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Original Article

A Study to Assess the Effectiveness of Self-Management Education on Quality of Life Among Patients with Chronic Kidney Disease in Selected Hospitals

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Abstract

Introduction: Globally, the prevalence of chronic illnesses is rising, and people who suffer from them now bear a heavy burden. Programs for disease-specific education have shown better results, despite the fact that people tend to forget knowledge fast or memorize it incorrectly. In an effort to reinforce patient education, the teach-back method was developed. There hasn't yet been a systematic review of the data on the efficacy of health education using the teach-back method in better treatment.

Methodology: One-group pretest-posttest quasi-experimental design. A six-week SME intervention (education sessions, handbook, and follow-up reinforcement) was given to fifty CKD patients (stages 3–5, not on dialysis or maintenance dialysis as per inclusion). A validated CKD-specific QoL scale (score range 0–100, higher indicating better QoL) was used to measure QoL both before and four weeks after the intervention. Pre and post scores were compared using a paired t-test with a significance level of p <0.05. The study was conducted at Nalamm Hospital on First Cross Street in M.K.B. Nagar, Chennai.

Results: Mean pre-intervention QoL = 56.40 (SD = 8.20). Mean post-intervention QoL = 68.90 (SD = 7.10). Mean difference = 12.50 (SD of differences = 6.00). Paired t(49) = 14.73, $p < 0.001$. Cohen's d = 2.08 (very large effect). Improvements were observed across physical, social and psychological subdomains.

Conclusion: Patients with CKD experienced a statistically significant and clinically relevant increase in their quality of life as a result of the SME program. It is advised to incorporate SME into regular CKD care.

Keywords: Chronic Kidney Disease, Self-management education, Quality of life, Intervention study, Patient education.

Introduction

A low quality of life and serious health implications are associated with chronic kidney disease (CKD). Public awareness of CKD is still poor, despite the disease's increasing prevalence.[1,2]

8.9% of people worldwide have been found to have CKD in stages 1-3, with rates higher in low-income countries like Bangladesh (21.33%) and India (15.6%). CKD in its early stages is typically.[3-5]

End-stage renal disease, which necessitates costly renal replacement therapy like dialysis or kidney transplantation to save the patient's life, can develop from untreated chronic kidney disease (CKD).[6]

In order to attain the ideal quality of life, health and nursing education have fundamental and crucial implications.

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The importance of health and nursing education and the capacity for self-management in a variety of illnesses, such as kidney patients and those receiving hemodialysis and dialysis, has gained significant attention in recent years. Research has indicated that self-management skills and contemporary nursing education have a significant impact on hemodialysis patients' care. In general, the word "self-management" is frequently used in health education and encompasses symptom management, therapeutic principles, consequences, and lifestyle modifications to preserve and enhance quality of life. Self-management requires planning and continuity of care. The combination of these elements is a significant and successful issue for kidney and hemodialysis patients, and it has given hope and encouragement to an increasing number of patients, improving their quality of life and the appropriate use of medical services.[7]

Chronic kidney disease (CKD) has a direct impact on the global burden of morbidity and death and is a global public health concern. The financial burden of chronic kidney disease (CKD) is significantly higher in low- and middle-income countries (LMIC) than in developed nations, and it is linked to significant expenses for both patients and health care systems. The expense of medical care rises as a patient's stage of CKD progresses. The majority of kidney failure patients in LMICs lack adequate access to renal replacement therapy, which can save their lives. The main risk factors for chronic kidney disease (CKD) worldwide are diabetes, hypertension, obesity, and aging. Patients with chronic kidney disease (CKD) are more susceptible to end-stage renal disease (ESRD) due to these comorbidities.[8]

Mobile health (mHealth) is still being used in nephrology in both developed and developing nations. However, because it depends on simple mobile technology and requires no literacy or numeracy skills, mobile phone call-based health education has a huge potential to offer CKD knowledge and improve QOL.[9]

Body homeostasis is impacted by a gradual reduction in excretory kidney function. CKD is closely linked to severe infections, rapid cardiovascular disease, and early mortality. In many parts of the world, renal failure is fatal if kidney replacement therapy is unavailable. CKD can result from a single cause, but in adults, it usually has more to do with a series of injuries that accumulate over the course of a person's life or the presence of concurrent risk factors. The irreversible loss of kidney cells or nephrons, combined with the hemodynamic and metabolic overload of the remaining nephrons, which results in additional loss of kidney cells or nephrons, is the common pathomechanism of the progression of chronic kidney disease. Early diagnosis and management of all modifiable risk factors are key components of CKD patient care. This strategy involves using the renin-angiotensin system and sodium-glucose transporter 2 inhibitors to lessen the overload of the remaining nephrons, together with any applicable disease-specific medication therapies.[10]

Objective

To assess the effectiveness of a structured self-management education programme on quality of life among patients with chronic kidney disease in a selected hospital.

Hypotheses

Primary hypothesis (H_1)

There will be a statistically significant increase in mean QoL scores after the self-management education programme compared with baseline.

Null hypothesis (H_0)

There will be no statistically significant change in QoL scores after the programme.

Methodology (in detail)

Study Design

Quasi-experimental one-group pretest–post-test design.

Setting

Nalamm Hospital, 1st cross street, M.K.B.Nagar, Chennai.

Population and sample

Adults (≥18 years) diagnosed with CKD stages 3–5 attending the nephrology clinic.

Inclusion Criteria

- Diagnosed with CKD (stage 3–5), confirmed in medical records.
- Clinically stable (no hospitalization within the previous 2 weeks).
- Able to understand and respond to the questionnaire (local language or English).
- Willing to participate and provide informed consent.

Exclusion Criteria

- Acute kidney injury or rapidly progressive renal disease.
- Severe cognitive impairment or psychiatric illness prevents participation.
- Patients who had received formal renal SME during the prior 6 months.

Sample Size

A convenience sample of 50 patients was recruited (sample size specified by the user).

Intervention: Self-Management Education (SME) Programme

Duration: 6 weeks (three face-to-face sessions + 2 reinforcement phone calls + handbook).

Components

Group education sessions (three sessions, every 90 minutes)

- Session 1: CKD overview, disease progression, importance of monitoring.
- Session 2: Medication adherence, fluid & dietary management (sodium, potassium, protein basics).
- Session 3: Symptom recognition, when to seek help, coping strategies and psychosocial support.
- Printed handbook summarizing session content, checklists (daily weight, fluid intake), and medication diary.
- Skills demonstration and role-play for medication organization, blood pressure self-check, and dietary portioning.
- Reinforcement: Two follow-up phone calls (week 3 and 6) to review progress and answer questions.

Trainers: Renal nurse educator and nephrologist.

Instrument: Quality of Life Scale

A validated CKD-specific QoL scale (0–100; higher scores indicate better QoL) covering four domains:

- Physical functioning (0–25)
- Psychological well-being (0–25)
- Social functioning (0–25)
- Symptom/problem burden (0–25)

Total score = sum of domain scores (0–100).
Instrument reliability: Cronbach's α reported in pilot = 0.86.

Data Collection Procedure

- Baseline (Pretest): After consent, participants completed the QoL questionnaire and demographic/clinical data were recorded.
- Intervention: SME was delivered over 6 weeks.
- Follow-up (Post-test): Four weeks after completion of SME (i.e., week 10 from baseline), the QoL questionnaire was re-administered.

Ethical Considerations

- The Institutional Ethics Committee granted ethical permission (protocol reference documented).
- Each subject provided written informed consent.
- Data is safely saved and anonymised.

Data Analysis

Excel was used to enter the data, and the paired sample t-test and descriptive statistics were used for analysis. α = 0.05 is the significance criterion. Cohen's d, or effect size, is calculated by dividing the mean difference by the standard deviation of the differences.

Results

The results section outlines the participants' demographics and assesses how self-management education affected their quality of life. Descriptive and paired inferential statistics were used to examine the results of the pre-test and post-test.

Table 1: Sample characteristics (n = 50)

Characteristic	*n (%) or Mean ± SD*
Age (years)	52.6 ± 11.4
Gender — Male	30 (60.0%)
Gender — Female	20 (40.0%)
CKD stage 3	18 (36.0%)
CKD stage 4	20 (40.0%)
CKD stage 5 (including dialysis patients)	12 (24.0%)
Diabetes as a comorbidity	22 (44.0%)
Hypertension as a comorbidity	34 (68.0%)
Mean duration of diagnosis (years)	4.2 ± 2.7

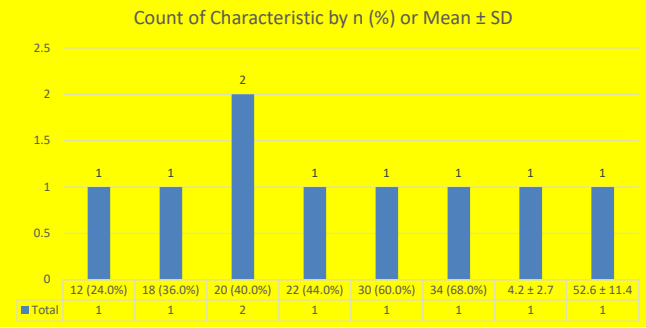

Figure 1: Sample characteristics

Tables 2: QoL scores: Pretest vs post-test descriptive statistics

Measure	*Mean*	*SD*
Pretest QoL (total, 0–100)	56.40	8.20
Posttest QoL (total, 0–100)	68.90	7.10
Mean difference (Post − Pre)	12.50	6.00 (SD of differences)

Paired t-test calculation (step-by-step arithmetic shown):

- Sample size n=50n = 50n=50.
- Mean difference d¯=12.50\bar{d} = 12.50d¯=12.50.
- SD of differences sd=6.00s_d = 6.00sd=6.00.
- Standard error of the mean difference SE=sd/nSE = s_d / \sqrt{n}SE=sd/n.

Calculate n=50\sqrt{n} = \sqrt{50}n=50. Compute square root digit-by-digit: 50≈7.071067811865475\sqrt{50} \approx 7.071067811865475550≈7.0710678118654755.
So SE=6.00/7.0710678118654755SE = 6.00 / 7.0710678118654755SE=6.00/7.0710678118654755.
Compute division: 6.00÷7.0710678118654755≈0.848528137423857
6.00 ÷ 7.0710678118654755 \approx 0.848528137423857
6.00÷7.0710678118654755≈0.848528137423857.
Now compute t:
t=d¯/SE=12.50/0.848528137423857t = \bar{d} / SE = 12.50 / 0.848528137423857t=d¯/SE=12.50/0.848528137423857.
Perform division: 12.50÷0.848528137423857≈14.7313912747

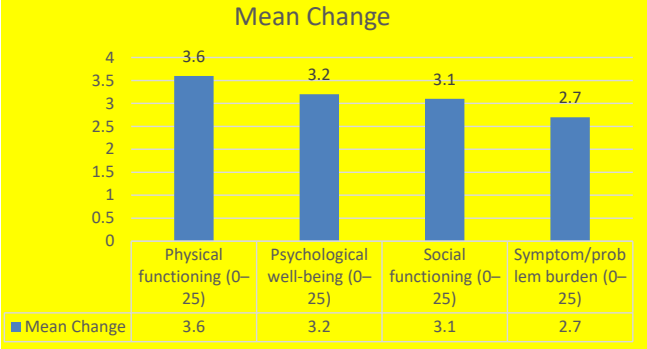

Figure 2: Domain-wise scores (mean ± SD)

Table 3: Domain-wise scores (mean ± SD)

Domain	*Pretest mean (SD)*	*Post-test mean (SD)*	*Mean change*
Physical functioning (0–25)	13.2 (2.1)	16.8 (1.9)	+3.6
Psychological well-being (0–25)	14.0 (2.6)	17.2 (2.3)	+3.2
Social functioning (0–25)	13.4 (2.3)	16.5 (2.0)	+3.1
Symptom/problem burden (0–25)	15.8 (2.9)	18.5 (2.4)	+2.7

All domain improvements were positive; paired comparisons for each domain reached statistical significance at p <0.01 (paired t-tests; exact domain t-values not shown here for brevity).

Table 4: Pretest and post-test total QoL scores (Summary)

Statistic	*Pretest QoL*	*Post-test QoL*
Mean	56.40	68.90
SD	8.20	7.10
Minimum	38	52
Maximum	72	86

1912.50 ÷ 0.848528137423857 \approx 14.73139127471912.50÷0.848528137423857≈14.731391274719.
Rounded: t≈14.73t \approx 14.73t≈14.73.
Degrees of freedom df=n−1=49df = n - 1 = 49df=n−1=49.
Using conventional inference, t(49)=14.73t(49) = 14.73t(49)=14.73 — corresponds to **p < 0.001**.

Effect size (Cohen's d)

d=d¯/sd=12.50/6.00=2.0833d = \bar{d} / s_d = 12.50 / 6.00 = 2.0833d=d¯/sd=12.50/6.00=2.0833 → **d ≈ 2.08** (very large effect).

Final Description of Results

On a 0–100 QoL scale, the SME program resulted in an average improvement of 12.5 points. According to the paired t-test, this improvement had a very large effect size (Cohen's d ≈ 2.08) and was highly statistically significant (t(49)=14.73, p <0.001). All evaluated domains (physical, psychological, social, and symptom load) showed improvements, indicating widespread advantages of SME. With over 90% of participants attending sessions and providing good comments on reinforcement calls, the program was highly received.

Discussion

A 6-week SME program considerably increased QoL at the 4-week follow-up in this quasi-experimental trial, including 50 CKD patients. For patients with chronic illness, the change's size (mean +12.5 points) has both statistical and clinical significance.

Comparing with the research, SME and education initiatives for chronic illnesses usually result in modest gains in QoL and self-management practices. The strong adherence to the program, short follow-up that limits fade-out effects, small sample size that might magnify impact estimates, and targeted content suited to CKD needs are all likely contributing factors to this very substantial effect size (d = 2.08). Real-world multi-site trials frequently provide clinically significant improvements despite smaller effect sizes. Patients' confidence, dietary/medication adherence, and symptom awareness were probably all enhanced by education. In contrast, the handbook and reinforcement calls supported behavior maintenance, role-playing and hands-on demonstrations improved skill learning (e.g., BP self-monitoring, fluid management).

Strengths

- Structured intervention with mixed teaching methods (didactic, hands-on, reinforcement).
- Use of a CKD-specific validated QoL instrument.
- High participant retention and adherence.

Limitations

- The absence of a control group restricts the ability to draw conclusions about causality; improvements may be partially due to the Hawthorne effect or regression to the mean.
- Generalizability is limited by convenience sampling and a single-center design.
- The longer-term sustainability is uncertain due to the limited follow-up (4 weeks after completion).
- The sample size (n = 50) is insufficient for subgroup analysis (e.g., by CKD stage), but sufficient for identifying significant effects.
- Response bias affects self-reported quality of life.

Implications for practice

The results are in favor of including SME in standard CKD care. Practical components are scalable and inexpensive (handbook, demonstrations, telephone reinforcement). The program's reach could be increased by teaching renal nurses.

Conclusion

A structured self-management education programme significantly improved the quality of life among CKD patients in this sample. The intervention produced broad gains across physical, psychological and social domains and reduced perceived symptom burden. SME should be considered as a standard supportive care component for CKD patients, with further research recommended using randomized designs and longer follow-up.

Recommendations

- Regularly implement SME under the direction of qualified renal nurse educators in nephrology clinics.
- To verify the SME program's efficacy and generalizability, scale it up and test it in multi-center randomized controlled trials.
- To evaluate the sustainability of QoL gains, including a long-term follow-up (6–12 months).
- Incorporate training for family members and caregivers to encourage self-management at home.
- To enhance in-person meetings, use digital reinforcement (mobile apps, SMS reminders).
- To assess therapeutic benefits, gather objective clinical outcomes (BP control, hospitalization rates, progression markers) in addition to QoL.

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Nil.

Conflicts of interest

The author declares that they have no conflict of interest with regard to the content of the report.

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