ORIGINAL ARTICLE

The Effect of Self-management Program on Improving Knowledge, Self Regulation, Health Quality Among Patients With Chronic Kidney Disease

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ABSTRACT

Introduction: Chronic kidney disease (CKD) often causes no symptoms until kidney failure occurs. Lack of self-awareness in delaying disease progress will aggravate the disease thus resulting in poor quality of life. Implementing a self-management program can help a person identifies early symptoms of CKD and omit to manage their health. The implement of a CKD self-management program can increase knowledge about CKD , good self-regulation in patients with chronic kidney disease. Specific target: Participants suffering from chronic kidney disease. **Methods:** This experiment design is a quasi-experiment with an intervention group of 24 people (n = 24) and a control group of 15 people (n = 15). There is accessibility issues and less variability within the group. The control group received visits as usual, while the intervention group received visits and CKD self-management programs accompanied by booklet. Both groups were closely monitored 4 times for 2 weeks, each for one hour face to face. SPSS 22 programs utilize to analyzed the findings, using the analysis of covariance. **Results:** The level of knowledge about kidney disease has increased by 66% (p-value=0.000), the level of self-regulation in CKD patients was significantly increased by 70% (p-value=0.000), uric acid levels has decreased significantly by 45 % (p-value=0.000), blood protein levels remain the same (Mean=0.00), and cholesterol level decreased slightly by 28.09% (p-value=0.002). **Conclusion:** CKD Self management program improve knowledge about chronic kidney disease, improve self regulation and health quality.

Keywords: Self-management, Chronic kidney disease, Knowledge, Self-regulation

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INTRODUCTION

Chronic Kidney Disease (CKD) is a condition characterized by a decrease to the loss of kidney function. CKD is a problem that occurs globally, especially in low-income countries and most of the patients with CKD are at stage 3-5 (1,2). CKD prevalences in Indonesia has increased every year, in 2013 the number of CKD in Indonesia was around 2.0% of the total population and increased to 3.8% in 2018, while kidney disease experiencing hemodialysis was 19.3% in 2018 (3). The number of patients with CKD stage 5 who underwent hemodialysis at Bandung Hospital showed the prevalence is 0.0003% in period of 2017-2018 (4).

CKD has a long and erratic trajectory time (5). CKD can have almost no symptoms or minimal symptoms because patients with terminal kidney disease feel that the complaints they experience are very burdensome for them (6). Patients often do not realize the self-management importances to prevent disease progression, lack of patient awareness for preventing the progression of CKD can lead to decreased quality of life for patients and accelerate the stage transfer of CKD to a higher level. Other problems that commonly arise in CKD are anxiety and depression. Fatigue, complex therapy regimens, side effects of therapy, and fluid restrictions cause patients to feel depressed (7).

Delayed treatment of CKD causes lengthy patient care, decreased life expectancy, decreased quality of life, increased medical costs that will affect not only the patient himself but the patient's family. Patient can experienced depression and the threat of depression that can be experienced by the patient. To answer the problems that arise, programmed management is needed to prevent disease progression in patients with CKD. Self-management program is a program that focuses on behavior modification, especially in patients with chronic diseases so that it is hoped that there will be a delayed in disease progression and an increase in health status. (8) Self-management programs have been widely used as part of health promotion to treat patients with chronic diseases, because self-management programs are designed to prevent further decline in kidney function, prevent depression and can improve the quality of life of patients with kidney disease. Therefore, support and encouragement for effective self-management in patients with CKD is needed (9). Research conducted by previous researchers in 2019 regarding self-management programs found that the application of self-management programs in patients with CKD at an early stage had a positive impact by slowing disease progression, improving quality of life and reducing the length of treatment during hospitalization (10) CKD self-management programs increase knowledge about chronic kidney disease, improve self-regulation and quality of health characterized by a decrease in uric acid levels, relatively stable cholesterol and protein levels.

MATERIALS AND METHODS

Study design

This study used a quasi-experimental design with a writing process that focuses on changes in the observed treatment of the writing subject.

Intervention Protocols

Completing a questionnaire on knowledge about CKD, a self-regulation questionnaire and CCI form. Conduct an interview process and explain the contents of the booklet and together, the participants determine the problems encountered and set goals based on the priority problems that have been prepared previously. Together with the participants determine the solution to the problem. Monitoring blood pressure and understanding the contents of the booklet 4 times over a period of 2 weeks. Fill out the final questionnaire and carry out a physical examination for final evaluation. Measurements were made after obtaining informed consent from participants. The first (pre test) and second (post test) measurements use the same instrument.

Sampling and Sample Size

The implementation of this study was carried out in Umaq Dian Village, which is located on the banks of the Belayan river, Tabang District, Kutai Kartanegara Regency, Indonesia. The population used for this research is the residents of the village of Umaq Dian.

The inclusion criteria is the citizens who were willing to participate, minimum urine protein 0.15 (±), uric acid > 7.5 mg / dl for women and > 8.5 mg / dl for men, cholesterol > 200 mg / dl , blood pressure > 130/90 mmHg. The exclusion criteria is the participants who do not have one of the criteria above and were not willing to take part in this research. Participants totaled 39 people, 24 participants in the intervention group and 15 participants in the control group.

Instruments

The instruments used were questionnaire sheet for knowledge about CKD, self-regulation questionnaire sheet, Charlson comorbidity index (CCI) form, booklet, reagent strips urinalysis brand verify, nesco multiple check, stationery and the Omron brand digital blood meter.

The variables measured were the level of knowledge about CKD, the level of self-regulation, urine protein, uric acid, cholesterol and blood pressure. The level of knowledge possessed by respondents based on their experience of CKD , measured using a questionnaire and it's assessed using an ordinal scale with a result range of 0-7 for not understanding, 8-14 understanding enough, 15-21 understanding and 22- 28 really understand. The respondent's self-regulation questionnaire about their health was measured using an ordinal scale, 32-56 very low, 57-80 low, 81-104 moderate and 105-125 high. The CCI is classified into three levels: mild (score of 1–2), moderate (score of 3–4) and severe comorbidity (scores ≥ 5). Urine protein measurement using reagent strips, (-) indicates normal and 20 indicates 4+ protein found in urine. Measurement of uric acid using a Nesco brand multicheck with a range of 2.5 - 7.7 mg/dl for men and 4.0-8.5 mg/dl for women. Cholesterol was measured using a Nesco brand multicheck with a value <200 mg/dl is normal and > 240 mg/dl is high. Blood pressure was measured using an Omron brand digital sphygmomanometer with a range of 120-130/80-85 is normal and >180/>110 is severe hypertension.

Ethical Consideration

This study was approved by Tabang District Community Health Center No. 02/PKM-TBG/012/2020 for voluntary participants, informed consent and confidentiality of participants identity.

Data Collection

The author uses primary data sources from the residents of Umaq Dian Village with predetermined criteria. Participants fill out the approval form to follow the research implementation process. Perform urinalysis, serum uric acid, serum cholesterol and blood pressure measurements.

Data Analysis
Analysis data used the Statistical Program for Social Science (SPSS) version 22 which included the mean, standard deviation, sample size, t-value, degree of freedom and significance levels. The average age was analyzed using the Microsoft Excel program.

RESULTS

Data was collected directly by visiting residents who had a history of chronic disease. The mean age of the participants was 61.4 years with a minimum age of 33 years and a maximum age of 80 years. A total of 16 participants showed positive proteinuria 1 (+1), 4 people showed a positive value of 2 (+2), 3 people had a positive proteinuria value 3 (+3) and 1 person had positive proteinuria 4 (+4). The systolic pressure of all participants had an average of 143 mmHg and an average diastolic pressure of 91 mmHg. Most of the participants had a history of chronic hypertension and some participants had other comorbidities such as stroke, kidney stones, uncontrolled diabetes mellitus, uncontrolled heart disease and chronic edema conditions.

Participants' Charlson comorbidity index (CCI) had a mean score of five, with a maximum value of 24 and a minimum value of one. The Charlson comorbidity index can predict one-year mortality for participants who may have various comorbid conditions, such as heart disease, AIDS, or cancer (a total of 22 conditions). Each condition is assigned a score of 1,2,3,4, or 6, depending on the risk of death associated with the condition.

Levels of Knowledge About CKD
The results of the knowledge level test about CKD before the participants performed CKD self-management had an insufficient level of knowledge about CKD. There is an increase knowledge after intervention (M = 16.71, SD = 6.6) than before interventions, t= -11.3, p=0.000. (table I)

Levels of Self-Regulation
The results of the self-regulation level test after the participants performed CKD self management program, they had a moderate level of self regulation (M = 88.3, SD = 19.1, t= -12, p= 0.000) (table II)

Proteinuria Overview
The results of statistical tests showed that there was no change in the value before the participants did self-management with n = 0. The results of statistical tests also showed that there was no change after the

Table I : Description of Knowledge Level about CKD (Knowledge Level Test Results before and after treatment)

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2 tailed)
Pre test knowledge level about chronic kidney disease	8.75	.24	5.936	1.212	-11.317	23	.000
Post test knowledge level about chronic kidney disease	16.71	24	6.590	1.345			

t : t value df : degree of freedom Sig : significance levels
N : sample size Std. Deviation : standar deviation Std. Error Mean : standar error mean

Table II : Self-regulation Level Test Results before and after treatment

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2 tailed
Pre test self-regulation level	37.75	.24	19.483	3.977	-12.033	23	.000
Post test of self-regulation level	88.25	24	19.059	3.890			

t : t value df : degree of freedom Sig : significance levels
N : sample size Std. Deviation : standar deviation Std. Error Mean : standar error mean

Table III : Results of Protein Levels Test in Urine Before and After Treatment

		N	Mean Rank	Sum of Ranks
Proteinuria levels before treatment	Negative rank	0[a]	.00	.00
Proteinuria levels after treatment	Positive rank	0[b]	.00	.00
	Ties	24[c]		
	Total	24		

Sum of Ranks: The combined samples N : sample size Mean rank : the arithmetic average of the positions in the list

	Proteinuria levels before-after treatment
Z	.000[a]
Asymp. Sig. (2.tailed)	1.000

Z : number representing how many standard deviations above or below the mean population
Asymp. Sig : the p-value based on chi-square approximation

Table IV : Uric Acid levels, Cholesterol, blood pressure overview before and after treatment.

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2 tailed
Uric acid levels before treatment	6.646	24	1.6283	.3324	4.3	23	.000
Uric acid levels after treatment	5.321	24	1.1814	.2411			
Cholesterol levels before treatment	207.96	24	54.244	11.072	3.55	23	.002
Cholesterol levels after treatment	181.33	24	51.421	10.496	3.36	23	
systolic pressure before treatment - systolic pressure after treatment	11.4	24	16.67	3.402	4.1	23	.000
diastolic pressure before treatment - diastolic pressure after treatment	6.67	24	7.982	1.629			

t : t value df : degree of freedom Sig : significance levels
N : sample size Std. Deviation : standar deviation Std. Error Mean : standar error mean

participants did self-management with n = 0. So it can be concluded that the value of protein in the urine before and after intervention does not change (p= 1.000) (Table III)

Uric Acid Levels in the Blood
The results showed there was a significant decrease in the uric acid levels of the participants after intervention (M = 5.3, SD = 1.18, t= 4.2, p= 0.000) (table IV)

Cholesterol Levels in the Blood
The result shows there is significant decrease in the cholesterol level of the participants after intervention (M = 181.3, SD = 51.4, t= 3.6, p= 0.002) (table IV)

Blood Pressure Overview
The results of the blood pressure test showed a significant decrease after intervention (M = 6.67, SD = 8.0, t= 4.1, p= 0.000) (table IV).

DISCUSSION

The level of knowledge about the participants' kidney disease showed a significant increase in results, from the 24 participants who did self-management, all of them had an increased understanding of chronic kidney disease. The approach was carried out directly 4 times for 2 weeks. All participants pay attention to the contents of the booklet provided and regularly study it. Before participants carried out self-management accompanied by booklets, the average level of knowledge they possessed was quite understanding. However, after being given a booklet and undergoing an intensive 2-weeks self-management program, there was a significant increase in knowledge about kidney disease. The level of self-regulation of participants also experienced significant changes, from 24 participants who had very low average self-regulation, after carrying out self-management programs, had an average of moderate self-regulation. This was supported by the enthusiasm of the participants during the visit and self-awareness of the importance of keeping the kidneys healthy.

This significant change is supported by 3 factors, namely individual, social and information factors (11). Participants have different personality backgrounds, different moods and emotions, and different attitudes and experiences regarding chronic kidney disease. Social factors in the form of education level, age, gender, ethnicity and culture of each participant also determine changes in the level of knowledge and self-regulation they have. Information obtained during life, media and direct implementation also play an important role in changing levels of knowledge and self-regulation. All participants were very cooperative when the self-management program was implemented, and tried to follow the recommendations provided in the booklet. Problems that have been arranged together and the objectives to be achieved by participants can be fulfilled properly. The problems and solutions to be achieved can be fulfilled properly, this is due to the design of the solutions that have been prepared in the booklet and are easily accessible. High individual self-awareness also makes the implementation of self-management programs well. Participants were very enthusiastic and had positive responses after knowing about CKD properly and having a commitment to improve their health. The information obtained from the self-management program can increase the patient's knowledge, skills and confidence, and the patient can also adjust to the stage of CKD he is experiencing (12). Recent studies using cohort methodologies have shown that self-management interventions are effective for CKD patients because they can slow disease progression, improving overall quality of life (13).

The uric acid levels found in data collected showed significant changes before undergoing self-management programs and after undergoing self-management programs. Although the average uric acid range was still normal, there was a difference between male and female uric acid levels before and after the implementation of the self-management program. Some participants had uric acid levels above normal but after following the program there was a significant decrease in uric acid levels. High uric acid levels are associated with a significant reduction in glomerular filtration rate and have a higher risk of kidney failure. Hyperuricemia is a potentially modifiable factor in CKD (14).

The picture of proteinuria in participants with an average age of 61.4 years showed that all participants had a previous proteinuria condition, this is supported by a study which states that diabetes mellitus, hypertension and those over 50 years of age have a significantly high risk of developing proteinuria. The use of the dipstick urine method for initial screening has proven to be economical and effective in identifying the presence of CKD in community settings (15), especially in areas that have difficulty accessing health services in hospitals. The cholesterol figure before self-management was 207.96 with a high threshold category. The condition of dyslipidemia is a complication of damage to the kidneys, the profile of fat in the blood depends on kidney function and the degree of protein in the urine (16). Along with the occurrence of kidney damage, the condition of dyslipidemia often worsens (17). However, the average cholesterol value of participants after self-management became 181.33, which indicates that it is still in the normal range, so this shows that self-management programs can lead to better health outcomes, are better for participants (18).

The blood pressure in participants experienced significant changes between before and after doing a self-management program. Most of the participants

had a history of uncontrolled hypertension. Systemic hypertension causes intraglomerular hypertension resulting in glomerular hypertrophy and injury to the kidneys. Hypertensive conditions can lead to decreased kidney function in patients who have experienced CKD before (2,19). Self-management programs have been shown to change knowledge and self-regulation in all participants who have a history of uncontrolled hypertension. After knowing that the blood pressure was above the normal range, most of the participants who had a history of hypertension took the initiative to immediately go back to the health center and commit to continue taking anti-hypertensive drugs and trying to control their blood pressure.

There are several limitations in this research, timeline research only has a duration of 2 weeks from the 12 weeks that should have been done in the previous research. This is due to the difficulty in getting permission to reach the population in question regarding the COVID-19 pandemic in 2021. However, in the reference article, the previous author acknowledged that 12 weeks was quite a long time and was less effective for the author himself, this was stated in the author's discussion limitation on published articles. Another limitation is the setting of the writing location which should be in the hospital clinic, but because the conditions made it impossible to conduct in clinical setting due to the Covid 19 pandemic, it was decided that this research should be done in a community that has a green zone (free from covid 19).

Likewise with the inclusion criteria that should use serum creatinine data to determine the glomerular filtration rate of potential participants, to determine whether or not potential participants have kidney problems, another screening method is used, the urinalysis method, with reagent strips to identify the presence of protein in the urine (dipstick), measure serum uric acid levels, and measure serum cholesterol levels. Based on the selected screening method, it is possible to determine potential participants who meet the inclusion criteria. Studies show that proteinuria is a risk factor as well as a marker of kidney damage (20–22). Proteinuria has an important role in determining a person's deterioration of kidney function and has been used as a marker for glomerulopathy problems (23). Likewise, a significant decrease in glomerular filtration rate and the risk of kidney failure is closely related to high serum uric acid levels in the blood (14) Hyperuricemia is an independent risk factor for assessment of renal function (24). Uric acid levels in the blood often increase in patients with kidney damage (25,26). A person suffering from CKD also tends to experience problems with narrowing of his blood vessels, so checking cholesterol levels is very important as a measuring tool for CKD (27). Cholesterol measurement is actually more accurate to say as a risk factor that aggravates the condition of the kidney that has been damaged. Cholesterol assessment can also be used as a measure of the success of a self-management program.

CONCLUSION

Self-management programs within booklet with social cognitive therapy is an effective approach to increasing knowledge about CKD can improve self-regulation in patients with chronic kidney disease. Self-management programs can be carried out in the community with intensive follow up and also can improve health quality by lowering serum uric acid levels, serum cholesterol and blood pressure.

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