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THE EFFECT OF COUNSELLING WITH DIETARY DIARY ON KNOWLEDGE, ATTITUDE, AND COMPLIANCE OF RENAL FAILURE PATIENTS WITH HAEMODIALYSIS THERAPY

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ABSTRACT

Chronic Kidney Disease (CKD) is a form of renal failure for at least 3 consecutive months that can be treated with hemodialysis. CKD patients need to undergo diet according to their kidney condition to prevent complications. In 2018 Basic Health Research , the prevalence of CKD reached 3.8 percent for population aged ≥15 years. The study aimed to determine the effect of nutritional counselling with dietary diary on the knowledge, attitudes, and dietary compliance of CKD patients undergoing hemodialysis at Council of Churches Indonesia (PGI) Cikini Hospital. The study used a one-group pre and post-test design with 39 subjects. Nutrition counselling was carried out using a dietary diary. Knowledge and attitudes of subjects were collected by asking subjects to fill out questionnaire before and 1 week after nutrition counsellings was done. Dietary compliances were collected through energy intake, macro and micronutrients, and Inter Dialytic Weight Gain (IDWG) values. The results showed that there were increases in the number of subjects with adequate and good knowledge levels, positive attitudes, and in the compliant group as 84.6 percent; 94.9 percent; and 69.3 percent, respectively. Bivariate analysis showed that there were significant differences in the level of knowledge and compliance of CKD patients underwent hemodialysis at RS PGI Cikini after nutrition counselling with dietary diary. It was concluded that nutritional counselling with a dietary diary affected the knowledge and dietary compliance of CKD patients underwent hemodialysis at PGI Cikini Hospital. Dietary diary can be used as a tool to monitor patient's dietary compliance.

Keywords: nutrition counselling, dietary diary, CKD patients.

INTRODUCTION

Chronic kidney disease (CKD) is a condition of disrupted kidney structure or function for at least 3 consecutive months and affects a person's health condition. This condition is characterized by the presence of protein in the urine (albuminuria), abnormal urine sediments, and decreased glomerular filtration rate (GFR). GFR that reaches <15 ml/min per 1,73 m^2 indicates that chronic renal failure has occurred and requires dialysis therapy, transplantation, or other treatments to replace kidney functions.[1] Chronic renal failure in the early stages tends to be asymptomatic, so it can only be detected through blood or urine tests. However, at stage 4 or 5, symptoms such as nausea and vomiting, decreased appetite, swelling, shortness of breath due to pulmonary edema, and low urine output (oliguria).[2]

The causes of CKD are diverse globally, however, the two main causes are diabetes mellitus, both type 1 and 2, and hypertension. Other causes include primary glomerulonephritis, chronic infections, genetics, and exposure to environmental factors such as pollution, herbal medicines, and pesticides that are common in developing countries in Asia and Africa.[3] When there are nephrons in the kidney that are damaged, the kidney will try to increase the filtration rate in normal nephrons while the GFR is still within the normal limit. This adaptation mechanism will slowly overload the healthy nephrons and cause more extensive nephron damage, so that the filtration rate will decrease and the kidney functionality will also decline.[4] In a study of CKD patients in Iran, it was found that low birth weight (LBW), history of diabetes, history of kidney disease, and history of receiving chemotherapy were associated with CKD risk. Meanwhile, in Indonesia, diabetes, hypertension, smoking, and history of using non-steroidal anti-inflammatory drug (NSAID) have significant associations with the incidence of CKD, especially in the productive age group.[5,6]

Globally, the prevalence of CKD reaches more than 10 percent of the world's general population with about 843.6 million people suffering from the first to the fifth stage of CKD.[7] Based on Basic Health Research (Riset Kesehatan Dasar/Riskesdas) 2018, the number of people aged 15 and older with chronic kidney disease based on doctors' diagnosis reached 3.8 permille. The number increased when compared to the prevalence in 2013, which was 2.0 permille.[8] In addition, 0.45 percent or 11,226 people aged 15 years old and older were diagnosed with CKD by doctor in Jakarta with 0.59 percent of them were male and 3.10 percent were 75 years old and older.[9] Based on the 11th Report of Indonesian Renal Registry on 2018, the number of patients with stage 5 CKD reached 53,940 patients and 36 percent of them had hypertensive kidney disease etiology.[10]

The kidneys have both excretory and endocrine functions. When these two functions deteriorate due to CKD, renal replacement therapy (RRT) is needed to ensure that the physiological processes can run properly and the body's homeostasis is maintained. Besides the GFR, there are several indications for patients with CKD who require RRT, including hypertension that cannot be controlled by anti-hypertensive drugs, fluid build-up, pleurisy, encephalopathy and neuropathy, nausea and vomiting, and symptoms of malnutrition.[2] Once the GFR and symptoms have been validated by the doctor, the doctor will offer several RRT options according to the patient's condition, including hemodialysis,

CAPD, and kidney transplantation. Hemodialysis is a replacement therapy by filtering the blood with a special device to filter water, dissolved substances, and toxins from the blood, just as the kidneys do in normal conditions. The filtering process occurs through two mechanisms, diffusion and osmotic pressures, which push small molecules such as solutes and water to move through the membrane.[11] As many as 19.3 percent of the Indonesian population aged 15 years old and older who had been diagnosed with CKD had been or were currently undergoing hemodialysis with 38.7 percent of them were from DKI Jakarta.[8] Hemodialysis can be done twice a week for five hours up to three or four times a week for about four hours.[12]

In patients with CKD who are undergoing hemodialysis, various problems such as salt and water retentions, phosphate retention, secondary hyperparathyroidism, hypertension, hyperlipidemia, anemia, and heart disease can be found. Non-compliance is also a common problem that occurs in hemodialysis patients. It can affect various aspects of patient care, including medication, drug regimens, and dietary and fluid restrictions. Overall, it is estimated that as many as 50 percent of patients who are undergoing hemodialysis are disobeying to some parts of their recommended dialysis therapy.[13]

Nutrition counselling is a two-way communication process between the counsellor and the patient or client to assist them in acknowledging, recognizing, and making the right decisions to overcome the nutritional problems they face.[14] Nutrition counselling is done with communication, both verbal and nonverbal, and tools or media that are tailored to the needs of the client or patient. In a study by Surya et al. on patients with CKD who underwent hemodialysis at Roemani Hospital Semarang, it was found that providing nutritional counselling using pocket book had the effect in increasing patients' knowledge.[15] Nutritional counselling can be a forum to exchange knowledge between counsellors and patients or clients. Information obtained from the communication process in counselling can increase one's knowledge.[16]

In Suranti et al.'s research on patients with CKD who underwent hemodialysis, it was proven that there was a significant effect of providing nutritional counselling on attitudes of patients with CKD.[17] Changes in attitude can be caused by the knowledge gained from the nutritional counselling process. Changes in attitude can be in the form of addition, transfer, or modification of attitude components, namely beliefs, emotions or one's evaluation of objects, and tendencies to act. Regarding dietary adherence, a research by Surya et al. at Roemani Hospital Semarang stated that providing nutritional counselling by using pocket book could increase adherence to the sodium restriction which was characterized by a significant decrease in sodium intake of CKD patients who underwent hemodialysis.[15] Adherence to the recommended diet can be influenced by new information obtained through the nutrition counselling process and changes in the attitude of patients towards the recommended diet. Adherence to the hemodialysis diet is important for CKD patients to maintain their kidneys' conditions and prevent complications in other organs.

The purpose of this study was to determine the effect of providing nutritional counselling by using a dietary diary on knowledge, attitude, and dietary compliance of

patients with chronic renal failure who underwent hemodialysis at PGI Cikini Hospital Jakarta.

METHODS

This research is a quantitative study using experimental design with specific treatment or also known as one group pre and post-test design. The research was conducted at PGI Cikini Hospital from September to November 2020. The total subjects involved in this study were 39 patients with CKD who underwent hemodialysis at PGI Cikini Hospital. Subjects were obtained by using purposive sampling method with inclusion and exclusion criteria. The inclusion criteria were patients in the age group of 17 – 65 years who were not illiterate, were willing to be contacted by telephone or Whatsapp or other communication media, and were willing to participate in the study. The exclusion criteria were patients who did not want to fill out the consent form and did not continuously participate in the study until it was completed.

The independent variable in this study was the treatment or intervention that was given to the subjects, which were nutritional counselling by using dietary diary. The dietary diary was used to monitor the habits and diet of the subjects and recorded the amount and type of food consumed, the time of consuming the food, and the activities that were carried out on that day. The dependent variables in this study were the knowledge, attitude, and dietary compliance of patients with CKD who underwent hemodialysis. The characteristics of the subjects included gender, age, education level, and the length of the hemodialysis therapy. Data on the patients' gender were divided into male and female, while data on the patients' education level were categorized into elementary school graduates, junior high school graduate, senior high school graduates, and college graduates. Data on age and length of the hemodialysis therapy were presented as a mean ($\bar{x}$).

Nutrition counselling is a two-way communication process between the counselor and the patient. In this study, nutrition counselling were conducted twice with the hemodialysis dietary diary as the media, containing personal data, materials on hemodialysis diet, calculation of nutrient requirements, and food intake sheets that would be filled by patients within one week. Level of knowledge was known by asking patients to fill out a questionnaire with 12 questions and three answer options regarding understanding of the hemodialysis diet, including the amount of certain food that could be carefully consumed, the types of food that should be limitedly consumed, and the application of the hemodialysis diet before and after receiving nutrition counselling. The number of correct answers would be divided by 12, then multiplied with 100. The questionnaire scores were categorized as Poor if the score was less than 60 percent, Adequate if the score was between 60 – 80 percent, and Good if the score was above 80 percent. Data on patient's attitude was collected by asking them to fill the attitude questionnaire with 10 questions before and after getting the nutritional counselling with dietary diary. The highest score for every question was 4 and the lowest was 1. If the subject did not choose any answer, then the score would be 0. The result of the attitude questionnaire then grouped into Negative if the score reached more than 25 and Positive if the score was 25 or less.

Dietary compliance in this study was a combination of energy and nutrient intake and Inter Dialytic Weight Gain (IDWG). The dietary compliance data was categorized into the Compliant and Non-Compliant groups. The intake data were collected using 2x24 hours food recall before and after the intervention. Intakes of energy, protein, fat, carbohydrate, sodium, potassium, phosphorus, and fluid were compared with the individual needs of the subject which were calculated by the nutritionist who provided counselling. Based on the fulfilment of individual needs, the intake data were then categorized as Deficient (<80% of needs), Adequate (80 – 100% of needs), and Excessive (>110% of needs). IDWG is the weight gain that is affected by salt and fluid intake between hemodialysis sessions. IDWG is calculated by substracting the patient's weight before hemodialysis with the weight after hemodialysis. The difference is divided by the pre-hemodialysis weight, then multiplied with 100 percent. A good IDWG value only reaches 2.5 – 3.5 percent of dry weight (post-hemodialysis body weight) or does not exceed 5 percent of dry weight (post-hemodialysis body weight). Each aspect of the subject's adequate energy and nutrients intakes would be given 1 as the score and IDWG that did not exceed the limit would also get 1 as the score. The subject was included in the Compliant category if the total intakes and IDWG scores reached the maximum score of 6, which consist of 1 for each adequate intake of energy, protein, fat, carbohydrate, and fluid, and also another 1 for good IDWG score. asupan kalori, asupan protein, asupan lemak, asupan karbohidrat, asupan cairan, dan IDWG.

The data were statistically analyzed using the univariate and bivariate analysis. The results of the univariate analysis would be the percentages of each categories or groups on each variables, including the knowledge, attitude, and dietary compliance of the subjects, both before and after the intervention with nutrition counselling by using a dietary diary. Bivariate analysis was conducted using the paired subject test to see if there were significant changes in the dependent variables after the intervention.

RESULTS AND DISCUSSIONS

Table 1 Gender and Education Level of the Subjects

Characteristics	n	%
Gender		
Male	21	53.8
Female	18	46.2
Total	39	100.0
Education Level		
Elementary School (SD) Graduates	1	2.6
Junior High School (SMP/MTs) Graduates	5	12.8
Senior High School (SMA/MA) Graduates	18	46.2
University Graduates	15	38.4
Total	39	100.0

Table 2 Average Age and Duration of Hemodialysis of the Subjects

Characteristics	Mean ± Standard Deviation
Age (years)	43.69 ± 10.974
Duration of Hemodialysis (HD) (months)	34.00 ± 43.834

Based on Table 1, 21 subjects (53.8%) were male and 18 subjects (46.2%) were female. Out of the 39 subjects, almost half of them or as many as 18 subjects (46.2%) graduated from Senior High School (SMA/MA), followed by 15 subjects (38.4%) successfully completed their education at the university level, 5 subjects (12.8%) graduated from Junior High School (SMP/MTs), and 1 subject (2.6%) graduated from elementary school (SD). The average age of the subjects in this study was 43.69 years with a standard deviation of 10.974. The youngest subject was 24 years old and the oldest was 65 years old. Regarding the duration of hemodialysis therapy that they went through, the average duration was 34 months with a standard deviation of ±43.834. The shortest duration of hemodialysis therapy was 2 months and the longest was 180 months or 15 years.

Table 3 Distribution of Knowledge Levels, Attitudes, and Dietary Compliances in CKD Patients Who Underwent Hemodialysis Before and After Receiving Nutrition Counselling with Dietary Diary

Variables	Before		After	
	n	%	n	%
Knowledge Level				
Poor	20	51.3	6	15.4
Adequate	12	30.8	16	41.0
Good	7	17.9	17	43.6
Total	39	100.0	39	100.0
Attitude				
Negative	7	17.9	2	5.1
Positive	32	82.1	37	94.9
Total	39	100.0	39	100.0
Dietary Compliance				
Non-Compliant	39	100.0	12	30.7
Compliant	0	0	27	69.3
Total	39	100.0	39	100.0

Based on the results of knowledge questionnaire regarding the hemodialysis diet, more than half of the subjects or 20 subjects (51.3%) had poor knowledge level (<60%), as many as 12 subjects had an adequate level of knowledge (60 – 80%), and only 7 subjects (17.9%) who had good level of knowledge (>80%) before receiving nutritional counselling with dietary diary. After receiving nutrition counselling, the post-test results showed that there was an increase in subjects' knowledge level with 17 subjects (43.6%) who had good knowledge level (>80%), followed by 16 subjects (41%) who had adequate knowledge level (60 – 80%), and only 6 subjects (15.4%) had a poor level of knowledge (<60%).

Result in another study by Surya et al. at Roemani Hospital Semarang showed that the number of subjects with a good level of knowledge increase to 93.3 percent after receiving nutritional counselling with pocket book from 6.7 percent before receiving the nutrition counselling.[15] New information on hemodialysis diet obtained from the counselling given by nutritionists and this would increase patients' knowledge about hemodialysis diet. In addition, the media used in the form of dietary diary is also act as a reminder of the information that has been obtained from nutritionists.

Based on the data on subjects' attitudes towards hemodialysis diet, the majority or 32 subjects (82.1%) had positive attitudes and as many as 7 subjects (17.9%) had negative attitudes towards hemodialysis diet before receiving nutrition counselling. After receiving nutrition counselling, there was an increase with 37 subjects (94.9%) who had positive attitudes and only 2 subjects (5.1%) who had negative attitude towards hemodialysis diet. In another study by Suranti et al. at Wonosari Hospital Gunungkidul, there was an increase in the number of patients with CKD who had positive attitude up to 97.5 percent after receiving nutritional counselling from 85 percent before receiving nutritional counselling.[17] The changes in attitudes towards hemodialysis diet in subjects were caused by the increased on the knowledge about hemodialysis diet. The information obtained from nutritional counselling sessions made the subjects began to realize the problems they had and prepared to change their attitudes in order to live healthier.

The dietary compliances of subjects were based on the adequacy of subjects' energy and nutrient intakes and their IDWG scores. Based on the dietary compliance data, all subjects or 39 subjects (100%) were not compliant before receiving nutrition counselling. However, there was a decrease, with only 27 subjects (69.3%) were compliant and as many as 12 subjects (30.7%) were not compliant with the hemodialysis diet after receiving nutritional counselling using dietary diary. In a study by Ulfah et al. on patient with CKD in Samarinda, there was an increase in the number of subjects who were compliant with the fluid restriction, which became 60 percent after receiving nutritional counselling from 0 percent before receiving nutritional counselling.[18] Based on the transtheoretical model, dietary compliance is an action taken after obtaining the information needed to acknowledge the problems and prepare to behave healthier.[19] Information on the hemodialysis diet and changed attitudes towards the hemodialysis diet were the basis of increased compliance of subjects towards the diet.

Based on Table 4, the average score of the subject's knowledge before receiving nutrition counselling was 60.43 percent and increased by 25 percent to become 75.57 percent after receiving nutritional counselling. The p value of 0.00 ($p<0.05$) indicates that providing nutritional counselling with dietary diary as its media has a significant effect on the level of knowledge of patients with CKD, proven by the average post-test score that has increased.

Table 4 Changes in Knowledge, Attitude, and Dietary Compliance of CKD Patients Who Underwent Hemodialysis Before and After Receiving Nutrition Counselling with Dietary Diary

Variables	Mean	Deviation Standard	*p*-value
Knowledge			
Before Receiving Nutrition Counselling (Pre-test)	60.43	21.26	0.000
After Receiving Nutrition Counselling (Post-test)	75.57	19.10	
Attitude			
Before Receiving Nutrition Counselling (Pre-test)	27.51	3.42	0.070
After Receiving Nutrition Counselling (Post-test)	28.61	3.10	
Dietary Compliance			
Before Receiving Nutrition Counselling (Pre-test)	2.49	1.12	0.000
After Receiving Nutrition Counselling (Post-test)	4.10	1.68	

An almost similar result was shown in a study by Surya et al. on patients with CKD who underwent hemodialysis at Roemani Hospital Semarang, where found a significant effect of providing nutritional counselling with pocket book as its media on the level of knowledge of patients with CKD.[15] Providing nutritional counselling with diet chart as its media also had significant effect in increasing the scores of nutritional knowledge of stage 3 and 4 CKD patients in Rajasthan, India.[20] In this study, the average increase in knowledge test scores was higher in male subjects and subjects with higher education levels. The increased number of correct answers as a sign of improved knowledge occurred on the topics of suitable vegetables for hemodialysis diet and the nutrient content of restricted food sources. However, despite receiving nutrition counselling with the hemodialysis dietary diary, the subject's knowledge in restricted food sources and mineral contents in it still needed some improvements due to higher number of incorrect answers compared to other topics. In the future, nutrition counsellors need to emphasize the restriction of certain minerals, such as sodium, from other food and not only focus on the amount of salt consumed.

Based on data of subjects' attitudes regarding hemodialysis diet, it is known that the average score of the subject's attitude before receiving nutrition counselling was 27.51 and an increase about 4 percent to 28.61 after receiving nutrition counselling. There was no significant change between the attitude of the subject before and after being given nutritional counselling with dietary diary based on the *p* value of 0.07 ($p>0.05$). The insignificant effect could be related to the number of subjects with positive attitudes that had reached more than 80 percent before given the nutritional counselling and the increase

in post-test results also tended to be smaller than the increase in other dependent variables, so it could be said that nutritional counselling by using dietary diary was not the only factor that affected the attitude of subjects towards hemodialysis diet, The increase in the average score of the attitude questionnaire in this study occurred in female subjects and subjects who had higher education levels. Subjects did not respond positively to the topics regarding restricting high-sodium foods, high-potassium vegetables, and phosphorus-rich foods. The lack of positive response could be attributed to the subject's lack of understanding of these topics that could be seen by the high number of incorrect answers on similar topics of the questionnaires.

Regarding dietary compliance, the average score before receiving nutritional counselling was only 2.49 and it increased to 4.10 or about 65 percent from the pre-test score after receiving nutritional counselling. The *p* value of 0.00 ($p<0.05$) indicated that there was an effect of providing nutritional counselling by using dietary diary as its media in increasing the dietary compliance of the subject who were undergoing hemodialysis diet.

Almost similar results were shown in a study by Surya et al. on CKD patients at Roemani Hospital Semarang, where there was a significant effect of providing nutritional counselling with pocketbook on patients' compliance for sodium restriction as seen from the patients' sodium intakes.[15] In addition, in another study by Ulfah et al. on CKD patients who underwent hemodialysis at Abdul Wahab Sjahranie Hospital, Samarinda, providing nutritional counselling could significantly increase patients' compliance with fluid intake restrictions.[18] A greater increase in subjects' dietary compliance scores occurred in male subjects and subjects with higher education levels in this study. After providing nutritional counselling by dietary diary as its media, the amount of energy and macronutrient intake of the subjects increased, which was marked by the number of subjects with adequate energy and nutrient intake. In addition, the number of subjects with excessive sodium intake also decreased to 38.5 percent from 53.8 percent previously. The average IDWG score of the subjects in the post-test decreased to 3.32 from 3.47 before receiving nutrition counselling. The IDWG score is still within the normal category since it was the lowest limit of 5 percent.

During this study, there were several obstacles experienced, one of which was the limited time to meet the subjectd patients face-to-face since the study was conducted during the peak of the COVID-19 pandemic. Therefore, the counselling and pre-test were conducted in the hemodialysis room, which was not conducive to conduct counselling, while other data were collected through phone calls. In addition, limited number of subjects and relatively short duration of intervention are also became the obstacles in this study.

CONCLUSION

Based on the results of research on CKD patient who underwent hemodialysis, it can be concluded that there is an effect of providing nutritional counselling using dietary diary as its media on the level of knowledge and dietary compliance of CKD patients at PGI Cikini Hospital Jakarta. However, there is no significant effect of providing nutritional counselling with dietary diary on the attitude of patients with CKD at PGI Cikini Hospital.

The average score of patients' knowledge, attitudes, and dietary compliances increased after receiving nutritional counselling.

CKD patients need certain tools during the counselling process, one of which is the dietary diary to monitor patients' compliances in carrying out the recommended diet in order to maintain their health. Further research needs to be carried out with more subjects and longer duration of counselling that is carried out in a special counselling room. With this way, the changes in attitude and patient's compliance in carrying out the CKD diet can be higher.

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