Effectiveness of the Nurse-led Self and Family Management Support Program among Adults with Early-stage Chronic Kidney Disease: A Randomized Controlled Trial

Rostikorn Khwanchum, Linchong Pothiban, Tipaporn Wonghongkul, Sumalee Lirtmulikaporn*

Abstract: Chronic kidney disease is a significant health problem that leads to severe complications and premature death. Adults with early-stage chronic kidney disease need to maintain renal function and prevent the progression, which can be achieved through effective self-management. This randomized controlled trial with a two-arm pre-post-test aimed to investigate the effectiveness of the Nurse-led Self and Family Management Support Program for increasing disease knowledge and self-management among adults with early-stage chronic kidney disease. The sample consisted of dyads of 64 adults with the disease and their family members. The dyads were randomly assigned to the experimental arm (n = 32) and the control arm (n = 32). The experimental arm received the Nurse-led Self and Family Management Support Program, while the control arm received only usual care. Data were collected using a demographic data recording form, the Disease Knowledge Scale, and the Chronic Kidney Disease Self-Management Scale. Data analysis was undertaken using descriptive statistics, two-way repeated measures ANOVA with post hoc tests, and independent t-test.

From the results, the participants in the experiment arm had better disease knowledge and self-management than the control group at 4, 8, and 12 weeks after the program and were better than before the program. Nurses can apply this program to encourage individuals and family members to be involved in providing all aspects of support for self-management for adults with early-stage chronic kidney disease. However, further testing in other settings is needed.

Keywords: Disease knowledge, Early-stage chronic kidney disease, Family support, Nursing, Self-management

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Introduction

Chronic kidney disease (CKD) is becoming a significant problem for public health and is the 12th most common cause of death,[1] accounting for 1.2 million deaths worldwide.[2] Globally, CKD affects 697.5 million people or 9.1% of the world's population, with early-stage CKD accounting for almost 10%.[1] The prevalence of CKD is increasing, with low- and middle-income nations experiencing the highest growth, especially in Asian countries.[3] In Thailand, the prevalence rate of CKD was 10,292 per 100,000 people.[1] Between 2015 and 2022, the prevalence of diabetes and hypertension,[4] suggested that CKD is likely to increase continuously.

Early-stage CKD is the critical period for disease management because, during these stages, sufficient

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restoration of vascular tissues is possible through neo-angiogenesis mechanisms,[5] indicating an opportunity for slowing disease progression and improving renal outcomes. Effective self-management allows people with CKD (PW-CKD) to live with this disease. Self-management contributed to a slower decline in the estimated Glomerular Filtration Rate (eGFR) and improved urine protein creatinine ratio.[6] Unfortunately, 70.33% of adults with early-stage CKD in Thailand have a low level of overall self-management behaviors[7] to delay kidney progression. Poor self-management leads to worse clinical outcomes, particularly eGFR and high blood pressure, which increases the need for dialysis.[8] Suboptimal self-management is related to poor disease knowledge,[9] which is a prerequisite to understanding the need for change in behavior and lifestyle practices. Notably, adults with early-stage CKD are likely asymptomatic, making them not concerned about their disease and not seeing the need for strictly controlling their self-management behavior.[10]

Various types of support are needed to achieve self-management, especially from family members. In the Thai context, most people with chronic illness live within a family,[11] so family members are major sources of support to them. Families can directly supervise medical regimens, particularly medication taking and lifestyle modifications, and follow-up and can encourage the sufferer when facing frustration over the long course of chronic care. They can also provide information for self-management.[12] For early-stage CKD, family members assume a variety of commitments, such as organizing transportation to consultations to coordinate care, supporting dietary management, fostering a setting that supports sustaining daily activities to control CKD, and providing guidance in day-to-day activities.[13]

Nurses are essential to support both adults with CKD and family members to understand CKD and their roles, including adherence to the treatment, nutrition, prevention and management of complications, and follow-up, as well as train them to monitor blood pressure, blood glucose, and body weight.[14] Thus, this study intended to develop and test the effectiveness of the Nurse-led Self and Family Management Support Program (N-SFSP) among adults with early-stage CKD.

Conceptual Framework and Review of Literature

Individual and Family Self-Management Theory (IFSMT)[15] guided this study. Self-management is described as a process involving how an individual and family utilize knowledge, beliefs, self-regulation abilities and skills, and social facilitation to attain health-related outcomes.[15] There are three dimensions of self-management: context, process, and outcomes. For context, self-management is influenced by the condition-specific risk and protective factors, physical and social environments, individuals, and families. From the literature review, the important contextual factors of CKD self-management include the individuals' characteristics (i.e., knowledge[9] and awareness of CKD[10]) and the family's characteristics, particularly the family's capabilities to provide support, information, and guidance in coping with problems in CKD self-management.[12] Contextual dimension elements have a direct impact on outcomes, as well as on how individuals and families engage in the self-management process. Interventions focusing on the context can lower risk or create environments encouraging self-management.[15] Then, the process of self-management consists of beliefs, knowledge, capabilities to self-regulate, and facilitation from others. Individuals tend to adopt the advised health behavior if they are informed about and adopt a health belief compatible with their behaviors if they have self-regulatory skills to modify their behavior, and if they are exposed to social facilitation supporting them in adopting health practices. Improving the self-management process for individuals and families leads to more favorable proximal (i.e., self-management behavior) or distal (i.e., improved health status) outcomes.[15]

According to the IFSMT, the family is one unit with the individuals.[15] Changes occurring to a family member cause a shift in the entire family structure. As a result, the family serves as the focal point of care, empowering individuals to engage in effective self-management strategies and ongoing practice. For adults with early-stage CKD, family acts as the main source of support through interaction and assistance that make it easier to handle stressful situations, including emotional, informational, instrumental, and appraisal support.[16] Additionally, cooperation between families and health providers helps to increase awareness of health issues or actual health practices. Nurses who are the closest health providers to the individuals and families[14] can teach family members how to provide support using proper educational strategies to increase family members' capabilities to support adults with early-stage CKD. Therefore, adults with early-stage CKD will have higher knowledge and self-regulation abilities, enabling the development and maintenance of self-management to perform medical management, including medication taking and lifestyle modification, role management to live with the illness and other members of society, and emotional management to cope with the emotional effects of CKD and maintain their mental health.[17,18]

Systematic reviews of studies in chronic conditions showed that nurse-led programs contributed to better disease knowledge and self-management skills in both the clients and family members by motivating lifestyle adjustments and integration of self-management into their lives.[19,20] Nurse-led counseling offers information, knowledge, and understanding about CKD and helps families achieve a new outlook in CKD care.[21] Another systemic review on nurse-led self-management programs in non-dialysis CKD revealed that comprehensive interventions (lifestyle changes coupled with health behavior adjustments) could improve exercise capacity and lower blood pressure, C-reactive protein, and proteinuria.[22] Nevertheless, those programs did not involve family members providing continuous patient support, and nurses are required to enhance family support for early-stage CKD. In Thailand, there was a program that involved family members and a multidisciplinary team to enhance self-management and delay kidney progression in adults with early-stage CKD.[23] The results included higher CKD knowledge and better self-management. They improved eGFR, but it focused on family participation with the multidisciplinary team rather than promoting family members' ability to assist patients as a main source of support. Moreover, two programs focused on individual and family support for individuals with diabetic retinopathy[24] and people with stage 3 CKD,[25] which led to better self-management,[24,25] lower HbA1C,[24] and lower blood pressure.[25] However, these programs were conducted in older people over 60 years, so the findings from these programs might not be generalizable to adults. There was no specific detail on the training provided to strengthen the family's ability to support adults with early-stage CKD, which indicates that the knowledge of enhancing family support is limited.

Study Aim and Hypotheses

This study aimed to examine the effect of the Nurse-led Self and Family Management Support Program (N-SFSP) on increasing disease knowledge and self-management of adults with early-stage CKD. It was hypothesized that adults with early-stage CKD receiving the N-SFSP would have better disease knowledge and self-management than those receiving only usual care. Disease knowledge and self-management of adults with early-stage CKD at 4, 8, and 12 weeks after the program ended would be better than before receiving the program.

Methods

Design: A randomized controlled trial (RCT) with a two-arm pre-post-test parallel trial was employed and reported following the Consolidated Standards of Reporting Trials (CONSORT).

Sampling and Settings: Sample size calculation was performed utilizing the power table for ANOVA for more than three groups' mean test[26] with a significance level of .05 and power of .80. Without similar research in Thailand, we employed the effect size of 0.5; that is the minimum effect size considered acceptable in RCT.[26] From the calculation, the number of participants was 29 per arm, with an additional 10% for possible dropout.[26] Therefore, the sample consisted of 32 dyads of adults with early-stage CKD and family per arm.

Participants were selected from a province in southern Thailand through multi-stage random sampling. Firstly, one province was randomly selected from 14 provinces; then, one district was selected from the 19 districts of the selected province using simple random sampling. Next, one sub-district was randomly selected from the selected district. After that, the participants were purposively selected from the registry in the chosen community hospital based on the inclusion criteria. The inclusion criteria for adults with early-stage CKD were: 1) age 40-60 years; 2) cognitively intact with a score of more than 23 points on the Thai Mental State Examination (TMSE); 3) able to understand, speak, read, and write in the Thai language; and 4) having at least primary education. The exclusion criteria included a progression of kidney function that required renal replacement therapy. Then, the adults with early-stage CKD identified their family members who were also screened using the inclusion criteria: 1) living with adults with early-stage CKD; 2) identified by adults with CKD as the significant person involved in daily caregiving; 3) cognitively intact assessed using the TMSE with a score of more than 23 points; 4) having at least primary education; and 5) able to understand, speak, read, and write in the Thai language. The exclusion criteria included psychological problems. Discontinuation criteria were: 1) inability to participate throughout all activities and 2) moving out of the province.

Initially, 100 adults with early-stage CKD were approached, but only 64 met the criteria. All participants stayed in the study for the whole time frame, and 32 participants in each arm were ultimately used for data analysis (**Figure 1**).

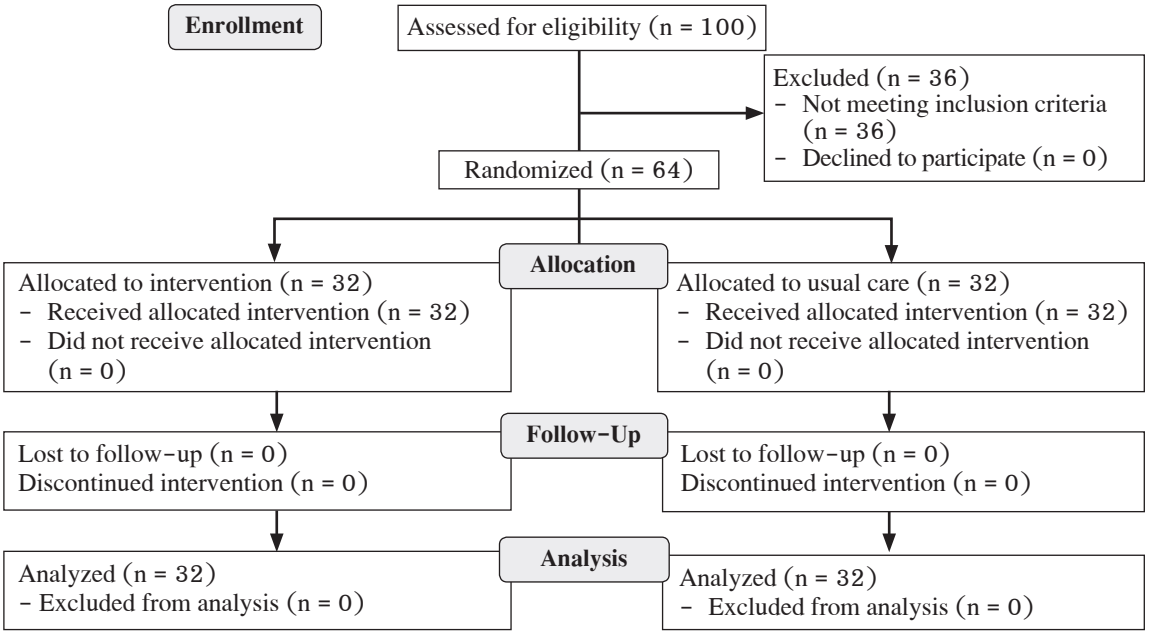

Figure 1. Flowchart of randomization

Randomization: The participants were randomly assigned to the experimental and control arms using the permuted block design procedure with a block size of four using sequential numbers put in sealed opaque envelopes, with six possible permutations of the treatment among four participants, EECC, ECEC, ECCE, CEEC, CECE, and CCEE. Two additional participants were included to guarantee an equal number of individuals for each treatment group. A nurse who had no involvement in the trial performed central allocation concealment.

Ethical Considerations: Approval was obtained from the Research Ethics Committee of the Faculty of Nursing, Chiang Mai University (No. 2020-FULL028) and the Ethics Committee of Surat Thani Provincial Public Health Office. All participants received a detailed explanation of the study, objectives, protection of their rights, and potential risks and benefits. Participation in the study was entirely voluntary, and there was no impact on their access to medical care if they decided not to participate or refused to answer any questions. For the home visit, the primary investigator (PI) maintained respect for privacy and made an appointment for a home visit based on the participant's convenience. Participants agreeing to participate in this study signed a consent form. Their identities were protected to maintain confidentiality. Preventive measures to prevent the spread of COVID-19 were strictly followed.

Research Instruments: Three instruments were used in this study.

The PI created a *Demographic Data Recording Form* to gather information on adults with early-stage CKD (age, gender, marital status, education, religion, occupation, monthly income, medical care rights, duration of CKD, comorbidity, and current medication) and their family (age, gender, education, monthly income, relationship with and duration of living with adults with early-stage CKD).

The Disease Knowledge Scale was developed by the PI. It contains 15 items to assess knowledge about CKD and management, including kidney function (1 item), definition of CKD (1 item), causes of CKD (2 items), signs and symptoms of CKD (2 items), blood sugar and blood pressure control (2 items), and self-management practices for delaying kidney progression (7 items). The items are rated on a true, false, or uncertain response choice. One point is given when answering "true." A zero is given when answering "false" and "uncertain." An example item is *"Early-stage CKD often has no obvious symptoms."* Total scores range between 0 and 15, with scores of 0-5 representing a low disease knowledge level, 6-10 representing a moderate disease knowledge level, and 11-15 representing a high disease knowledge level.[27] The Disease Knowledge Scale was reviewed for content validity by a panel of six experts, including two nephrology nurses, a nurse in non-communicable disease clinic, a nurse instructor in nephrology, a nephrologist, and a family medicine physician, yielding a content validity index (CVI) of 0.96. The Kuder-Richardson (KR-20) coefficient was 0.75 in a pilot test with 15 adults with early-stage CKD and 0.71 in the main study.

Chronic Kidney Disease Self-management (CKD-SM), created by Lin et al.[28] and back-translated into Thai by Photharos et al.[29] was adopted, with permission, to assess self-management behaviors. It comprises 29 items in self-integration with 11 items, problem-solving with nine items, seeking social support with five items, and adherence to CKD recommendations with four items. An example item is *"I avoid foods that are harmful to the kidneys."* Items are rated on a 4-point scale from 1 (never) to 4 (always). Total scores range between 0 and 116, with a score of 29-58, reflecting a low level of self-management behaviors, a score of 59-87, reflecting a moderate level of self-management behaviors, and a score of 88-116, reflecting a high level of self-management behaviors.[29] The Cronbach's alpha was 0.86 in a pilot test with 15 adults with early-stage CKD and 0.89 in the actual study.

The Nurse-led Self and Family Management Support Program (N-SFSP)

The N-SFSP was developed by the PI based on the IFSMT[15] for dyads of adults with early-stage CKD and family members. It was reviewed by the same experts who reviewed the Disease Knowledge Scale and revised it according to their suggestions. The program aimed to enhance disease knowledge about

CKD and promote the self-management behavior of adults with early-stage CKD through the nurse's roles in education and skill training with the involvement of family members. The PI ran five sessions of activities in four weeks (**See details in Appendix, Table 1**).

Usual care refers to the care that adults with early-stage CKD receive from health care providers at the non-communicable disease clinic at a community hospital, including a follow-up with a physician every three months and an annual laboratory test. During the follow-up with a physician, history and vital signs are taken, and medications are prescribed. The clinic nurses then advise about health behaviors, self-care, and medication taking.

Data Collection: After ethics approval, the PI approached the eligible participants who met the inclusion criteria in a meeting room at the selected community hospital to explain the study details, including data collection, confidentiality, and risks and benefits of participation. They signed an informed consent if they agreed and were willing to participate in the study. Data were collected by a research assistant (RA), a nurse with a master's degree in nursing science and three years of health research experience. The PI trained the RA for data collection using the research instruments. The double-blind method was used to 1) prevent participants from knowing which arm they were in by carrying out activities for each arm on separate days and to prevent the RA from knowing participants' arms by having participants send the completed questionnaires via post at the PI's expense. Data collection took place between March 2021 and August 2021.

Data Analysis: Demographic data were analyzed using descriptive statistics (percentage, frequency, mean, and standard deviation) and compared with an independent t-test, Chi-square test, and Fisher's exact test. Disease knowledge and self-management were compared using two-way repeated measures ANOVA with post hoc tests. Before analyses, statistical assumptions were examined using the Kolmogorov-Smirnov test, and the results revealed normal distribution and homogeneity of variance. Mauchly's Test of Sphericity yielded a p-value of less than 0.001 for disease knowledge and self-management, which was lower than the acceptable value of 0.05,[30] indicating a violation of sphericity. Therefore, the degree of freedom was adjusted with Greenhouse-Geisser Epsilon.[3]

Results

There were 32 participants in each arm. Most of the participants in both arms were female, aged from 40 to 60 years. Most were married, and all were Buddhist. They had primary education and worked as farmers. They earned a monthly income of THB 3,000-50,000 (USD 88.68-1,477.98). They were covered by Thailand's Universal Coverage with a duration since CKD diagnosis of 1-8 years. They had diabetes and hypertension as comorbidities that were treated with oral medicines. Adults with early-stage CKD in both groups did not have any statistically significant differences in their demographics (**Table 1**).

Table 1. Demographic characteristics of the participants (n = 64)

Characteristics	Experimental (n = 32)	Control (n = 32)	p-value
	n (%)	n (%)	
Gender			.763[b]
Male	8(25.0)	6(18.8)	
Female	24(75.0)	26(81.2)	
Age (years)			.738[tt]
Mean ± SD	52.1 ± 6.1	51.6 ± 5.8	
(Range)	40-60	40-60	
40-45	5(15.6)	5(15.6)	
46-50	10(31.3)	9(28.1)	
51-55	4 (12.5)	8(25.0)	
56-60	13 (40.6)	10(31.3)	

Table 1. Demographic characteristics of the participants (n = 64) (Cont.)

Characteristics	Experimental (n = 32)	Control (n = 32)	p-value
	n (%)	n (%)	
Marital status			.621[a]
Single	7(21.8)	10(31.3)	
Widowed	3(9.4)	1(3.1)	
Divorced	0	1(3.1)	
Separated	2(6.3)	2(6.3)	
Married	20(62.5)	18(56.2)	
Education level			.766[a]
Primary	18(56.3)	18(56.3)	
Secondary	8(25.0)	8(25.0)	
Educational diploma	5(15.6)	3(9.3)	
Bachelor's degree	1(3.1)	2(6.3)	
Higher	0	1(3.1)	
Religion			.492[b]
Buddhism	32(100.0)	30(93.8)	
Christianity	0	2(6.2)	
Occupation			.192[a]
Farmer	24(75.0)	23(71.9)	
Employed	2(6.2)	4(12.5)	
Vendor	1(3.1)	1(3.1)	
Self-employed	2(6.3)	4(12.5)	
Government employee	3(9.4)	0	
Monthly personal income in THB			.135[t]
Mean ± SD	12,812.5 ± 3,063.2	15,712.5 ± 10,389.2	
Range	3,000-50,000 88.68-1,477.98	8,000-20,000 236.48.68-591.19	
< 5,000 (147.80 USD)	0	3(9.3)	
5,001-10,000 (147.83-295.60 USD)	12(37.5)	11(34.3)	
10,001-15,000 (295.63-443.39 USD)	16(50.0)	6(18.8)	
15,001-20,000 (443.42-591.19 USD)	4(12.5)	6(18.8)	
> 20,000 (591.19 USD)	0	6(18.8)	
Health coverage			.586[a]
Universal coverage	30(93.8)	28(87.5)	
Social security scheme	1(3.1)	3(9.4)	
Government	1(3.1)	1(3.1)	
Duration since CKD diagnosis (years)			
Mean ± SD	1.7 ± .7	2.2 ±1.6	.131[t]
Range	1-3	1-8	
< 2	26(81.3)	23(71.2)	
3-4	6(18.7)	6(18.8)	
> 5	0	3(9.3)	
Comorbidity			.133[a]
Diabetes mellitus	13(20.3)	21(65.6)	
Hypertension	17(26.6)	10(31.3)	
Dyslipidemia	2(3.1)	1(3.1)	
Current medications for comorbidity			
Oral medicine	32(100.0)	32(100.0)	

Note. [a] = Chi-square test; [b] = Fisher's Exact test; [t] = Independent sample t-test.

Disease knowledge and self-management scores at each measurement point between the control and experimental arms were compared using an independent sample t-test. Results showed no significant difference in disease knowledge and self-management at baseline between the experimental and control arms. However, the scores of disease knowledge and self-management were significantly different between arms at 4 ($p < .001$), 8 ($p < .001$), and 12 ($p < .001$) weeks after the program ended (**Table 2**).

Table 2. Means differences in disease knowledge and self-management of the participants in the experimental and control arms at each point of measurement (n = 64)

Variable	Experimental arm (n = 32)	Control arm (n = 32)	t	p-value
	Mean (SD)	Mean (SD)		
Disease knowledge				
Baseline	8.68 (0.3)	9.15(0.4)	-.845	.401
4 weeks after program	12.68(1.40)	9.37(2.01)	7.642	< .001
8 weeks after program	12.96(1.17)	9.50(2.04)	8.307	< .001
12 weeks after program	13.0(1.20)	9.53(2.14)	8.063	< .001
Self-management				
Baseline	71.03(5.86)	68.43(9.18)	1.347	.183
4 weeks after program	89.78(6.12)	69.18(9.70)	10.129	< .001
8 weeks after program	89.96(5.95)	70.59(10.68)	8.960	< .001
12 weeks after program	89.81(6.52)	70.87(12.02)	7.829	< .001

Note. t = Independent sample t-test

The mean disease knowledge and self-management scores between the experimental and control arms before and at 4, 8, and 12 weeks after the program ended were compared using two-way repeated measures ANOVA. There were significant differences in the mean scores of disease knowledge ($p < .001$) and self-management ($p < .001$) between the experimental arm and control arm and between each measurement point in each arm ($p < .001$). The time-group interaction was also significant ($p < .001$) (**Table 3**).

Table 3. The difference in disease knowledge and self-management between control and experimental arms at each point of measurement

Variables	SS	df	MS	F^r	p-value	η^2
Disease knowledge						
Between subjects						
Group	385.141	1	385.141	33.950	< .001	
Error	703.344	62	11.344			
Within subjects						
Time	247.516	3	82.505	103.667	< .001	.626
Time x group	182.453	3	60.818	76.417	< .001	
Error	148.031	186	.796			
Self-management						
Between subjects						
Group	15129.000	1	4205.000	60.871	< .001	
Error	15409.609	62	248.542			
Within subjects						
Time	5123.766	3	1707.922	111.945	< .001	.646
Time x group	3508.594	3	1169.531	77.341	< .001	
Error	2812.641	186	15.122			

Note. ^{r} = 2-way repeated measures ANOVA

Then, multiple pairwise comparisons between each measurement point were carried out using the Bonferroni test. In the experimental arm, significant differences in disease knowledge and self-management scores were observed between baseline and four weeks after the program ended ($p < .001$), between baseline and eight weeks after the program ended ($p < .001$), and between baseline and 12 weeks after the program ended ($p < .001$), For the control arm, the differences of disease knowledge and self-management scores at baseline, 4, 8, and 12 weeks after the program ended were not significantly different (**Table 4**).

Table 4. Multiple pairwise comparisons of disease knowledge and self-management scores between the control and the experimental arms at each point of measurement

Variable	Baseline (1)	4 weeks after (2)	8 weeks after (3)	12 weeks after (4)	p-value					
	(SD)	(SD)	(SD)	(SD)	(1) VS (2)	(1) VS (3)	(1) VS (4)	(2) VS (3)	(2) VS (4)	(3) VS (4)
Disease knowledge										
Experimental	8.68 (2.24)	12.68 (1.40)	12.96 (1.17)	13.03 (1.20)	< .001	< .001	< .001	0.111	0.293	1.000
Control	9.15 (2.18)	9.37 (2.01)	9.50 (2.04)	9.53 (2.14)	.195	.083	.659	1.000	1.000	1.000
Self-management										
Experimental	71.03 (5.86)	89.78 (6.12)	90.00 (5.95)	89.81 (6.52)	< .001	< .001	< .001	.510	.734	1.000
Control	68.43 (9.18)	69.18 (9.70)	70.59 (10.68)	70.87 (12.02)	.100	.158	.258	.556	.737	1.000

Note. The significance level of the post hoc test using the Bonferroni correction is $p < .008$.

Discussion

The findings showed the effectiveness of the N-SFSP in improving disease knowledge and self-management of adults with early-stage CKD, which supported the research hypotheses. The N-SFSP incorporated education about CKD (definition, causes, signs and symptoms, treatment, prevention, complications, and delaying kidney progression), potentially contributing to a better understanding of CKD. Accordingly, the IFSMT proposes that education is a direct means of information delivery linked to positive effects on enhancing knowledge.[15] Furthermore, our study included family members in CKD education, allowing them to learn about CKD. Therefore, they might be able to provide information about CKD to adults with early-stage CKD. Family is a crucial context for people with chronic illnesses contributing to an individual's knowledge and beliefs.[15] Congruent with previous studies, continuous information support from family increased the knowledge of adults with stage 3 CKD in Thailand[31] and family members' knowledge of diabetes led to higher disease knowledge in the adults with type 2 diabetes.[32]

Moreover, the nurse-led discussion and reflection on the learned contents about CKD helped to enhance the understanding of CKD and clarified the issues that needed further explanation. In the context of CKD, nurses serve as primary health educators in providing individuals with information about their disease and empowering them to engage in more information-seeking behaviors,[14] which in turn leads to higher CKD knowledge. Consistently, nurse-led education programs led to better disease knowledge in adults with early-stage CKD[33,34] and other chronic illnesses.[20]

Our findings showed that after receiving the N-SFSP, the participants had better self-management than those who did not before receiving it. To support the self-management process, the dyads of adults with early-stage CKD and their family members received education and skill training about CKD self-management from the nurse. Nurses are significant health personnel who provide social facilitation to increase the capability of individuals and family members to perform self-management by enhancing their knowledge skills of self-management.[14,15] When equipped with the knowledge and skills necessary, the individuals can self-regulate to reflect on their performance to improve their behaviors and pursue their goal of performing self-management tasks.[15] Nurses can give necessary support by stressing the significance of self-management behaviors by educating and encouraging the individuals to engage in those behaviors.[35] Moreover, in our study, family members engaged in self-management education and skill training jointly with adults with early-stage CKD. Consequently, family members could develop a comprehensive understanding of CKD self-management, enabling them to supervise and guide adults with early-stage CKD daily. Consistently, a nurse-led enhancement of social support from family members could lead to a significant improvement in self-management among adults with early-stage CKD.[33]

Additionally, we found a sustained increase in disease knowledge and self-management at 4, 8, and 12 weeks after the program ended. The nurse's home visit and telephone visit in the N-SFSP provided an opportunity to discuss the participants' self-management behaviors in an actual situation. This contact helped participants monitor and evaluate their self-management skills and progress from earlier sessions. At the same time, family members could also reflect on their performance in supporting adults with early-stage CKD. Self-monitoring allows individuals to evaluate their performance and progress, leading to greater motivation to perform a behavior and, thus, more sustainable behavior change.[36] Likewise, an individual and family self-management program that enhanced self-monitoring, self-reflection, and self-evaluation skills could improve self-management at 16 weeks of follow-up.[25] Also, a systematic review showed that nurse-led programs led to sustained improvements in self-management behaviors among people with hypertension.[20]

Limitations

This study was conducted on adults with early-stage CKD visiting a community hospital in a province in southern Thailand. Thus, generalizability to other populations and contexts may be limited.

Conclusions and Implications for Nursing Practice

The findings lent support to the effectiveness of the N-SFSP in improving disease knowledge and self-management of adults with early-stage CKD. Nurses can incorporate the N-SFSP into health education and counseling to cultivate the self-management skills of adults with early-stage CKD while strengthening the capabilities of family members to identify with the adults with early-stage CKD and support self-management in daily life. However, further studies in other settings are required.

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Appendix

Table 1. Activities in the N-SFSP

Time schedule	Topic	Method/Strategies	Media
Session 1: At hospital Day 1 of Week 1 Duration: 2 hours	- Knowledge about CKD	**Introduction:** The PI provided information to increase positive beliefs related to CKD self-management by asking about experiences in CKD care and allowing participants to share experience related to CKD care. **Teaching:** Providing education about CKD (definition, causes, signs and symptoms, treatment, prevention, complications, and delaying kidney progression) **Providing:** Giving a booklet about current situations of CKD, functions of kidney, common causes of CKD, symptoms of CKD, delaying kidney progression (controlling hypertension and diabetes, diet and beverages, medications, exercise, psychological care), CKD self-management (medical management, role management, and emotional management), a record for participants (participants brought the manual with them in all sessions) - Group discussion - Sharing experience - Reflecting on the lecture and video clips by writing about what have been learned from the lecture and video clips, and about own feelings after learning	- Point presentation on definition of CKD, causes of CKD, signs and symptoms, treatment, prevention, complications, and delaying kidney progression - A video clip titled "CKD: Know, Understand, Prevent" - The booklet titled "You and Your Family Can Delay Kidney Progression by Yourselves"
Session 2: At hospital Day 2 of Week 1 Duration: 2 hours	- Knowledge about CKD self-management - Development of self-regulation skills	- **Teaching:** Providing lecture about three tasks of CKD self-management (medical management, role management, and emotional management) -**Encouraging:** Giving examples and showing images of each task of self-management to promote understanding **Goal setting:** Empowering to set a goal about lifestyle modification to delay kidney progression, diet modification by reducing consumption of salty and sweet food, appropriate medication taking for disease, avoiding taking unnecessary painkillers, practicing proper exercise for CKD, and direct impacts of lacking lifestyle modification on kidney functions and treatment costs - Reflecting on the lecture and video clip by asking them to write a description of what they had learned from the lecture and video clip, to reflect on their own feelings	- The booklet titled "You and Your Family Can Delay Kidney Progression by Yourselves" - Power Point presentation (35 slides) with content about definition of CKD, self-management, importance of self-management - A video clip titled "How to Live with CKD" - A brochure titled "CKD Self-management"

Table 1. Activities in the N-SFSP (Cont.)

Time schedule	Topic	Method/Strategies	Media
Session 3: At hospital Week 2 Duration: 2 hours	- CKD self-management skills for adults with early stage CKD - Family members' ability to support CKD self-management	**Strengthening and supporting self-management:** - Demonstrating a role model who was an adult diagnosed with early stage CKD to share experiences related to CKD, self-management, and lifestyle modification to delay kidney progression - Demonstrating a role model who was a family member with experience in CKD care and support - Reflecting on what had been learned from the role models and writing in a piece of paper - Giving verbal reinforcement	- A booklet titled "You and Your Family Can Delay Kidney Progression by Yourselves"
Session 4: At home Week 3 Duration: 60 minutes	- Knowledge and behavior of self-management in real situation - Development of abilities in self-evaluation	**Self-monitoring, observing, and problem-solving:** - Conducting a home visit to enhance the key skills of self-management and encourage family members to provide support for self-management - Discussing and explaining about self-management skills in real situation at home - Providing encouragement for performing behaviors to delay kidney progression, listen to, and give advice if needed - Giving reinforcement and encouragement - Reflecting on the outcomes of self-management and the support received from family members - Analyzing and giving advice about self-management and problems or barriers that arose	- A booklet titled "You and Your Family Can Delay Kidney Progression by Yourselves"
Session 5: Telephone follow-up Week 4	- Confidence and maintenance of self-management	**Strengthening and coaching:** - Conducting a telephone visit to discuss about self-management skills and enhance the family's ability to support for self-management - Enhancing family's ability to support self-management process - Discussing about the support received from family members, problems and barriers - Giving verbal reinforcement/ encouragement for maintaining self-management behaviors	

ประสิทธิผลของโปรแกรมการสนับสนุนการจัดการตนเองและครอบครัวที่มีพยาบาลเป็นผู้นำในผู้ใหญ่โรคไตเรื้อรังระยะแรก: การทดลองแบบสุ่มและมีกลุ่มควบคุม

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บทคัดย่อ: โรคไตเรื้อรังเป็นปัญหาสุขภาพที่สำคัญซึ่งนำไปสู่ภาวะแทรกซ้อนรุนแรงและเสียชีวิตก่อนวัยอันควร ผู้ใหญ่โรคไตเรื้อรังระยะแรกจำเป็นต้องรักษาการทำงานของไตและป้องกันการลุกลามเป็นโรคไตเรื้อรังระยะสุดท้าย ซึ่งสามารถทำได้ผ่านการมีความรู้เรื่องโรคและการจัดการตนเองอย่างมีประสิทธิภาพ การทดลองแบบสุ่มมีกลุ่มควบคุมและทดสอบก่อนหลังนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมการสนับสนุนการจัดการตนเองและครอบครัวที่มีพยาบาลเป็นผู้นำต่อความรู้เรื่องโรคและการจัดการตนเองในผู้ใหญ่โรคไตเรื้อรังระยะแรก กลุ่มตัวอย่างประกอบด้วยผู้ใหญ่โรคไตเรื้อรังระยะแรกและสมาชิกครอบครัว จำนวน 64 คู่ ได้รับการสุ่มเข้ากลุ่มทดลอง (n = 32) และกลุ่มควบคุม (n = 32) โดยกลุ่มทดลองได้รับโปรแกรมการสนับสนุนการจัดการตนเองและครอบครัวที่มีพยาบาลเป็นผู้นำ ในขณะที่กลุ่มควบคุมได้รับการดูแลตามปกติ เก็บรวบรวมข้อมูลโดยใช้แบบบันทึกข้อมูลประชากร แบบวัดความรู้เกี่ยวกับโรค และแบบวัดการจัดการโรคไตเรื้อรังด้วยตนเอง วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา การวิเคราะห์ความแปรปรวนแบบสองทางวัดซ้ำด้วยการทดสอบหลังการวิเคราะห์ และการทดสอบทีอิสระ

ผลการศึกษาพบว่าผู้เข้าร่วมวิจัยในกลุ่มทดลองมีความรู้เรื่องโรคและการจัดการตนเองที่ 4, 8 และ 12 สัปดาห์หลังจากได้รับโปรแกรมดีกว่ากลุ่มควบคุมและดีกว่าก่อนได้รับโปรแกรม พยาบาลสามารถใช้โปรแกรมนี้เพื่อส่งเสริมให้สมาชิกในครอบครัวมีส่วนร่วมในการให้การสนับสนุนทุกด้านเพื่อการจัดการตนเองสำหรับผู้ใหญ่โรคไตเรื้อรังระยะแรก อย่างไรก็ตาม จำเป็นต้องมีการทดสอบเพิ่มเติมในพื้นที่อื่น

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