for at least 3 months, willing to take part in education according to HD schedule and doing routine HD twice a week. The study's exclusion criteria include patients who do not do hemodialysis on the specified schedule, missing educational activities and difficult to weigh the body, such as experiencing a decrease in consciousness, not being able to stand on a scale or experiencing other conditions.

Data Collection Procedure

Assessment of patient's demographic data, such as age, sex, and education status was obtained from the patient's medical record. Patient IDWG data was collected at different times after the informed consent form was signed by the patient.

The Educational Interventions

Patients are invited by researchers to attend educational sessions according to the hemodialysis schedule, the researchers provide 3 different times depending on the hemodialysis schedule. Patients are given educational material by researchers which include fluid management and manifestations of excess fluid, meaning weight gain due to excess fluid, the importance of compliance and sources of information that can be used. After giving the material, the researcher continued with personal education. Respondents were taught how to calculate their fluid needs based on discharge (urine) and were asked to fill in a column on the number of fluid sheets recommended every day while at home for 14 days of research. During each hemodialysis visit, this note sheet is requested to be brought and submitted to the researcher to be recorded. The recording of the amount of urine independently and the amount of fluid recommended is an integrated effort of self-care of hemodialysis patients, namely cognitive, affective and psychomotor. Leaflets and booklets are given to patients to facilitate the learning process.

Statistical Analysis

the analysis used in the study is univariate analysis to describe each of the variables studied, and the test that is distinguished is the *T*-test, which is the two dependent mean difference test (*paired t-test*), which is to examine differences in weight gain before and after given education.

RESULTS

Univariate Analysis

Table 1: Demographic characteristics of the patients

	Number of Patients (*N*=34)	Percentage
Age (years, mean±SD)	49.65±10.43	
Gender		
Male	19	55.9%
Female	15	44.1%
Educational Level		
Primary School	0	0%
Secondary School	1	2.9%
high School	22	64.7%
University	11	32.4%

Table 1 shows the mean age of the participants was 49.65±10.43 years; 55.9% were male. In total, 32.4% of the participants had university education, 64.7% had high school education, and others had lower education.

Bivariate Analysis

Table 2: IDWG Pre and Post Education

IDWG	Mean	SD	SE	P Value	N
Before	5.83	1.73	0.29	0,0001	34
After	4.85	1.50	0.26		

Table 2 shows the average weight gain before education, which is 5.85 kg, while the average weight gain after education is 4.85 kg. Statistical test results obtained p value 0.0001, it can be concluded that there is a significant difference between weight gain before and after education.

DISCUSSION

Characteristics of Respondents

a. Age

The results of the univariate analysis showed that patients with Chronic Kidney Failure (CRF) who underwent

hemodialysis in RSUD Kota Tasikmalaya were on average 49.65 years old with an age range of 25-64 years. In theory, a decrease in kidney function starts when a person starts entering the age of 30 years and at the age of 60 years kidney function decreases to 50% due to a reduced number of nephrons and lack of ability to regenerate. The decrease in total renal blood flow and a reduction in glomerular size and number causes elderly to experience a decrease in GFR (Glomerular Filtration Rate), and in the elderly, the most common causes of chronic renal failure are progressive renal sclerosis and chronic pyelonephritis.

In reality, age is not the only risk factor for chronic kidney failure. Obesity, hypertension and diabetes mellitus are other factors that play a role in the onset of chronic kidney failure. The modern lifestyle adopted by young adults makes this age group easily obese, hypertensive and diabetes mellitus. Diabetes and hypertension are responsible for the largest proportion of chronic renal failure, accounting for 43.4% and 25.5% of the total cases respectively (Ignatavicius & Workman, 2006). Several other studies also prove that hypertension and DM are the main causes of chronic renal failure (Smeltzer *et al.*, 2008).

Hypertension that exceeds 140/90 mmHg will cause damage to the *cortex* or outer layer of the kidney which will stimulate the production of the hormone *renin*. The excess of this hormone will stimulate an increase in blood pressure in those who experience kidney damage. Hypertension can cause kidney complications and kidney disease can cause hypertension. When blood vessels are thickened by fat deposits, blood pressure increases. As a result, blood flow to the entire body decreases, including blood flow to the kidneys which ultimately causes hypertensive complications in the form of kidney failure.

Hypertension can aggravate damage to the glomerulus and kidney blood vessels, and therefore, is a major cause of end-stage kidney disease. Conversely, kidney function abnormalities can cause hypertension. In some circumstances, the relationship between hypertension and kidney disease can lead to a dangerous circle: damage to the primary kidney can cause an increase in blood pressure, which then causes damage further kidney, then increases blood pressure, and so on, until end-stage renal disease (Guyton & Hall, 2007).

Like hypertension sufferers, DM sufferers have a risk of 20% to 40% for renal disease. Some evidence suggests that immediately after diabetes occurs, especially when blood glucose levels rise, the kidney filtration mechanism will experience stress which causes leakage of blood protein into the urine. As a result, the pressure in the kidney blood vessels increases which then increases the pressure will stimulate the occurrence of nephropathy (Smeltzer *et al.*, 2008).

b. Gender

The results of the study in Table 4.2 show that the number of CRF patients undergoing hemodialysis in Tasikmalaya City Hospital is more male, namely 19 people, while the female number is 15 people. The results of this study are in line with the research of Rosdiana *et al.,* (2014) who found that the incidence of CRF was higher in men than women in every age. Yamagata *et al.* (2007) also found that an increase in creatinine urea caused by a decrease in kidney function was more experienced by men than women.

Men have a greater risk of CRF than women because of their smoking habits. According to the Multiple Risk Factor Intervention Trial (MRFIT), smoking is one of the main risk factors that can cause end-stage kidney disease. Some reasons that might be considered that smoking can harm the kidneys are: increased blood pressure and heart rate, reduced blood flow in the kidneys, increased production of angiotensin II (hormones produced in the kidneys), narrowing of blood vessels in the kidneys, damage to the arterioles (branches of arteries), and formation atherosclerosis (Hallan *et al*., 2011).

In addition to smoking, factors other than cause men to be more at risk for CRF are due to the influence of sex hormones. Sex hormone is thought to mediate gender effects on CRF, through interactions with the system of renin-angiotensin aldosterone, modulates the synthesis of nitric oxide and causes a decrease in collagen. Sex hormone androgen is thought to have contributed to the ongoing loss of kidney function in men through the stimulation of apoptotic pathways, which is a unique type of cell death program that is activated in CRF (Gandolfo *et al*., 2004).

c. Level of Education

The results of the univariate analysis showed that patients with Chronic Kidney Failure undergoing hemodialysis in Tasikmalaya City Hospital had the majority of secondary education, namely 64.7% of high school education.

Azwar (2010) mentions there is a link between the level of education towards positive behavior which is the basis of understanding (understanding) and behavior in an individual. The results or changes in behavior in this way take a long time, but the changes achieved will be lasting because they are based on their own awareness. The level of individual education provides more opportunities for the acceptance of new knowledge, including health information.

The results of the study by Choi *et al*. (2011) found that higher educational attainment was independently associated with lower prevalence of chronic diseases and short-term mortality among all age and race/ethnicity groups.

The Effect of Education on IDWG

From the results of the study in Table 2 shows the average value of IDWG before education was 5.8 while the average IDWG after education was equal to 4.8. The results of the further analysis showed that there was a significant difference in the average IDWG before and after education (p-value = 0.0001).

IDWG in CRF patients undergoing hemodialysis is inevitable because a decrease in kidney function causes the glomerular filtration rate to decrease so that the body fails to discharge fluid from the body. Mild addition is still considered safe, but if weight gain exceeds 4.8% of the patient's dry weight it will cause various comorbidities, such as hypertension, intradialytic hypotension, left heart failure, peripheral edema, pulmonary edema, ascites, pleural effusion and congestive heart failure (Pace, 2007).

The lack of adherence of dialysis patients to the limitation of their therapeutic regimens, especially non-adherence to fluid restriction is often the cause of excessive IDWG (Barnet *et al*., 2008; Oshvandi *et al*., 2013). There is evidence that indicates that hemodialysis patients are often unable to adhere to the diet and limit their fluid consumption, so an effort to increase knowledge self-care through education is needed (Oshvandi *et al*., 2013).

Providing education can provide learning opportunities for patients and their families to improve knowledge, improve skills and develop their coping abilities, and the goal of educating patients is the occurrence of long-term behavioral changes. This can be achieved by providing knowledge that the patient really needs so that the patient is able to make his own decisions and ultimately will improve the outcomes individual's health (Wingard, 2005).

Barnet *et al*.(2008) found that education in hemodialysis patients can reduce interdialytic weight gain and education can significantly improve patient compliance with fluid intake restrictions.Likewise the research of Baraz *et al.* (2010) who found a decrease in interdialytic weight gain after giving education. This decrease occurs because the provision of education can improve the knowledge self-care patient's so that patients are able to change their behavior and habits in adhering to the diet and limiting fluids.

In hemodialysis patients, the provision of education self-care will provide new knowledge of the cognitive domain, increase understanding and train analytical skills on their health condition and analyze the educational content of the original condition. The patient also has an attitude of trust in his abilities and has a positive value in his life despite undergoing a hemodialysis process for his entire life. The psychomotor skills needed in hemodialysis patients are the ability to calculate fluids that come out in 24 hours and regulate the amount of fluid that is allowed to be consumed. This ability can arise after the patient has modeled the source of his knowledge model. This can be a nurse as a nurse educator, husband/wife or caregivers other.

Other research that is in line with the results of this study is a study conducted by Dehaghani & Shafaghi (2010) which found that there was a decrease in interdialytic weight gain before and after giving education to hemodialysis patients. Furthermore, Oshvandi (2013) researchindicate that small-group education was effective on decreasing and controlling interdialytic weight gain, and stabilizing the systolic blood pressure in patients undergoing hemodialysis. He also concluded that the education program was an inexpensive and effective intervention that needed to be given to patients

undergoing hemodialysis.

CONCLUSION

The average age of respondents was 49.65 years, with male sex more than females, 19 people (55.9%), and the majority of respondents had a high school education background, which was 22 people (64.7%). There is a difference in interdialytic weight gain between before and after giving education. The average interdialytic weight gain decreased after being given education. It can be concluded that the education in patients undergoing hemodialysis leads to a decrease in interdialytic weight gain.

Recommendations from this study need to do further research on factors that influence interdialytic weight gain and education to hemodialysis patients to need to be programmed.

ACKNOWLEDGEMENT

The authors thanks to the director of Tasikmalaya Health Polytechnics Ministry of Health Republic of Indonesia, the authority and staffs of the hemodialysis unit Tasikmalaya hospital and dear patients under hemodialysis who participated in this research.

REFERENCES

Atashpeikar, S., Jalilazar, T. & Heidarzadeh, M. (2012). Self-care ability in hemodialysis patients. *Journal of caring sciences*, 1(1), pp 31-35.

Azwar,S. (2010.Sikapmanusia, TeoridanPengukura-nnya.Yogyakarta:Pustaka Pelajar.

Baraz,S., Parvardeh, S.,Mohammadi, E. & Broumand, B.(2010). Dietary and fluid compliance:an educational intervention for patients having haemodialysis.*Journal of Advanced Nursing*,66(1), pp 60-68.

Barnett, T., Li Yoong, T., Pinikahana, J. & Si-Yen, T. (2008). Fluid compliance among patients having haemodialysis: can an educational programme make a difference? *Journal of Advanced Nursing*, 61(3), pp 300-306.

Choi, A. I., Weekley, C. C., Chen, S. C., Li, S., Tamura, M. K., Norris, K. C. & Shlipak, M.G. (2011). Association of educational attainment with chronic disease and mortality: the Kidney Early Evaluation Program (KEEP). *American Journal of Kidney Diseases*, 58(2), pp 228-234.

Dehaghani, A. R. & Shafaghi, K. (2010). The effect of diet education on blood pressure and weight of the patients with hemodialysis in Kashan. *Iranian Journal of Nursing and Midwifery Research*, 10(4).

Era,D.P.(2008). Pengaruh Edukasi Terhadap Penambahan Berat Badan Di Antara 2 waktu dialysis padapasien Hemodialisis di RS Islam Jakarta CempakaPutih (Doctoral dissertation, Tesis FIK-Universitas Indonesia. www.lontar.-ui.ac.id/file).

Gandolfo, M. T., Verzola, D., Salvatore, F., Gianiorio, G., Procopio, V., Romagnoli, A., Giannoni, M. & Garibotto, G. (2004). Gender and the progression of chronic renal diseases: does apoptosis make the difference? *Minerva urologica e nefrologica- The Italian journal of urology and nephrology*, 56(1), pp 1-14.

Guyton, A. C. & Hall, J. E (2007). Textbook of Medical Physiology. 11th Edition. EGC, Jakarta.

Hallan, S. I. & Orth, S. R. (2011). Smoking is a risk factor in the progression to kidney failure. *Kidney international*, 80(5), pp 516-523.

Ignatavicius, D. D. & Workman, M. L. (2006). *Medical Surgical Nursing: Critical thinking for collaborative care*. 5th Edition. Elsevier Saunder, St.louis, Missouri.

Johnson, J.Y. (2008). Critical Thinking, Ethical Decision Making, and the Nursing Process. 11th Edition, Lippincott Williams & Wilkins, USA.

Nerbass, F. B., Morais, J. G., Santos, R. G. D., Krüger, T. S., Koene, T. T. & Luz Filho, H. A. D. (2011). Factors related to interdialytic weight gain in hemodialysis patients. *Jornal Brasileiro de Nefrologia*, 33(3), pp 300-305.

Oshvandi, K., Fathabadi, M.A., Falahi Nia, G.H., Mahjub, H. & Adib-Hajbaghery, M. (2013). Effects of Small Group Education on Interdialytic Weight Gain, and Blood Pressures in Hemodialysis Patients. *Nursing and Midwifery Studies*, 1(3), pp 128-132.

Pace, R. C. (2007). Fluid management in patients on hemodialysis. *Nephrology nursing journal*, 34(5), pp 557-560.

Parsons, T. L., Toffelmire, E. B. & King-Van Vlack, C. E. (2006). Exercise training during hemodialysis improves dialysis efficacy and physical performance. *Archives of physical medicine and rehabilitation*,

87(5), pp 680-687.

Rosdiana, I., Yetty, K.& Sabri, L.(2014).Anxiety and the Time of Running Hemodialysis Related to the Incomnia in Failure Patients Chronic Kidney. *Indonesian Nursing Journal*, 17(2), pp 39-47.

Sarkar, S. R., Kotanko, P. & Levin, N. W. (2006). Fellows' Forum in Dialysis: Interdialytic Weight Gain: Implications in Hemodialysis Patients. *Seminars in dialysis*, 19 (5), pp 429-433.

Smeltzer, S. C, Bare, B. G, Hinkle, J. L, Cheever, K. H (2008) *Brunner & Suddarth's Textbook of medical-surgical nursing*, 11th Edition, Lippincott William & Wilkins, Philadelphia.

Wingard, R. (2005). Patient education and the nursing process: meeting the patient's needs. *Nephrology Nursing Journal*, 32(2), pp 211-214.

Yamagata, K., Ishida, K., Sairenchi, T., Takahashi, H., Ohba, S., Shiigai, T., Narita, M. & Koyama, A. (2007). Risk factors for chronic kidney disease in a community-based population: a 10-year follow-up study. *Kidney international*, 71(2), pp 159-166.