Combination Of SMS Reminder and Diary to Improve Diet Compliance Undergoing Hemodialysis

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Abstract: *Dietary adherence to chronic kidney disease (CKD) is an aspect that plays an important role as one of the keys to successful therapy, preventing condition worsening and rapid stage progression and uremic syndrome. Providing media aids such as diaries and SMS reminders is one of the methods to increase compliance. The purpose of this study was to analyze the increase in dietary adherence of CKD patients after being given diaries and SMS reminders. The method in this study was to use a quasi-experimental design with a pre-test and post-test case-control. The researcher chose this method because it was in accordance with the research design being carried out, namely knowing the effect of variables on the two groups and comparing the treatment group with the control group. The population in this study was 107 patients and the sample in this study consisted of 44 respondents who were divided into two groups. Sampling using an accidental sampling technique. Data collection was carried out using a diet adherence questionnaire. Data analysis was performed by paired t-test and independent t-test. The results of the paired t-test showed that there was an increase in dietary adherence after the intervention with a p-value of 0.001. The independent t-test showed that there were differences in dietary adherence in the intervention group and the control group after giving diaries and SMS reminders with a p-value of 0.000. Conclusion Diaries and SMS reminders can improve dietary adherence in CKD patients undergoing hemodialysis.*

Keywords: *Diary, Chronic Kidney Disease, Diet Compliance, SMS Reminder*
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INTRODUCTION

Chronic kidney disease failure is a condition in which the kidneys experience impaired function by decreasing the glomerular filtration rate so that they are unable to maintain a balance of metabolism, fluids, and electrolytes in the blood which causes accumulation of metabolic waste and uremia which progresses progressively and irreversibly (Ayunda & Priyantini, 2017; Hikmawati, 2019; Riahta & Yetti, 2020). Global Burden of Disease data in 2017 shows that chronic kidney failure ranks 18th as a cause of death in the world 2017. Based on the 2017 National Chronic Kidney Disease Fact Sheet in the United States, there are 30 million adults with chronic kidney disease (Putri, 2020). The growth rate of kidney failure patients in 2018 increased by 50% from the previous year (Manurung & Sari, 2020).

The results of the 2018 Riskesdas showed that the number of cases of CKD in Indonesia was 499,800 people (Putri, 2020). The 2014 Indonesian Renal Registry (IRR) stated that the province of West Java was the province with the highest number of hemodialysis patients, namely 5,029 with 3,348 active patients (Risnawati et al., 2020).

According to medical record data at the Ciamis Regency Hospital, the number of patients who visited CKD outpatients who underwent hemodialysis from January to October 2021 reached 8,447 patients, while 147 inpatients with CKD patients. Causes of CKD include glomerulonephritis (45%), diabetes mellitus (32%), hypertension (28%), heart attacks, polycystic kidney disease, pyelonephritis, drugs, and lifestyle (Kalengkongan et al., 2018; Priska & Herlina, 2019; Riahta & Yetti, 2020)

Chronic Kidney Disease is strongly influenced by the patient's lifestyle and diet and plays an important role in the quality of the patient's health. A good lifestyle will help maintain health status and disease stability, while patients who do not maintain dietary patterns and nutritional arrangements will experience worsening conditions with reduced kidney function, rapid stage progression, and uremic syndrome (Riahta & Yetti, 2020). Treatment of CKD patients can be done through kidney transplantation, hemodialysis, and peritoneal dialysis (Anisah & Maliya, 2021). Patients use more hemodialysis therapy, in this hemodialysis therapy patient compliance is one of the determinants of the success of therapy.

However, several studies have shown that many CKD patients have poor adherence to the recommended diet. Research (Rahayu, 2019) shows the non-compliance of CKD patients with the diet is 72.5%. Based Permata (2019) also stated that the level of adherence to the diet of CKD patients was lacking, namely 76.9% (Permata, 2019). This is in line with a preliminary study in the Hemodialysis Room of the Ciamis District Hospital through interviews, 7 out of 12 CKD patients tended to have poor adherence to the recommended diet. So based on this phenomenon, management needs to be done to overcome the problem of patient non-compliance with the diet to prevent the worsening of the condition. One of the management that can be done to improve adherence is to use a diary.

Based on research Marbun (2021) which examined the effect of diaries on the diet of CRF patients, it was stated that there was an increase in dietary compliance after being given a diary (Marbun et al., 2021). In addition, based on several other studies, the SMS (Short Message Service) method can also be used as a treatment to improve patient compliance. As Widiany (2018) conducted research on giving SMS reminders to hemodialysis patients to control albumin, it was found that giving SMS reminders were able to manage the patient's albumin levels(Widiany et al., 2018). So based on this, researchers are interested in combining the method of giving diaries and SMS reminders to improve dietary adherence in chronic kidney failure patients undergoing hemodialysis.

METHOD

This study uses a Quasi-Experimental method with a Case-Control Pre-Test and Post-Test design. The variables used in this study are the independent variables, namely diaries and SMS reminders, and the dependent variable, namely dietary compliance. The population in this study was 107 patients. Sampling used an accidental sampling technique with an experimental formula which resulted in a total sample or respondents of 44 patients divided into two groups, namely 22 patients for the intervention group and 22 patients for the control group. This research has been subjected to ethical trials by the Health Research Ethics Committee at Bakti Tunas Husada University with No. 191/ec.01/kepk-bth/VII/2022. The instrument in this study was a work diary containing identity, expectations, hemodialysis visit schedules, kidney function, material about CRF at a glance, hemodialysis material, life motto, patient diet material, dietary requirements material, calculation of nutritional needs, food ingredients, the impact of non-adherence, daily intake, urea and interdialytic weight gain material (Marbun et al., 2021). SMS reminder as a patient reminder media with examples of Indonesian vocabulary as follows:

"Assalamualaikum Wr.Wb, saya ……… perawat dari STIKes Muhammadiyah Ciamis. Bagaimana kabar bapak/ibu?.............. Apakah bapak/ibu sudah melakukan pola diet sesuai anjuran?......................
Mengingatkan kepada bapak/ibu bahwa diet gagal ginjal kronik merupakan hal yang sangat penting sehingga bapak/ibu diharapkan untuk selalu melakukan dan mematuhi anjuran diet agar dapat mencapai kualitas kesehatan yang baik dan maksimal. Terima kasih dan semangat selalu, semoga hari bapak/ibu menyenangkan. Wassalamualaikum Wr.Wb".

The questionnaire as a measuring tool for dietary adherence contains 21 statements and is valid with a value range of 0.458-0.928 with 13 favorable statements and 12 unfavorable statements. The scale used is a Likert scale with the options always, often, sometimes, and never. Compliance was measured using a compliance questionnaire which was assessed based on the respondent's answers, then compliance behavior was written in a diet diary, then the patient received an SMS reminder once a week for 4 weeks, and then compliance was measured again through a questionnaire. Data analysis using paired t-test and independent t-test. The questionnaire measuring instrument in this study was tested for validity on 20 respondents with the same characteristics in the Hemodialysis Room of the Ciamis District Hospital using the Pearson product-moment with the result that there were 4 questions with a value of r count <r table, so these questions could not be used as research instruments. The number of valid questions is 21 with a value range of r count 0.458 - 0.928 which means > 0.444 so they meet the requirements to be used as research instruments.

In this study uses primary data, namely data obtained directly from the respondents. Compliance data collection was carried out through questionnaires, respondents were asked to fill out and answer questionnaires. Before filling out the questionnaire, respondents filled out the availability sheet to become respondents first. Patient compliance behavior is recorded through a diet diary. Patients are given information about the chronic kidney failure diet and then given directions regarding procedures and what to write in a diary. Observations regarding patient dietary adherence were carried out using the SMS reminder method and a diet diary once a week for 4 weeks as a reminder message regarding dietary control so that adherence is achieved. After the intervention was carried out in the treatment group, adherence data was returned through questionnaires to the two groups so that the patient's dietary adherence was known to increase.

Data analysis carried out in this study are as follows: 1). Univariate analysis was performed to describe all the data variables studied. The data were analyzed using univariate categorical data which were analyzed using frequency distribution and percentage or proportion measures, while numerical data were analyzed by calculating the mean, standard deviation, maximum and minimum values with a 95% confidence interval (α = 0.05). 2). Bivariate analysis in this study was conducted to prove the hypothesis, namely, to see an increase in dietary compliance in kidney failure patients undergoing hemodialysis after using diaries and SMS reminders. Processing on bivariate analysis using SPSS computer tools and done numerically. Before the bivariate test, normality and homogeneity tests were carried out to see the distribution of the data, if the data were normally distributed, the bivariate test was carried out using a t-test, and if the data were not normally distributed, the bivariate test was carried out by using the non-parametric Wilcoxon and non-parametric Mann Whitney tests. The normality test uses the Shapiro-Wilk test, and the homogeneity test uses the One-way ANOVA test.

RESULTS

The research was carried out in the hemodialysis room at the Ciamis District Hospital from March to April 2022. The hemodialysis room at the Ciamis District Hospital is one of the places that meet the criteria of researchers in carrying out research after pre-research. The hemodialysis room at the Ciamis District Hospital has a fairly large patient population, namely 107 patients, making it easier for researchers to take samples.

This research was carried out by entering into a time contract and providing an explanation of the research method, then the respondent who agreed to the research contract signed a consent letter to become a respondent. Furthermore, the researchers conducted the first dietary compliance measurement by providing statements contained in the questionnaire to be answered honestly by the respondents. After measuring adherence, respondents were given information about diet through a diary as well as directions on how to fill it out and received reminder messages containing messages reminding them to always comply with dietary recommendations and the importance of dieting for CKD patients.

The results of data collection were then processed and analyzed based on each variable univariate and bivariate. Univariate analysis was conducted to see an overview of the frequency distribution and presentation of the variables. Meanwhile, bivariate analysis was carried out to see the comparison of the increase in the value of compliance in each variable. Data processing was carried out through a parametric paired t-test to see changes in increasing adherence to the CKD diet before and after giving diaries and SMS reminders. Meanwhile, the parametric independent t-test was conducted to see differences in changes in the increase in the intervention group and the control group. The use of analysis test paired t-test and independent t-test is used because the data scale used is the ratio and the data is normally distributed and homogeneous. The results in this study can be explained as follows:

Table 1. Frequency Distribution of Respondent Characteristics

Variabel	Intervention		Control	
	F	%	F	%
Age				
18-40 year	8	36.4	5	22.7
41-60 year	10	45.5	11	50.0
> 60 year	4	18.2	6	27.3
Gender				
Male	15	68.2	13	59.1
Female	7	31.8	9	40.9
Educational Level				
Elementary School	5	22.7	7	31.8
Junior high school	4	18.2	3	13.6
Senio high school	6	27.3	7	31.8
Collage	7	31.8	5	22.7
Profession				
Housewife	4	18.2	7	31.8
self-employed/trading	3	13.6	2	9.1
Government employees	4	18.2	2	9.1
Doesn't work	9	40.9	7	31.8
Etc	2	9.1	4	18.2
Hemodialysis duration				
< 1 years	4	18.2	6	27.3
1-2 years	3	13.6	4	18.2
> 1 years	15	68.2	12	54.5

Table 1 shows the age of most patients, namely 41-60 years of age, with 10 (45.5%) patients in the intervention group and 11 (50.0%) patients in the control group. Male patients had more quantity than women, namely 15 (68.2%) patients in the intervention group and 13 (59.1%) in the control group. The highest level of education in the intervention group was the high school with 6 (27.3%) patients and tertiary education with 7 (31.8%) patients. Meanwhile, in the control group, the highest level of education, namely elementary and high school, was 7 (31.8%) patients. In this study, respondents who did not work had the highest number, namely 9 (40.9%) patients in the intervention group and 7 (31.8%) patients in the control group. Respondents tended to have had hemodialysis for more than 1 year, namely, in the intervention group there were 15 (68.2%) patients and in the control group, there were 12 (54.5%) patients.

Table 2. Test Paired T-Test Before and After Administration Of The Diary And Sms Reminder

Groups		Mean	SD	Increase	p value
Intervention	Pre	59.45	5.829		
	Post	70.09	4.576	10.64	0.001
Control	Pre	58.68	4.379		
	Post	61.23	3.891	2.55	0.002

Based on table 2, shows that there was an increase in adherence to the CKD diet after giving diaries and SMS reminders in the intervention group with a p-value of 0.001. Likewise in the control group, there was an increase in dietary adherence after the intervention with a p-value of 0.002.

Table 3. Independent T-Test Before and After Giving Diaries And Sms Reminders

Groups	Pre				Post			
	Mean	SD	Difference	*P Value*	Mean	SD	Difference	*P Value*
Intervention	59.45	5.829			70.09	4.576		
			0.77	0.622			8.86	0.000
Control	58.68	4.379			61.23	3.891		

Based on table 3, it shows that there are differences in adherence values in the two groups after the intervention of providing diaries and SMS reminders with a p value of 0.000 (<0.05). Meanwhile, before the intervention, it was known that there was no difference in the value of compliance with a p value of 0.622 (> 0.05).

DISCUSSION

Paired t-test showed an increase in both the control and sample. These results are in line with research (Marbun et al., 2021) which examined the effect of diaries on dietary adherence where the results showed that there was a change in dietary adherence after being given counseling with diaries. Research (Widiany, 2017) also mentions that giving SMS reminders can increase patient compliance.
Both groups in this study experienced increased dietary adherence. Increased compliance in the control group can occur due to several factors, one of which is the existence of family support. As (Widiany, 2017) states that family support can affect dietary adherence. In addition, the number of respondents aged 41-65 years in the control group was more, which could affect dietary adherence. In Masulili (2017) it is explained that at this age a person has a mature mind and tends to comply with health programs (Masulili & Serly, 2017). Although there was an increase in adherence in the two groups, the increase in adherence in the intervention group was more significant than in the control group. This proves that respondents who were given diaries and SMS reminders experienced a higher increase within 4 weeks.

Education through diaries can make it easier for readers to get information because they can be read repeatedly and the information contained in the book is written clearly so that it is easy to understand (Mahyuvi & Hasina, 2021; Marbun et al., 2021; Mikhael et al., 2018). Diaries are used by patients to manage themselves both in medication and diet. Increased adherence occurs because filling in the diary successively can make a good habit for the patient so that the patient is always obedient to the diet (Khoiriyyah & Ediati, 2015).

The habit of people seeking information through social and digital media makes using SMS reminders easy for patients to get information and remember health programs such as diets (Marbun et al., 2021). Providing SMS reminders is able to increase dietary adherence because through SMS reminders the interaction between patients and health workers is well established. Patient interactions with health workers through communication can increase compliance because someone who gets attention will find it easier to receive advice (Widiany & Afriani, 2019).

The independent test sample t-test showed that there was a significant difference so these results were in line with the study of the effect of diaries on adolescents with arthritis by (Stinson et al., 2008) which resulted in an increase in adherence of 72.0% and 70.5%. The results of this study are also in line with research Lubis (2016) which examined that SMS reminders can increase diabetic patient adherence to treatment, namely as much as 81.3% (Lubis, 2016).

Differences in adherence occur because diaries are used as a medium for self-management and self-monitoring regarding dietary patterns that are carried out (Khoiriyyah & Ediati, 2015) The use of print media such as diaries as information aids can have an impact on increasing dietary adherence because the sense of sight can capture as much as 75% to 87% of knowledge (Hidayah & Sopiyandi, 2019; Marbun et al., 2021) . Print media such as diaries and booklets can be taken home and studied independently and can be read repeatedly making it easier for patients to get information (Daryani et al., 2021).

The use of social media such as WhatsApp has become a dependency and a large source of information, making it a vehicle for providing health information to increase adherence (Yasa et al., 2020). SMS and WhatsApp are also cheap and easy communication media so respondents are not burdened to get information through these media (Zia et al., 2021). The combination of giving diaries and SMS reminders is very effective in increasing compliance. Research (Riyanto, 2021) explains that an increase in knowledge, attitude, and compliance of young women in taking blood-boosting tablets occurs after three months of health promotion interventions using the WhatsApp application. Meanwhile, based on the results of this study, giving diaries and SMS reminders can improve adherence after 4 weeks of intervention.

CONCLUSION

The conclusion from the results of this study is that there is an increase in adherence to the CRF diet after being given a diary and an SMS reminder. In addition, there were differences in the value of dietary compliance in the intervention group and the control group after being given a diary and an SMS reminder. The mean value of adherence to the CRF diet before and after being given the diary, in the intervention group was higher than in the control group. So the combination intervention of diaries with SMS reminders is expected to be one of the interventions to improve.

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