

Measuring Health-Related Outcomes After a Peer-Led Educational Intervention for African Americans with Chronic Kidney Disease

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There are multiple reasons for the disparity in chronic kidney disease (CKD) among African Americans, including higher rates of diabetes, the absence of disease-specific health knowledge, and unhealthy lifestyle behaviors (eating, exercise). This pilot study measured health-related outcomes of a social worker-coordinated and peer-led psychoeducational program, based on cognitive behavioral therapy (CBT). One-group pretest/posttest was used to measure changes in outcome variables, such as CKD-related health knowledge, healthy lifestyle and behaviors, and medication adherence.

Data from 54 African-American patients indicated statistically significant improvement in scores on the Health Knowledge Scale, but no change in healthy lifestyle and behaviors or medication adherence. Social workers should provide cost-effective and clinically proven psychosocial educational treatments for patients with chronic health conditions. This intervention can be replicated with large, diverse groups in collaboration with other medical professionals.

CHRONIC KIDNEY DISEASE

Chronic kidney disease (CKD) is a primary problem globally and in the United States. The Centers for Disease Control and Prevention (CDC, 2015) ranks CKD as the ninth leading cause of death in the United States. According to the National Kidney Foundation (NKF, 2017), minorities such as African Americans, Hispanics, Asians, Pacific Islanders, American Indians, and Alaska Natives are at the increased risk for CKD. African Americans are three-times more likely than any other minority group to have kidney failure, compared to White Americans. In a 12-year follow-up cohort study of 9,082 African Americans and Caucasian adults between the ages of 30 and 74 years, African Americans' risk of CKD was 2.7 times higher than that of Whites (Fox et al., 2010). African Americans with an age range between 25 and 44 years have an even higher risk for CKD.

In 2016, there were 124,675 new end-stage renal disease (ESRD) diagnoses, (USRDS, 2018). The occurrence of ESRD has increased to over 20,000 cases per year (Harding et al., 2019; Ishigami & Matsushita, 2018; USRDS, 2018). According to the 2015 USRDS data, the rate of kidney failure differs by race in the United States; thus, African Americans experience ESRD at a three times higher rate than their White counterparts (McCullough, Morgenstern, Saran, Herman, & Robinson, 2019; Saran et al., 2018).

There are multiple reasons for this racial/ethnic disparity, including higher rates of diabetes and hypertension among African Americans. According to the USRDS (2016), African Americans account for 13 percent of the population, but 35 percent of those Americans who are experiencing kidney failure. In fact, African Americans, because of diabetes and high blood pressure, experience kidney failure at a higher level than any other group.

This phenomenon is reflected in the steadily rising incidence of diabetic ESRD among African Americans. African Americans with diabetes have four times the risk of kidney failure, compared to Caucasian Americans (USRDS, 2016). Hypertension, the second leading cause of ESRD, affects one in every three African Americans. For African Americans, the incidence rate of hypertension is listed as the primary cause of ESRD, the incidence of which is dramatically higher than among other racial/ethnic groups (USRDS, 2015).

Other significant reasons for this disparity include the absence of disease-specific health knowledge and unhealthy lifestyle behaviors. Several studies have found that most African Americans are unaware of their increased risk for developing CKD (Vassalotti, Gracz-Weinstein, Gannon, & Brown, 2006; Waterman, Browne, Waterman, Gladstone, & Hostetter, 2008). Although many patients may have a general knowledge of CKD, they cannot know their CKD status or obtain appropriate treatment without testing and communication from their provider (Plantinga, Tuot, & Powe, 2010). In fact, awareness of CKD is limited across all populations. In a survey of urban African American adults, less than 3% named kidney disease as an important health problem, compared with 61% and 55% naming hypertension and diabetes, respectively (Plantinga et al., 2010). Less than one half of those surveyed could define kidney disease, one quarter could name a diagnostic test, and 7% knew that protein in the urine was a sign of kidney disease (Plantinga et al., 2010).

Unfortunately, health lifestyle behaviors, such as poor renal diet, limited physical exercise, and unstable medication adherence are major risks among African-American patients with CKD (Norton et al., 2016). As patients experience kid-

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ney failure, delaying or managing further progression is difficult in most cases. Most people with CKD find it difficult to maintain a well-balanced renal diet (Tsay, 2003). Fluid and salt control are primary causes of elevated blood pressure and expensive emergency room visits.

African Americans also struggle to adhere to guidelines for physical activity and weight management. There are many patients in clinics who are overweight or suffering from obesity at a predialysis stage, on dialysis, or with a transplant (Szromba, 2012). Also, dialysis patients have poor capacity for exercise and self-reported physical functioning, all of which can be potentially ameliorated by exercise training. Reboredo et al. (2010) monitored aerobic exercise training's effect on blood pressure, quality of life, and laboratory results in patients with ESRD being treated with hemodialysis. The study revealed that supervised aerobic exercise training increased physical functioning, contributed to blood pressure control, and improved several quality-of-life measures (Reboredo et al., 2010).

Meanwhile, several studies have shown that only 50% to 60% patients with chronic illness adhere to prescribed medications, regardless of evidence that medication treatment advances life expectancy and quality of life (Bosworth, 2012). Medication nonadherence includes delaying prescription refills, failing to fill prescriptions at all, cutting dosages, or reducing the frequency of administration (Bosworth, 2012). For instance, Lizer, Parnapy, Marsh, and Mogili (2011) explored whether a relationship with a pharmacist-assisted psychiatric clinic would improve adherence to medications and quality of life over six months. Improvements were seen in two domains over the six-month period: physical capacity and psychological well-being (Lizer et al., 2011). Babu, Nagaraju, Prasad, and Reddy (2012) also conducted a study to evaluate medication adherence and quality of life in patients with cholesterol issues. Patients who were adherent to their cholesterol medications reported a better quality of life regarding social activities. It was concluded that nonadherence to medications was prevalent in the study groups, but on the lower side of the range; adherent patients had higher quality of life (Babu et al., 2012).

PEER-LED PSYCHOEDUCATIONAL INTERVENTION

Few, if any, studies have investigated the effectiveness of peer-led support as a means of increasing health knowledge and decreasing negative health lifestyle behaviors in African Americans with CKD. In fact, peer-led support has been effective in patients with cancer, diabetes, heart disease, depression, HIV/AIDS, multiple sclerosis, brain injury, and several other health conditions (National Kidney Foundation, 2012; Tang, Funnell, Sinco, Spencer, & Heisler, 2015; Taylor, Gutteridge, & Willis, 2015). The peer-led models of education are known to be vital to improving health awareness and health behavior in patients with other chronic diseases (Beck, Greenwood, & Blanton, 2018).

Studies have established the effectiveness of peer-led support on illness by using self-management coaching interventions in patients recently diagnosed with type 2 diabetes (Wulp, De Leeuw, Gorter, & Rutten, 2012). Wulp et al. (2012) found that peer-led self-management coaching programming for patients recently diagnosed with type 2 diabetes improved self-efficacy in patients who had experienced low self-efficacy shortly after diagnosis. Long, Jahnle, Richardson, Loewenstein, and Volpp (2012) studied veterans with diabetes to determine whether peer counselors or financial incentives were better than the usual care in helping African-American veterans to decrease their hemoglobin A1C (HbA1c) levels. Results indicated that mentors and mentees placed the most telephone calls in the first month, with calls decreasing to a mean of two in the sixth month (Long et al., 2012). Levels of HbA1c decreased from 9.9% to 9.8% in the control group, from 9.8% to 8.7% in the peer-mentored group, and from 9.5% to 9.1% in the financial incentive group. Mean change in HbA1c levels from the beginning of the study to 6 months was 1.07% (95% CI, 1.84% to 0.31%) in the peer-mentored group and 0.45% (95% CI, 1.23% to 0.32%) in the financial incentive group (Long et al., 2012). The overall results indicated that peer counselors improved glucose control in the cohort of African-American veterans with diabetes.

Harris and Larson (2007) explored the effectiveness of peer-led support counseling from the perspective of 12 participants living with HIV who had had experiences with peer counseling. Results showed that peer counseling helped participants to discover, refine, and embrace hope after having received a diagnosis of HIV, rather than spending time trapped in a high-risk lifestyle. Participants reported that peer counselors listened to and validated them, helping them to deal with the emotions of living with HIV (Harris & Larson, 2007). Participants in the study perceived peer counselors as experienced, given their personal backgrounds regarding HIV and connected issues (e.g., being gay or having experienced a high-risk lifestyle).

Peer support has also been shown to be effective for patients with CKD (NKF, 2012). For instance, Perry et al. (2005), in a controlled randomized intervention study with 203 patients, explored the impact of peer counselors on end-of-life decision making in CKD. Results showed that peer mentoring significantly influenced completion of advanced directives, compared with distributing standard printed materials. The influence was more pronounced in African Americans. According to the study, apart from increasing the use of advanced directives, the patients' overall well-being was increased as well.

Perry, Swartz, Kelly, Brown, and Swartz (2003) reported that the Robert Wood Johnson Foundation (RWJF) investigated and developed resources to help renal teams to improve palliative care for CKD patients. RWJF found that peer mentoring provided excellent, cost-free support. Repper and Carter's (2011) review of the peer-led support literature in

mental health services showed that peer support could lead to a reduction in hospital admissions with a concomitant reduction in workload for medical staff, as well as a reduction of healthcare costs.

Peer-led support also assisted the healthcare system in reaching otherwise hard-to-engage populations. Peer support leads to improved outcomes for clients, such as increased community connections, decreased hospitalization, improved quality of life, and improved social functioning (Moll, Holmes, Geronico, & Sherman, 2009).

Although peer-led support is an effective approach to managing chronic disease, it remains largely unexplored regarding increasing health knowledge and improving health behaviors in patients with CKD. The main objective of this study was to measure health-related outcomes after implementing a social worker-coordinated peer-led educational intervention for African Americans with CKD.

METHOD

Design

This pilot study used a one-group pretest/posttest design (O1 X O2). With relatively low internal validity, the pre-experimental design assesses selected outcome variables before and after an intervention but does not attempt to control for alternative explanation of any changes in scores that are observed (e.g., Rubin & Babbie, 2017). This design may be commonly found in the evaluation of the effectiveness of social services in order to demonstrate desired outcomes before and after services are delivered. Although this design may sound more feasible and scientifically acceptable in social work practice by assessing causal time order, it does not account for factors other than the intervention variable that might have caused the change between pretest and posttest results. Factors usually associated with threats to internal validity include history, maturation, testing, and statistical regression. In spite of empirical merits and practical application in social work practice, this pre-experimental design can be inferior to true experimental designs with randomization and control groups.

Participant Recruitment

The state of Mississippi has growing numbers of patients who have CKD. In a study conducted in Mississippi and released in January 2009, only about one in six African Americans in Mississippi with CKD were aware of having the condition (Flessner et al., 2009). The Leonard Morris Chronic Kidney Disease Leadership Task Force of the Mississippi State Department of Health (2010) states that many Mississippians were unaware of having kidney disease, which could lead to ESRD. African Americans accounted for about 67% of these people.

This pilot study recruited participants with CKD and regular attendees at the University of Mississippi Medical Center (UMMC) Renal Clinic in Jackson, MS. The clinic on average serves approximately 700 patients; all were regularly

followed. The study sample size was considered adequate to power a level of .80 and alpha level of .05 (confidence level 95%; Fowler, 2009). Study participants were selected as they came for clinic visits. Eligibility criteria for the pilot study were: a) African American; b) in Stages 2 to 4 of kidney disease; c) 20 to 65 years old; d) attending the designated renal clinic; and e) well enough to participate in 30–60 minutes of a face-to-face counseling session.

The project coordinator presented an information sheet describing the project scope and purpose to potential participants. The University of Mississippi Medical Center Institutional Review Board (IRB) approved the intervention pilot study with human subjects. Patients were enrolled into the study only with fully informed consent. Eighty-three patients participated in the intervention study at baseline.

Intervention Implementation

The study hired three paid African American patients referred to as “peer counselors” to deliver the intervention. Peer counselors, recommended by providers, were transplant patients who had experienced chronic kidney disease and were considered model patients. A research coordinator, the social worker from the UMMC clinic trained and supervised three peer counselors. Peer counselor training included general kidney disease information about blood pressure, diabetes, diet, exercise, adherence, and self-efficacy skills.

The goals of this peer-led psychoeducational intervention were to: a) increase kidney-specific health knowledge, and b) change patients’ health behaviors and lifestyle. The intervention procedures were divided into two six-month intervals (Phases I and II) over the span of a year. In Phase I, the intervention sessions, consisting of components of individual and group counseling, were delivered either by phone or in face-to-face meetings. Individual or group sessions were held in the renal clinic examination rooms, social work office, or conference rooms. Each session lasted for approximately 45–60 minutes. Several telephone follow-ups were implemented to reinforce patient learning on kidney disease and healthy lifestyle practices (e.g., food/diet, exercise, medication adherence).

Since CKD is a slowly and progressive deterioration of kidney function that is typically irreversible, participants were scheduled for one or two visits in six months (Moodalbal & Hooper, 2017). During Phase I, the clinic nurse scheduled the initial visits; additional appointments were arranged by the peer counselors and renal clinic social worker. Participants who did not show for a scheduled visit received a call from one of the peer counselors. In addition to their required two regular visits, participants were encouraged to attend four other unscheduled visits and also had a weekly telephone support call. The weekly telephone calls were both supportive and educational. **Table 1** shows the psychoeducational topics that were discussed on each visit and in weekly follow-ups. The second six-month interval (Phase II) followed the same structure and served as a reinforcement of what was discussed in the first six months.

At the first individual session of the first six-month interval (Phase I), peer counselors introduced themselves, explained the process of the intervention, and outlined for the participant the contents of the kidney education and types of skills that the participant was expected to gain. The peer counselors described the telephone support system and what was expected of each patient. In the second session, peer counselors and participants discussed personal thoughts, emotions, and health behaviors, using the plan and goal sheet. This session also allowed participants to gain insight into possible cognitive distortions that could negatively affect self-regulation and ultimately affect health behaviors. This session involved teaching participants about self-efficacy through peer counseling and reinforcing positive behavior through demonstration.

The third to sixth "unscheduled" sessions followed the same structure to promote the use of a home blood pressure monitor, a diabetes monitor, a blood pressure and diabetes log, a telephone education and support log, and educational pamphlets on sodium and fluid restriction. These support materials empowered participants to take personal responsibility for monitoring their health. Participants were asked to monitor and record their physical activity, as well as salt and fluid intake at home. They were also asked to record reasons why they were unable to control their blood pressure or salt and fluid intake, based on real-life experiences. The research coordinator reviewed participant records on a weekly basis to determine who needed further assistance.

While peer counselors communicated with participants by telephone, they also led group sessions. Peer counselors facilitated group discussions and role-playing among participants and encouraged attendees to educate each other on kidney disease management. Participants hosted a health fair to display what they had learned in the educational sessions. For example, participants wore tee shirts with the inscription "Ask Me about Kidney Disease." Peer counselors hosted an interactive public event to educate participants' families on the education that the participants had received. Weekly followups by telephone offered alternative solutions for participants who needed further assistance to achieve their goals. Examples of discussions with participants included: offering advice related to substitutions for salt and fluid intake, and addressing nonadherence to blood pressure medications, dietary routine, and physical activities.

OUTCOME MEASURES

Health Knowledge Scale: The Health Knowledge Scale (Table 5) is a 10-item instrument designed to measure patient knowledge about kidney disease. Participants were asked to respond "True" or "False" to 10 statements. Four items (1, 3, 4, 10) should be answered False, and 6 items (2, 5, 6, 7, 8, 9) should be answered True. Correct answers were recoded as 1, and a wrong answer as 0, with higher scores indicating greater knowledge. Total scores could range from 0 to 10. Table 3 includes the full statements with correct answers.

Health Lifestyle and Behaviors Scale: The questions asked in this instrument related to specific items defining kidney health behaviors that affect quality of life. The instrument addressed three major components: daily nutritional habits, physical activities, and medication adherence (see Tables 4 and 5). The first section, regarding renal diet, included questions such as "How many meals do you eat in a normal day?", "How often do you eat vegetables?", and "How often do you eat chips, dip, or extra salt?" The desired answers were coded as: 1 = healthy eating habits and 0 = unhealthy eating habits. Summed scores could range from 0 to 10, with higher scores indicating healthier lifestyles.

The second section contained three questions about physical activities: In a week, 1) "Do moderate activities for at least 10 minutes at a time?" (such as brisk walking, vacuuming, gardening, or minimal change in breathing or heart rates); 2) "Do you do these moderate activities more than 3 days per week for at least 10 minutes?"; and 3) "Do vigorous activities for at least 10 minutes at a time?" (such as running or any stronger activities that causes increase in breathing or heart rates). Desired physical activities were coded 1; summed scores ranged from 0 to 3, with higher scores indicating healthier lifestyles.

The third section addressed medication adherence. Reasons for not taking medications properly were listed in 15 statements, such as "You were in a hurry, too busy, or forgot"; "It was inconvenient"; "The medication made you feel bad"; or "You missed medications because you were feeling better." "Yes" answers were scored 1, and "No" answers were scored 2, with higher scores indicating more positive medication compliance.

Data Analyses

The statistical analyses were conducted using version 25.0 of the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to describe the participants' demographic information, such as gender, age, education, annual income, and health insurance. Descriptive statistics with mean and standard deviation were used to measure health-related outcomes, and *t*-tests were conducted to compare group mean score differences from pretest to posttest regarding individual items and summed scores for each scale.

RESULTS

Table 2 displays sociodemographic characteristics of intervention participants. The majority were female ($n = 35$; 65%) and 51 to 70 years old ($n = 30$; 56%). Educational levels were fairly equally distributed, but 33% ($n = 18$) had not completed high school. Most participants ($n = 35$, 65%) reported their income from \$5,000 to \$9,999, and most participants were insured by Medicare or other insurance (private or Medicaid), with only 8 persons uninsured.

Table 3 presents descriptive statistics of individual item scores and summed scores for the Health Knowledge Scale, with *t*-values and statistical significance. The mean pretest

score was 4.70 ($SD = 1.25$) in a total possible score of 10, indicating that this sample had limited knowledge about kidney disease before attending the educational sessions. A year later, the knowledge score had improved significantly to a statistical mean of 7.44 ($SD = 2.21$). When summed scores were compared, the paired-sample t -values was -4.72 , significant at $p < .001$. Scores on five items requiring specific medical knowledge were not significantly changed in the posttest.

Table 4 shows results of the Health Lifestyle and Behavior Scale. There was no statistically significant improvement in group mean scores for the renal diet category from pretest ($M = 5.48$; $SD = 1.63$) to posttest ($M = 5.34$; $SD = 2.13$). This result indicated that all participants maintained mixed eating habits. The level of physical activity improved slightly, but was not statistically significant ($M = 1.04$ versus $M = 1.17$).

Table 5 presents the descriptive statistics for 15 statements related to medication adherence. "Yes" answers indicated medication noncompliance, with higher scores indicating greater noncompliance. Mean score differences were found for a few items, such as "You don't like to take medication"; "If you took the medication, you would not be able to carry out your normal activities, for example, driving"; and "You missed medications because you were feeling better." The overall score was changed, ($M = 26.94$, $SD = 2.72$ versus $M = 27.12$, $SD = 3.75$) but the difference was not statistically significant.

DISCUSSION AND IMPLICATIONS

This pilot study showed limited improvement in health-related outcomes such as CKD-related health knowledge, healthy eating habits and physical activity, and medication adherence. Health knowledge significantly improved from pretest to posttest. However, most participants gave incorrect answers to three items about medical diagnostic symptoms, when it was expected that they would demonstrate full understanding of CKD symptoms, diagnosis, and treatment. Except for several single items, there were no statistically significant changes in group mean differences for the three health-related outcome measures. The year-long psychoeducational intervention was expected to show positive changes in lifestyle and behaviors. Factors that might have contributed to the failure to realize significant differences included difficulties with participant retention, a smaller sample in posttest compared to pretest due to attrition, and the simpler nature of the "Yes"/"No" answer options on certain items.

The study results provide practical lessons for social workers in healthcare settings. First, the study was an attempt to implement a feasible peer-led psychoeducational intervention. The primary author, Katina-Lang Lindsey, PhD, LMSW, a licensed social worker, trained potential peer counselors and coordinated the funded program. As a key member of the interdisciplinary research team, the social worker incorporated social cognitive therapeutic skills into the educational intervention manual. She played a critical role as a research coordinator in recruiting and retaining participants

and maintaining the quality of program delivery. Further, the social worker engaged in data collection and analysis, with assistance from statistical consultants.

This study also addressed the need for social work students to prepare to work with chronic disease-specific clients, such as those with diabetes or heart disease or kidney failure. As many social workers serve as members of interdisciplinary teams, they must have the disease-specific knowledge, skills, and techniques to work with patients with chronic illness in the healthcare system.

This study focused on African Americans in a disadvantaged socioeconomic situation, because underserved minority patients are often hard to reach. As advocates for vulnerable clients, such as CKD patients in disadvantaged socioeconomic states, social workers should provide cost-effective and clinically supported treatment options for these patients. Doctors and nurses treat CKD patients with medications, therapies, or surgery. Social workers, through intimate individual or group counseling, can educate CKD patients about their disease and about how to change their behaviors and lifestyles. Because of mistrust of the healthcare system by minority populations, same-race/ethnic peer counselors or educators could deliver treatment or implement clinical interventions.

This research presents a paradigm shift in researching unconventional interventions by social workers. Social workers have been overlooked as credible actors for designing, and implementing, as well as working directly with participants in, clinical intervention studies. There has been a perception that social workers are self-limited to conducting individual psychosocial assessment in clinical settings, not attempting to expand their skills and knowledge to intervention research activities. Now, social workers are beginning to change the atmosphere for implementing experimental or even mixed-methods designs. Further, it is important that social workers design interventions that are grounded in evidence-based social work practice (EPB). Despite the national emphasis on social work research, EBP-based curricula have not been commonly adopted in many schools of social work. EBP has been considered to be a new paradigm for both social workers practicing research and in education (Kawam, 2015). Primarily, social work researchers and educators have tended to embrace the concept of a systematic approach to EBP, as schools of social work have begun to integrate EBP into curricula (Kawam, 2015).

Several inherent limitations should be noted. Peer educators have been vital in the intervention study. Timely recruitment and training time for peer counselors were as expected. However, in mid-intervention, one male counselor dropped out, which may have negatively affected the quality of program delivery. Turnover in staff and members of the research team affected study flow and the intervention itself. Another problem came from the newly developed measures (e.g., Health Lifestyle and Behaviors Scale). The "Yes"/"No"

answer choice created a dichotomous variable with less score variability, increasing the difficulty of finding significant statistical group differences in this small sample size. These measures were used without testing them for reliability and validity. Measurement issues among primary outcome variables may have contributed to the failure to find significant relationships among variables. The scales were not validated with minority populations from disadvantaged socioeconomic situations. Natural attenuation in participation can be an issue in most intervention studies.

There is need for continued advocacy for people with CKD. CKD and ESRD are among the only chronic illnesses with legislation to support patients with the debilitating diseases. The study results show an urgent need for social workers to be involved in the treatment process to improve CKD patients' health-related quality of life. More nephrology social workers are needed in key roles in healthcare practice and legislative/policy advocacy. Social work students or practitioners in medical settings should obtain more knowledge about effective psychosocial, and educational interventions for patients with chronic illness. Social work practitioners should recognize populations that are disproportionately affected with CKD, and find ways to improve their well-being. Social workers can be better-informed practitioners and researchers, providing empirical evidence for research from their clinical workplaces.

Social work practitioners and researchers should continue to further explore peer-led educational interventions that have been successful for other chronic illnesses. Future research can be improved by adding more diverse clients, selecting well-tested measures, and implementing methodologically solid data collection procedures, such as repeated measures (pre-/post-/follow-up). By securing more research funding, social work researchers could implement a broader experimental study of this type.

Social workers need to continue to get involved with community-based interdisciplinary research teams as highly trained practitioner-researchers. They can provide more theory-based, in-depth training using cognitive behavioral theory for peer interventions throughout the kidney healthcare field. CKD social workers can replicate this intervention design with large, diverse populations, particularly in collaboration with other medical disciplines. Moreover, social work researchers need to participate in large, funded research projects on this subject to produce scientific evidence applicable to clinical practice. Peer-led psychosocial educational interventions hold a great deal of potential for the field and patients. While there is a need for scientific inquiry and clinical practice, there also a need to improve peer interventions. This is of great importance and holds a great deal of potential for the field of social work and patients nationally.

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Table 1. Module topics, delivery methods, and follow-up

Module topics	Delivery methods	Telephone follow-up
General health and kidney-specific disease education	Peer-led session (45–60 minutes)	September: Supportive education
Individual plan for kidney education	Peer-led session (45–60 minutes)	October: Supportive education
Promote blood pressure management and self-efficacy skills	Peer-led session (45–60 minutes)	November: Supportive education
Promote diabetes management	One group session led by social worker	December: Supportive education
Promote healthy diet/exercise and lifestyle change	Peer-led self-efficacy training	January: Supportive education
Promote adherence and self-efficacy skills	Two group sessions led by social worker and peer counselor	February: Supportive education

Table 2. Sociodemographic characteristics of participants in intervention group

Variable	Categories	Pretest (n = 54)	Posttest (n = 27)	Valid n	χ^2
Gender	Female	35 (64.8)	21 (77.8)	56	.167
	Male	19 (35.2)	6 (22.3)	25	.006*
Age	20–30	5 (9.0)	2 (7.4)	7	.571
	31–40	2 (3.7)	0 (0.0)	2	.053
	41–50	13 (24)	8 (29.6)	21	.013*
	51–60	18 (33.3)	6 (22.2)	24	.019*
	61–70	12 (22.2)	7 (25.9)	19	.890
	> 70	4 (7.4)	4 (14.8)	8	.671
Education	8th grade or less	6 (11.1)	7 (25.9)	13	.510
	Some HS or less	12 (22.2)	7 (25.9)	19	.251
	HS or GED	17 (31.5)	5 (18.5)	22	.049*
	Some college	12 (22.2)	6 (22.2)	18	.038*
	College degree	7 (13.0)	2 (7.4)	9	.147
Annual Income	< \$5,000	3 (5.6)	4 (14.8)	7	.957
	\$5,000 ~ \$9,999	35 (64.8)	16 (59.3)	51	.010*
	\$10,000 ~ \$19,999	7 (13.0)	7 (25.9)	14	.870
	\$20,000 ~ \$40,000	3 (5.6)	0 (0.0)	3	.118
	Don't know	6 (11.1)	0 (0.0)	6	.155
Insurance	Uninsured	8 (14.8)	2 (7.4)	10	.145
	Medicare only	11 (20.4)	3 (11.1)	14	.003 *
	Medicare & any other ins.	13 (24.1)	13 (48.1)	26	.429
	Medicaid or Medi-Cal only	14 (25.9)	9 (33.3)	23	.697
	Private, fee for service	4 (7.4)	0 (0.0)	4	.033 *
	HMO, PPO, IPA, etc.	4 (7.4)	0 (0.0)	4	.016

Table 3. Change in health knowledge scale with paired-sample *t*-test

#	Questions	Answer	Pretest	Posttest	<i>t</i> -value
	Kidney Disease Health Knowledge		0 ~ 1	0 ~ 1	
1.	Your kidney's only job is to remove wastes and excess fluid from your body.	False	.53 (.51)	.63 (.49)	-.527 (ns)
2.	People with diabetes or high blood pressure have/are more likely to get chronic kidney disease.	True	.36 (.48)	.73 (.45)	-1.809 (ns)
3.	People with chronic kidney disease always have a lot of symptoms.	False	.07 (.25)	.64 (.48)	-5.196 ***
4.	African Americans have a low risk of developing chronic kidney disease.	False	.09 (.29)	.50 (.51)	-3.166**
5.	Chronic kidney disease can be found with simple blood and urine tests.	True	.86 (.35)	.80 (.41)	.700 (ns)
6.	Early detection and treatment can often keep chronic kidney disease from getting worse.	True	.69 (.47)	.84 (.37)	-2.313 *
7.	Persistent protein in the urine is an early sign of chronic kidney disease.	True	.78 (.42)	.89 (.32)	.000 (ns)
8.	The best way to know how your kidneys are working is to know your glomerular filtration rate (GFR).	True	.36 (.48)	.89 (.32)	-2.828 **
9.	Anemia and bone disease are common problems for people with chronic kidney disease.	True	.36 (.48)	.73 (.45)	-1.809 (ns)
10.	People with chronic kidney disease have a low risk of getting heart disease.	False	.62 (.49)	.69 (.47)	-2.021 *
Sum.	Total Score Mean (SD) [Range from 0 to 10]		4.70 (1.25)	7.44 (2.21)	-4.72***

Note: ns = not significant. **p* < .05 ***p* < .01 ****p* < .001

Table 4. Difference in renal diet, eating habits and physical activities with paired-samples *t*-test

#	Health Lifestyle and Behavior Scale Questions	Correct responses (healthy = 1)	Pretest <i>M(SD)</i>	Posttest <i>M(SD)</i>	<i>t</i> -value
Renal Diet					
1.	How many meals do you eat in a normal day?	3 meals a day	.57 (.501)	.52 (.505)	-.901
2.	Do you usually eat breakfast?	Yes, I eat breakfast.	.77 (.424)	.81 (.394)	-.296
3.	How often do you eat between meals?	Rarely	.18 (.390)	.27 (.451)	-1.141
4.	How often do you drink fruit juice?	Less than every week	.30 (.462)	.30 (.462)	.000
5.	How often do you eat fruit?	At least once a day	.41 (.497)	.50 (.506)	-.327
6.	How often do you eat vegetables?	At least once a day	.47 (.505)	.30 (.462)	1.445
7.	How often do you eat chips, dip, or extra salt?	Less than every week	.67 (.477)	.77 (.427)	.000
8.	How often do you read labels on food?	Always	.47 (.505)	.52 (.505)	-.492
9.	To lower your risk of worsening HBP or KD are you eating less salt?	Yes, I eat less salt.	.90 (.297)	.86 (.354)	.811
10.	Have you made major changes for health reasons?	Yes, I made major health changes.	.88 (.324)	.84 (.370)	.371
Sum	Total Score Mean (SD) [0–10]		5.48 (1.633)	5.34 (2.128)	.517 (ns)
Physical Activity Statement (coded as 1)					
1.	Do moderate activities for at least 10 minutes at a time?	Yes	.49 (.506)	.44 (.502)	.000
2.	Do you do these moderate activities more than 3 days per week for at least 10 minutes at a time?	Yes	.72 (.461)	.85 (.366)	1.000
3.	Do vigorous activities for at least 10 minutes at a time?	Yes	.10 (.307)	.19 (.397)	-1.000
Sum.	Total Score Mean (SD) [0–3]		1.044	1.174	.684 (ns)

Note: ns = not significant. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 5. Reasons for medication noncompliance

	Medication Adherence (Reasons for Noncompliance)	Pretest M(SD)	Posttest M(SD)	No = 2	t-value
1.	You were in a hurry, too busy, or forgot.	1.64 (.490)	1.80 (.408)	Yes	-1.163 *
2.	It was inconvenient.	1.71 (.464)	1.75 (.442)	Yes	-.272
3.	The medication would not do you any good.	1.74 (.449)	1.78 (.422)	Yes	-.327
4.	The medication made you feel bad.	1.78 (.422)	1.65 (.487)	No	.901
5.	If you took the medication, you wouldn't be able to carry out your normal activities; for example, driving.	1.88 (.338)	1.63 (.495)	No	2.015**
6.	You thought you might become addicted or hooked on the medication.	1.74 (.449)	1.78 (.422)	Yes	-.327
7.	You don't like to take medication.	1.91 (.288)	1.65 (.487)	No	2.021**
8.	You were trying to do without it.	1.78 (.422)	1.74 (.449)	No	.327
9.	You did not have the money to purchase the medication (or its refills).	1.58 (.504)	1.46 (.509)	No	.901
10.	You did not have the medication available; for example, you left it at home or it was not with you.	1.71 (.464)	1.58 (.504)	No	.901
11.	You ran out of the medications.	1.46 (.509)	1.58 (.504)	Yes	-.827
12.	You missed medications because you were feeling better.	1.95 (.213)	1.82 (.395)	No	1.368*
13.	You missed medications because you felt sick.	1.91 (.294)	1.77 (.429)	No	1.142
14.	You took someone else's medications.	1.82 (.395)	1.82 (.395)	~	.000
15.	Are there any other reasons why you haven't taken a prescribed medication?	1.90 (.308)	1.90 (.308)	~	.000
Sum	Total Score Mean (SD) [Score range from 15 to 30]	26.94 (2.72) 17 ~ 30	27.12 (3.75) 16 ~ 30		

Notes: The lower score indicates less compliance and the higher score means more in compliance.

