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The effectiveness of education video and booklet media in knowledge of fluid restrictions among patients with chronic kidney disease

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Abstract

Background: The effects of chronic kidney disease (CKD) is fluid retention caused by excessive fluid intake. Lack of knowledge about fluid restriction can be the cause of fluid retention. Health education interventions can overcome this problem because having good knowledge about fluid restriction can affect the success of hemodialysis therapy.
Purpose: To determine the effectiveness of education video and booklet media in knowledge of fluid restrictions among patients with chronic kidney disease.
Method: The research uses a quasi-experimental design with the two groups pre-test post-test design. The population was CKD patients undergoing hemodialysis (HD). Sample is based on the inclusion and exclusion criteria that have been built and the sample is 30 HD patients.
Results: Based on independent sample t-test test, the p value was 0.001 (<0.05) so it can be concluded that there is a difference between interventions with booklet and video.
Conclusion: Fluid restriction education to CKD patients undergoing hemodialysis with booklet and video had an effect on the leveled of patient knowledge which characterized by an increased in post-tested scores compared to the pre-tested. There was a difference in influenced between fluid restriction education for patients with CKD undergoing hemodialysis with booklet and video where booklet media is more effective than video.

Keywords: Chronic Kidney Disease; Fluid Restriction; Health Education.

INTRODUCTION

Chronic Kidney Disease (CKD) is a condition in which the kidneys are structurally or functionally abnormal and persist for more than 3 months. Chronic kidney disease is progressive and irreversible, which is not reversible in advanced cases. patients with chronic kidney failure disease, when kidney function decreases significantly and the glomerular filtration rate (LFF) is <15ml/min/1.73m2, is called chronic renal failure (Putri, Mongan, & Memah, 2016).

Chronic renal failure (CKD) has become one of the leading causes of death and suffering in the 21st century. Partly due to increasing risk factors, such as obesity and diabetes, the number of CKD patients is also increasing, affecting an estimated 843.6 million people worldwide in 2017 (Jager, Kovesdy, Langham, Rosenberg, Jha, & Zoccali, 2019).

The prevalence of patients with chronic kidney disease in Indonesia increases every year: the prevalence of chronic kidney disease in 2013 was 0.2% and increased to 0.38% in 2018. The number of patients actively undergoing hemodialysis increased from 77,892 patients in 2017 to 132,142 patients in 2018. In Indonesia, male experienced chronic kidney disease with 4.17%, while the female experienced 3.52% (Minister of Health of the

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Republic of Indonesia, 2018). CDC states that CKD is more common in people aged 65 years or older (38%) than people aged 45-64 years (12%) or 18-44 years (6%) (Centers for Disease Control and Prevention, 2021).

Patients with chronic kidney disease require treatment such as kidney transplantation, peritoneal dialysis, hemodialysis, and outpatient care over a long period of time. Signs of incurable chronic renal failure patients with chronic renal impairment is performed two or three times a week with a duration of four to five hours per hemodialysis. Hemodialysis is usually performed throughout the patient's life. The goal of hemodialysis in patients with CKD is to correct fluid and electrolyte imbalances and eliminate residual protein metabolism (Black & Hawks, 2014).

Hemodialysis in patients can prevent death. However, hemodialysis treatment does not cure or improve kidney disease and cannot compensate for the loss of renal metabolic or endocrine function or provide treatment that improves the patient's quality of life. Compliance with hemodialysis affects quality of life (Alfarisi & Maliya, 2019).

One of the main needs is water. In "One Day Care" for hemodialysis patients, fluid is one of the nurse's focus areas along with oxygen, nutrition, elimination, protection, and function (Isroin, 2016).

Fluid imbalance in chronic renal failure patients undergoing hemodialysis must be controlled because if fluid intake and output are not controlled, it will cause fluid imbalance problems that have an impact on more serious health complications. Most hemodialysis patients do not comply with fluid intake restrictions and often fight them due to excessive thirst, experiencing hot weather, and not being remembered by family members.

Adherence means that patients must follow treatment regimens such as diet and fluid management for kidneys with impaired perfusion problems. Some studies report that factors that influence patient compliance are knowledge, social support, and self-efficacy (Sulistyaningsih, 2019).

In the care of patients with chronic kidney disease, one important element that needs to be considered is the provision of health education with a family approach, or family support. To achieve therapeutic success, the quality of interpersonal relationships between nurses, patients, and medical staff is closely related to treatment compliance. Therefore, to achieve therapeutic success, patients, nurses, and medical staff must receive supportive health education and family support approaches (Mahyuvi & Hasina, 2021).

Nurses can help patients reduce and control fluids is by providing health education. Traditional methods such as brochures, books, booklets, and sheets of paper are still used in health services. However, learning with video media, especially in the context of fluid restriction, is still rarely used.

Research in Riau showed a significant difference in understanding of fluid intake restrictions and IDWG in hemodialysis patients in the experimental group before and after individual health education (Hasneli, 2015). Research in Purworejo showed a significant difference between the intervention group before and after education was given (Relawati, Pangesti, Febriyanti, & Tiari, 2018).

This study aims in general to determine the difference in the effect of giving booklets with learning videos on the knowledge of fluid restriction of hemodialysis patients.

RESEARCH METHOD

The research uses a quasi-experimental design with the two groups pre-test post-test design. This research was conducted at Sebelas Maret University Hospital in March 2024 on patients undergoing hemodialysis. This research has gone through ethical approval from the Research Ethics Commission of the Sebelas Maret University with ethical number 29/UN27.06.11/KEP/EC/2024.

Sampling in the study using purposive sampling technique. In this study the number of samples used was 30 respondents with details on patients with health education treatment using video were 15 participants and health education treatment using booklet media were 15 participants. The inclusion criteria in this study were patients who received hemodialysis therapy twice a week, patients who were willing to participate in the study, and patients who had a cell phone or electronic device to view videos. Exclusion criteria in this study were patients who were blind, deaf, and illiterate. The independent variable in this study is videos and booklets media. The dependent variable is knowledge about fluid restriction.

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Before the intervention, the researcher gave the participants a pre-test sheet, after which a booklet or video about fluid restriction was given to the participants with details of 15 people getting education with a booklet and 15 people getting education with a video. Participants took the booklet or video home and studied the fluid restriction material at home. Participants were asked to study the booklet and video that had been given once a day, and on the next hemodialysis, the researcher gave a post-test sheet.

For the knowledge questionnaire, the author used the Guttman scale, where the Guttman scale uses yes and no answers. Of the 14 statements that the author will convey regarding the knowledge of chronic kidney failure patients about hemodialysis with the answer "yes is worth 1 (one) and no is worth 0 (zero), with the criteria: low if the score is 0-5; moderate: 6-10 and high: 11-14. The data analysis used in this study was the independent sample t-test, which is used to determine whether two unrelated samples have different averages.

RESEARCH RESULTS

Table 1. Characteristics of Participants

Variable	Group	
	Booklet (n=15)	Video (n=15)
Age (n/%)		
(Mean±SD)(Range)(Year)	(56.66±13.143)(28-75)	(49.6±11.814)(23-66)
< 25	0/0	1/6.7
25 – 45	3/20	3/20
46 – 70	9/60	11/73.3
> 70	3/20	0/0
Gender (n/%)		
Male	9/60	7/46.7
Female	6/40	8/53.3
Occupation (n/%)		
Unemployment	11/73.3	7/46.6
Government Employees	0/0	1/6.7
Teacher	1/6.7	1/6.7
Entrepreneur	2/13.3	3/20
Other	1/6.7	3/20
Education (n/%)		
Elementary School	3/20	0/0
Junior High School	4/26.7	3/20
Senior High School	3/20	8/53.3
University	5/33.3	4/26.7
Duration of Chronic Kidney Disease (n/%)		
< 1 Year	2/13.3	2/13.3
1 - 2 Years	6/40	4/26.7
3 – 4 Years	4/26.7	4/26.7
> 4 Years	3/20	5/33.3

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Knowledge Level Pretest (n/%)		
Moderate	11/73.3	10/66.7
High	4/26.7	5/33.3
Knowledge Level Posttest (n/%)		
Moderate	5/33.3	2/13.3
High	10/66.7	13/86.7
Blood Pressure Pretest (Mean±SD)(Range)(mmHg)		
Systolic	(147.53±14.67)(123-179)	(145.27±29.90)(100-211)
Diastolic	(73.73±9.24)(61-97)	(72.67±11.20)(50-92)
Blood Pressure Posttest (Mean±SD)(Range)(mmHg)		
Systolic	(147.13±11.17)(126-165)	(139.93±28.91)(105-187)
Diastolic	(72.33±10.78)(53-95)	(69.93±10.52)(54-93)
Interdialytic Weight Gains (IDWG) (Mean±SD)(Range)		
Pretest	(4.72±1.50)(2.1-7.1)	(4.54±2.02)(1.1-9.5)
Posttest	(3.50±1.40)(1.6-6.0)	(3.06±1.04)(0.9-4.2)

From table 1, it is known that the characteristics of participants in the booklet group are on average with age and standard deviation (56.66±13.143) with an age range between 28 to 75 years, the majority are male with a total of 9 (60%), unemployed as many as 11 (73.3%), with university education as many as 5 (33.3%), and the duration of kidney failure between 1-2 years as many as 6 (40%). While in the video group with an average and standard deviation of age (49.6±11.814) and a range between 23 to 66 years, the majority are female as many as 8 (53.3%), unemployed as many as 7 (46.6%), with the last high school education as many as 8 (53.3%), and the duration of kidney disease is more than four years as many as 5 (33.3%).

The average results of the initial knowledge level (pre-test) in the booklet intervention group were 11 (73.3%) respondents had a moderate level of knowledge and 4 (26.7%) respondents had a high level of knowledge, while the results of the final knowledge level (post-test) in the booklet intervention group were 5 (33.3%) respondents had a moderate level of knowledge and 10 (66.7%) respondents had a high level of knowledge. The average results of the initial knowledge level (pre-test) in the video intervention group were 10 (66.7%) respondents had a moderate level of knowledge and 5 (33.3%) respondents had a high level of knowledge, while the results of the final knowledge level (post-test) in the video intervention group were 2 (13.3%) respondents had a moderate level of knowledge and 13 (86.7%) respondents had a high level of knowledge.

The average initial blood pressure (pre-test) in the booklet intervention group was 147.53 mmHg (14.67) in systolic with a minimum value of 123 mmHg and maximum value of 179 mmHg, 73.73 mmHg (9.24) in diastolic with a minimum value of 61mmHg and maximum of 97 mmHg, while the average final blood pressure (post-test) in the booklet intervention group was 147.13 mmHg (11.17) in systolic with a minimum value of 126 mmHg and maximum value of 165 mmHg, 72.33 mmHg (10.78) in diastolic with a minimum value of 53 mmHg and a maximum value of 95 mmHg. The average initial blood pressure (pre-test) in the video intervention group was 145.27 mmHg (29.90) in systolic with a minimum value of 100 mmHg and a maximum value of 211 mmHg, 72.67 mmHg (11.20) in diastolic with a minimum value of 50 mmHg and a

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maximum value of 92 mmHg, while the average final blood pressure (post-test) in the video intervention group was 139.93 mmHg (28.91) in systolic with a minimum value of 105 mmHg and a maximum value of 187 mmHg, 69.93 mmHg (10.52) in diastolic with a minimum value of 54 mmHg and a maximum value of 93 mmHg.

The average result of initial IDWG (pre-test) in the booklet intervention group was 4.72% (1.50) with a minimum value of 2.1% and a maximum value of 7.1% and the average result of final IDWG (post-test) in the booklet intervention group was 3.50% (1.40) with a minimum value of 1.6% and a maximum value of 6.0%. While in the video intervention group the average pre-test IDWG was 4.54% (2.02) with a minimum value of 1.1% and a maximum value of 9.5% and the average result of the final IDWG (post-test) in the video intervention group was 3.06% with a minimum value of 0.9% and a maximum value of 4.2%.

Table 2. Independent Sample T-Test

Variable	Mean	t	p-value
Booklet Intervention Pretest	9.67	3.87	0.001
Booklet Intervention Posttest	11.80	3.87	0.001
Video Intervention Pretest	9.60	4.05	0.001
Video Intervention Posttest	11.60	4.05	0.001

In table 2, it is known that the average before health education on fluid restriction with booklet media was 9.67 (moderate knowledge level) and increased to 11.80 (high knowledge level) after respondents received health education on fluid restriction with booklet media. There is an average increase of 2.13 so that the statistical test results obtained t-count 3.87. The table above also presents the average value before the restriction health education with video media was 9.60 (moderate knowledge level) and increased to 11.60 (high knowledge level) after respondents received fluid restriction health education with video media so that the statistical test results obtained t-count 4.05. The result of this research is p-value = 0.001, With a p-value <0.05, H0 is rejected, resulting in the conclusion that there is a change in the knowledge of respondents in the booklet media group between before and after being given health education on fluid restriction.

Table 3. Paired Sample T-Test

Intervention	Mean	t	p-value
Booklet	2.13	-9.90	0.001
Video	2.00	-9.16	0.001

Based on table 3, the results of the paired sample t-test obtained with the average difference in the pre-test and post-test values of the booklet intervention is 2.13 and the video is 2.00. The significance value of the booklet and video intervention is 0.001 <0.05, which means that there is a difference in the level of knowledge after being given a fluid restriction health education intervention through booklet and video media. Based on the results of statistical tests, it can be concluded that booklet media is more effective than video media in increasing knowledge of fluid restriction in hemodialysis patients at Sebelas Maret University Hospital.

DISCUSSION

Based on the results of age distribution in the booklet or video intervention group, the majority of respondents had ages in the range of 45-70 years, which consisted of 20 participants or 66.7% with details of 9 (60%) participants aged 45-70 received booklet interventions and 11 (73.3%) received video

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interventions. As age increases, kidney function will also decline, resulting in a decrease in the rate of glomerular excretion and tubule function will also decline. On a small and normal scale, decreased kidney function is normal as long as it does not cause abnormalities and symptoms. However, if the decline in kidney function occurs rapidly and progressively, this can cause various abnormalities and symptoms for sufferers ranging from mild to severe symptoms, this condition can be interpreted as kidney failure. Based on this study, it means that age is one of the risk factors for kidney failure (Lamprea-Montealegre, McClelland, Grams, Ouyang, Szklo, & De Boer, 2018).

Based on occupation, the majority of patients with kidney failure are not working, namely 11 (73.3) patients with booklet intervention and 7 (46.7%) with video intervention. Apart from the age factor, respondents also did not work because they reduced physical activity. The activity level of hemodialysis patients decreased by 20-50%. This is influenced by the declining health conditions of patients and psychological factors (Rosiah et al. 2017). Activity restrictions are carried out because of complaints felt by patients ranging from leg cramps, difficulty sleeping, and fatigue, which of course these factors can interfere with patient activities.

The characteristics of respondents based on gender were male respondents with a total of 9 (60%) booklet intervention respondents and 7 (46.7%) video intervention respondents, while the female gender was 6 (40%) booklet intervention group respondents and 8 (53.3%) video intervention respondents. Based on education, the majority in the booklet intervention were college as many as 5 (33.3%) respondents and in the video intervention the majority were respondents with high school education, namely a total of 8 (53.3%) respondents. One of the factors that influence achievement in improving health education is the level of education. The higher a person's level of education, the easier it will be for that person to digest the information obtained, the level of education in a community can help the community's ability to understand and digest health education information (Artini, Maliya, & Sudaryanto, 2014).

Distribution based on the length of time suffering from kidney failure, the majority of booklet intervention respondents had suffered from kidney failure for 1-2 years, namely as many as 6 (40%) respondents and the majority of respondents with video intervention suffered from kidney failure for more than 4 years, namely as many as 5 (33.3%) respondents.

Based on the respondents' blood pressure, the average initial blood pressure (pre-test) in the booklet intervention group was 147.53 mmHg in systolic and 73.73 mmHg in diastolic, while the average final blood pressure (post-test) in the booklet intervention group was 147.13 mmHg in systolic and 72.33 mmHg in diastolic. In the video intervention group, 151.60 mmHg was obtained in systolic and 76.80 mmHg in diastolic, while the average final blood pressure (post-test) in the video intervention group was 139.93 mmHg in systolic and 69.93 mmHg in diastolic. The average diastolic number of respondents was at a fairly high blood pressure level of more than 140 mmHg, this shows that there is a relationship between hypertension and the incidence of chronic kidney failure (Cahyo, Nursanto, Risanti, & Dewi, 2021).

The average result of initial IDWG (pre-test) in the booklet intervention group was 4.72% with a maximum value of 7.1% and a minimum value of 2.1%, while in the video intervention group it was 4.54% with a maximum value of 9.5% and a minimum value of 1.1%. The average result of the final IDWG (post-test) in the booklet intervention group was 3.50% with a maximum value of 6% and a minimum value of 1.6%, while in the video intervention group it was 3.06% with a maximum IDWG value of 4,2% and a minimum value of 0.9%. High IDWG rates can cause symptoms to patients such as nausea, muscle cramps, and shortness of breath (Goto, Forsberg, Jonsson, Matsuda, Nilsson, Ekdahl, Henein, & Stegmayr, 2021). Factors that can affect IDWG include age, gender, education level, thirst, stress, family support, and knowledge level (Keane, Raimann, Zhang, Willetts, Thijssen, & Kotanko, 2021).

The average result of the initial knowledge level (pre-test) in the booklet intervention group is at a medium level of knowledge with a percentage of 73.3% or as many as 11 respondents, while the average result of the final knowledge level (post-test) in the booklet intervention group is at a high level of

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knowledge, namely 10 (66.7%) respondents. The average result of the initial knowledge level (pre-test) in the video intervention group was at a medium level of knowledge with a percentage of 66.7% or as many as 10 respondents, while the average result of the final knowledge level (post-test) in the video intervention group was at a high level of knowledge, namely 13 (86.7%) respondents. Increasing patient knowledge is important in managing hemodialysis patients with kidney failure, in the care of patients with chronic kidney disease, one important element that needs to be considered is the provision of health education. To achieve therapeutic success, the quality of interpersonal relationships between nurses, patients, and medical staff is closely related to medication adherence. Therefore, to achieve therapeutic success, patients must receive supportive health education and family support approaches (Mahyuvi & Hasina, 2021).

The level of knowledge of Sebelas Maret University Hospital hemodialysis patients before being given fluid education intervention has a sufficient level of knowledge after being given the intervention of providing fluid restriction health education with booklet and video media can be said to be good because it increases the level of knowledge.

This is in line with research in Denpasar, Bali which states that there is a significant and positive relationship between the level of knowledge and the dimensions of quality of life in terms of symptoms experienced and physical health (Desy, Nila, & Mahadri, 2022).

Knowledge is information, skills, and understanding obtained from education and experience. The level of knowledge is generally related to a person's ability to remember things they have learned (Swarjana, 2022).

This study showed a change in knowledge before and after the intervention between two groups, namely the booklet intervention group and the video intervention group.

Changes in booklet media intervention can be seen from the pre-test value of 9.67 and post-test of 11.80. Then the p value of 0.001 (<0.05) then H0 is rejected, meaning that there is an average difference between the values before and after health education on fluid restriction with booklet media.

Changes in video media interventions can be seen from the pre-test value of 9.60 and 11.60. Then the p value of 0.001 (<0.05) then H0 is rejected, meaning that there is an average difference between the values before and after fluid restriction health education with video media.

This is in line with research at the Pasundan Health Center which proves that there is an influence of video media on the knowledge and interest of primagravida mothers about postpartum family planning and likewise with booklet media which has an influence on the knowledge and interest of primagravida mothers about postpartum family planning (Anwar, Kalsum, & Siregar, 2023).

Based on the average value after the intervention, the average value after intervention with booklet media is greater than intervention with video media, namely 2.13 compared to 2.00. Interventions carried out in the booklet and video fluid restriction health education groups obtained a p value of 0.001 (<0.05) so it can be concluded that there is a significant difference between interventions with booklet and video media. The results showed that both media were equally effective for fluid restriction education to patients. Respondents with booklet media interventions are more effective than video media interventions (seen from the magnitude of t count more than t table).

This study is in line with research at the Gayamsari Health Center, Semarang City, which stated that booklet media is more effective than animated video media in increasing husbands' knowledge about postpartum danger signs (Karyaningtyas, Martanti, & Widyastuti, 2020).

The use of booklet and video media has its own advantages. In the group with fluid restriction education intervention media with booklets, it is known that there are changes in respondents' knowledge where respondents usually read booklets repeatedly with contents that are easy to understand. Respondents can also reopen the previous page without asking other family members to replay or rewind the video.

CONCLUSION

Providing fluid restriction education to CKD patients undergoing hemodialysis with booklet and video media has an effect on the patient's level of

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knowledge which is characterized by an increase in post-test scores compared to the pre-test. There is a difference in influence between fluid restriction education for patients with renal failure undergoing hemodialysis with booklet and video media where booklet media is more effective than video in providing fluid restriction education.

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