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# A study to assess the effectiveness of structured teaching programme on knowledge and practice regarding renal rehabilitation among chronic kidney disease patients

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**Abstract**

**Introduction:** Renal rehabilitation is a holistic approach aimed at reducing the ill effects of chronic kidney disease (CKD) and improving patients' adherence to recommended care practices. This study assessed the effectiveness of a structured teaching programme (STP) on knowledge and practice regarding renal rehabilitation among CKD patients.

**Methods:** A quasi-experimental pretest-posttest control group design was used among 60 purposively selected CKD patients from selected hospitals in Kollam. Data were collected using a structured knowledge questionnaire and a practice checklist.

**Results:** Findings showed a significant improvement in knowledge and practice scores in the experimental group following the intervention. Posttest mean knowledge score increased from 15.03±4.14 to 25.07±3.33, and practice score from 36.67±5.57 to 42.80±2.12. Significant associations were found between pretest knowledge and variables such as age and type of family, and between pretest practice and number of dialysis sessions per week. A weak positive correlation existed between posttest knowledge and practice.

**Conclusion:** The study proves the effectiveness of a structured teaching programme on knowledge, practice regarding renal rehabilitation among chronic kidney disease patients.

**Keywords:** Chronic kidney disease, renal rehabilitation, structured teaching programme, knowledge, practice

## Introduction

The kidney is one of the body's essential organs, playing a vital role in maintaining homeostasis by excreting waste products and regulating the body's fluid balance. In addition to these primary functions, the kidneys perform a wide range of other important tasks, including erythropoiesis (production of red blood cells), regulation of blood glucose and calcium levels, and various endocrine functions. Consequently, the loss of renal function affects not only the kidneys but also other organ systems such as the heart and lungs, since the kidneys are integral to multiple physiological processes. Kidney dysfunction can occur at any age and with varying degrees of severity. Severe impairment or complete loss of kidney function is referred to as renal failure**.** More than two million people worldwide currently rely on dialysis or kidney transplantation to survive; however, this represents only about 10% of those who actually need such treatment [1]. The number of patients diagnosed with End-Stage Renal Disease (ESRD) is increasing at an annual rate of 5-7% [2]. In India, the age-adjusted incidence rate of ESRD is estimated to be 229 per million population (pmp), with more than 100,000 new patients entering renal replacement programs each year [3].

During clinical postings, the researcher observed many patients undergoing hemodialysis. Several individuals who initially received dialysis once a week later required sessions three times per week. Due to inadequate knowledge regarding renal care and lifestyle modifications, their conditions progressively worsened, increasing their dependency on dialysis. Renal Rehabilitation is a holistic, multidisciplinary approach that encompasses exercise, dietary management, education, and psychosocial support, ultimately fostering a positive outlook and improved quality of life. It is a systematic, effective, and feasible secondary prevention strategy designed to manage chronic kidney disease and alleviate post-dialysis fatigue or "dialysis hangover." A structured teaching program involves a systematic method of education that begins with teacher-led instruction and concludes with self-directed learning by the participants [6]. Rehabilitation represents a new beginning after physical or functional decline and is crucial in educating, empowering, and enabling individuals to address the root causes of illness. Therefore, enhancing patients' knowledge and practice regarding renal rehabilitation is essential to promote healthier, more independent living.

### Objectives of the study

- To assess the knowledge and practice regarding renal

rehabilitation among chronic kidney disease patients at selected hospitals, Kollam.
- To evaluate the effectiveness of a structured teaching programme on knowledge and practice regarding renal rehabilitation among chronic kidney disease patients at selected hospitals, Kollam
- To find the association between pretest knowledge and practice scores regarding renal rehabilitation among chronic kidney disease patients and demographic variables.
- To find correlation between knowledge and practice regarding renal rehabilitation among chronic kidney disease patients.

**Hypothesis**
- **$H_1$:** There is a significant difference between pretest and posttest knowledge scores regarding renal rehabilitation among chronic kidney disease patients in experimental group
- **$H_2$:** There is a significant difference between posttest knowledge scores regarding renal rehabilitation among chronic kidney disease patients in experimental group and control group.
- **$H_3$:** There is a significant difference between pretest and posttest practice score regarding renal rehabilitation among chronic kidney disease patients in experimental group.
- **$H_4$:** There is a significant difference between posttest practice score regarding renal rehabilitation among chronic kidney disease patients in experimental group and control group.
- **$H_5$:** There is a significant association between mean pretest knowledge and practice score and demographic variables.
- **$H_6$:** There is a significant correlation between knowledge and practice regarding renal rehabilitation among chronic kidney disease patients.

**Conceptual framework**
Von Bertalanffy (1998), the general systems theory,

**Methodology**
- **Research Approach:** Quantitative Evaluative Approach
- **Research Design:** Quasi-experimental research design, two-group pretest-posttest design
- **Setting of the study:** -The study was conducted in the selected hospitals in Kollam, Kerala
- **Sample and sampling technique:** Non- probability purposive sampling technique
- **Sample Size:** The sample size consisted of 60 CKD patients who met the inclusion criteria, with 30 allocated to the experimental group and 30 to the control group

**Inclusion and exclusion criteria**
The inclusion criteria for sample selection were: patients diagnosed with chronic kidney disease, those willing to participate in the study, available during the period of data collection, and able to read and write Malayalam. The exclusion criteria included patients who were critically ill, unable to read and write Malayalam, or unwilling to provide informed consent.

**Method of data collection**
**Tool 1**
- **Section A:** demographic proforma to collect baseline characteristics of participants.
- **Section B:** consisted of a self-structured knowledge questionnaire containing 30 items, with a maximum possible score of 30 and a minimum of 0; one mark was awarded for each correct answer, and zero for incorrect responses.

**Tool 2:** Self-structured practice checklist to assess the practical aspects of renal rehabilitation.

**Tool 3**: Structured teaching programme, which covered topics such as renal education, care of arteriovenous (AV) fistula, dietary management, exercise, motivation, and employment support.
A pilot study was conducted in November 2024 for a period of one week at a selected hospital in Kollam after obtaining ethical clearance and administrative permission from the concerned authorities. Six CKD patients were selected using the non-probability purposive sampling method based on the inclusion criteria. The researcher provided a brief introduction to the study and obtained written informed consent from each participant prior to data collection. The pilot study helped to assess the feasibility, clarity, and effectiveness of the tools and methodology for the main study.

**Data Collection Procedure**
The main study was conducted at selected hospitals in Kollam. A total of 60 patients 30 in the experimental group and 30 in the control group, were selected for data collection using a non-probability purposive sampling technique based on the inclusion criteria. The data collection was carried out over two weeks in December 2024. Prior permission was obtained from the Institutional Ethics Committee and the concerned hospital authorities before initiating the study. The participants were assured of anonymity and confidentiality of the information they provided. The 60 samples were further divided into four subgroups, each consisting of 15 participants, to facilitate data collection. On the first day, a pre-test was administered to the first 15 participants in the experimental group using a structured knowledge questionnaire to assess their knowledge and a structured practice checklist to assess their practice regarding renal rehabilitation. This was immediately followed by the administration of the structured teaching programme on renal rehabilitation. On the second day, the same procedure was followed for the next 15 participants in the experimental group.
On the third day, the pre-test was conducted for the first 15 participants in the control group using the same tools (structured knowledge questionnaire and practice checklist), and on the fourth day, the remaining 15 participants in the control group underwent the same pre-test assessments. Unlike the experimental group, the control group did not receive the structured teaching programme. From the seventh to the twelfth day, post-tests were conducted for

both groups using the same structured knowledge questionnaire and structured practice checklist to assess any changes in knowledge and practice following the intervention.

**Ethical Considerations**

Ethical approval was obtained from the Institutional Ethics Committee, and formal permission was taken from the hospital authorities. Informed written consent was obtained from all participants. Anonymity, confidentiality, and privacy were ensured throughout the study, and all ethical principles for human research were strictly followed.

**Results**

Section A: Description of sample characteristics

**Table 1:** Section A Demographic Data

| Demographic Variables | Experimental Group (30) | | Control Group (30) | |
|---|---|---|---|---|
| | Frequency | Percentage (%) | Frequency | Percentage (%) |
| **Age in years** | | | | |
| Below 45 | 7 | 23.33% | 5 | 16.67% |
| 45- 55 | 7 | 23.33% | 9 | 30% |
| 56-65 | 5 | 16.67% | 11 | 36.66% |
| Above 65 | 11 | 36.67% | 5 | 16.67% |
| **Gender** | | | | |
| Male | 19 | 63.33% | 20 | 66.67% |
| Female | 11 | 36.67% | 10 | 33.33% |
| **Occupation** | | | | |
| Unemployed | 26 | 86.67% | 18 | 60% |
| Government employed | 4 | 13.33% | 0 | 0% |
| Self employed | 0 | 0% | 5 | 16.67% |
| Private employed | 0 | 0% | 7 | 23.33% |
| **Marital status** | | | | |
| Married | 28 | 93.34% | 25 | 83.33% |
| Single | 1 | 3.33% | 3 | 10% |
| Divorce/separate | 1 | 3.33% | 2 | 6.67% |
| **Education** | | | | |
| Primary education | 5 | 16.67% | 2 | 6.67% |
| Middle school | 1 | 3.33% | 2 | 6.67% |
| High school | 17 | 56.66% | 19 | 63.33% |
| Intermediate/diploma | 0 | 0% | 1 | 3.33% |
| Graduate | 5 | 16.67% | 5 | 16.67% |
| Professional graduate | 2 | 6.67% | 1 | 3.33% |
| **Monthly income of the family** | | | | |
| >Rs.1,35,169 | 5 | 16.67% | 1 | 3.33% |
| Rs.67,587- Rs.1,35,168 | 0 | 0% | 1 | 3.33% |
| Rs.50,560- Rs.67,586 | 4 | 13.34% | 4 | 13.33% |
| Rs.33,793- Rs.50,559 | 12 | 40% | 14 | 46.68% |
| Rs.20,274- Rs.33,792 | 1 | 3.33% | 4 | 13.33% |
| Rs.6768- Rs.20,273 | 1 | 3.33% | 2 | 6.67% |
| <Rs.6767 | 7 | 23.33% | 4 | 13.33% |
| **Type of family** | | | | |
| Nuclear family | 28 | 93.33% | 28 | 93.33% |
| Joint family | 2 | 6.67% | 2 | 6.67% |
| **Relationship with family members** | | | | |
| Excellent | 24 | 80% | 28 | 93.33% |
| Good | 2 | 6.67% | 0 | 0% |
| Average | 2 | 6.67% | 2 | 6.67% |
| Poor | 2 | 6.67% | 0 | 0% |
| **Co-morbid illness** | | | | |
| No | 2 | 6.67% | 1 | 3.33% |
| Diabetes | 3 | 10% | 0 | 0% |
| Hypertension | 11 | 36.66% | 9 | 30% |
| Both diabetes and hypertension | 14 | 46.67% | 20 | 66.67% |
| **Number of hemodialysis per week** | | | | |
| Two times a week | 13 | 43.33% | 13 | 43.33% |
| Three times a week | 15 | 50% | 17 | 56.67% |
| Once a week | 2 | 6.67% | 0 | 0% |
| **Duration of illness** | | | | |
| Newly detected | 0 | 0% | 1 | 3.34% |
| Within one year | 5 | 16.67% | 7 | 23.33% |
| One to five years | 21 | 70% | 15 | 50% |
| More than five years | 4 | 13.33% | 7 | 23.33% |

The majority of CKD patients belonged to the 56-65 year age group in the experimental group (36.66%) and above 65 years in the control group (36.67%). Most participants were male and belonged to nuclear families. More than half underwent hemodialysis two to three times per week.

**Section B: Description of level of knowledge of chronic kidney disease patients regarding renal rehabilitation in experimental and control group**

**Table 2:** Description level of knowledge regarding renal rehabilitation in pretest among chronic kidney disease patients in experimental and control group. (N=60)

| Score | Knowledge level | Experimental group | | Control group | |
|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage |
| 0-10 | Poor knowledge | 5 | 16.67% | 9 | 30% |
| 11-20 | Average knowledge | 22 | 73.33% | 19 | 63.33% |
| 21-30 | Good knowledge | 3 | 10% | 2 | 6.67% |

The data presented in Table 2 shows that in the pretest majority of samples (73.33%) in the experimental group had an average level of knowledge. Similarly, in the control group, most participants (63.33%) also demonstrated an average level of knowledge.

**Table 3:** Description of the Level of Knowledge Regarding Renal Rehabilitation in the Posttest Among Chronic Kidney Disease Patients in Experimental and Control Groups (N = 60)

| Score Range | Knowledge Level | Experimental Group | | Control Group | |
|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage |
| 0-10 | Poor knowledge | 0 | 0% | 5 | 16.67% |
| 11-20 | Average knowledge | 4 | 13.33% | 22 | 73.33% |
| 21-30 | Good knowledge | 26 | 86.67% | 3 | 10% |

The data presented in Table 3 show that, in the posttest, the majority of participants (86.67%) in the experimental group had a good level of knowledge regarding renal rehabilitation. In contrast, in the control group, the majority of participants (73.33%) had an average level of knowledge.

**Section C: Practice Level Regarding Renal Rehabilitation**

**Table 4:** Description of the Level of Practice Regarding Renal Rehabilitation in the Pretest Among Chronic Kidney Disease Patients in Experimental and Control Groups (N = 60)

| Score Range | Practice Level | Experimental Group | | Control Group | |
|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage |
| 15-25 | Poor practice | 1 | 3.33% | 4 | 13.33% |
| 26-35 | Average practice | 9 | 30% | 12 | 40% |
| 36-45 | Good practice | 20 | 66.67% | 14 | 46.67% |

The data presented in Table 4 indicate that, in the pretest, the majority of participants in the experimental group (66.67%) demonstrated a good level of practice regarding renal rehabilitation. Similarly, in the control group, most participants (46.67%) also showed a good level of practice.

**Table 5:** Description of the Level of Practice Regarding Renal Rehabilitation in the Posttest Among Chronic Kidney Disease Patients in Experimental and Control Groups (N = 60)

| Score Range | Practice Level | Experimental Group | | Control Group | |
|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage |
| 15-25 | Poor practice | 0 | 0% | 4 | 13.33% |
| 26-35 | Average practice | 1 | 3.33% | 11 | 36.67% |
| 36-45 | Good practice | 29 | 96.67% | 15 | 50% |

The data presented in Table 5 reveal that, in the posttest, the majority of participants in the experimental group (96.67%) demonstrated a good level of practice regarding renal rehabilitation. In the control group, half of the participants (50%) showed a good level of practice.

**Table 6:** Comparison of Mean Pretest-Posttest Knowledge Scores regarding renal rehabilitation in Experimental Group (n=30)

| Group | Mean | SD | t-value | Significance |
|---|---|---|---|---|
| Pretest | 15.03 | 4.14 | 14.458 | Significant |
| Posttest | 25.07 | 3.33 | | |

The data presented in table 6 findings suggest that the calculated t-value of 14.458, which is greater than the table value at the 0.05 level of significance, indicates a statistically significant improvement in knowledge following the intervention. This confirms that the structured teaching programme was effective in enhancing the knowledge of chronic kidney disease patients regarding renal rehabilitation.

**Table 7:** Comparison of Posttest Knowledge Scores between Experimental and Control Groups (N=60)

| Group | Mean | SD | t-value | Significance |
|---|---|---|---|---|
| Experimental | 25.07 | 3.33 | 8.925 | Significant |
| Control | 15.70 | 4.68 | | |

The calculated t value 8.925 is higher than that of the table value 2.00 at 0.05 level of significance indicating that there is a significant difference between the mean posttest score of knowledge regarding renal rehabilitation among chronic kidney disease patients in experimental group and control group, is accepted.

**Section E: Effectiveness of Structured Teaching Programme on Practice Regarding Renal Rehabilitation Among Chronic Kidney Disease Patients**

**Table 8:** Comparison of Mean Pretest and Posttest Practice Scores Regarding Renal Rehabilitation Among Chronic Kidney Disease Patients in the Experimental Group (n = 30)

| Group | Mean | SD | t-value | Significance |
|---|---|---|---|---|
| Pretest | 36.67 | 5.57 | 6.488 | S |
| Posttest | 42.80 | 2.12 | | |

The calculated *t* value of 6.488 is higher than the table value of 2.04 at the 0.05 level of significance, indicating that there is a statistically significant difference between the mean pretest and posttest practice scores of chronic kidney disease patients in the experimental group. This result suggests that the structured teaching programme was effective in improving the practice of patients regarding renal rehabilitation.

**Table 9:** Comparison of Mean Posttest Practice Scores Regarding Renal Rehabilitation Among Chronic Kidney Disease Patients in Experimental and Control Groups (N = 60)

| Group | Mean | SD | t-value | Significance |
|---|---|---|---|---|
| Experimental group | 42.80 | 2.21 | 7.055 | S |
| Control group | 33.73 | 6.71 | | |

The calculated *t* value of 7.055 is greater than the table value of 2.00 at the 0.05 level of significance, indicating that there is a statistically significant difference between the mean posttest practice scores of the experimental and control groups. This finding confirms that the structured teaching programme was effective in enhancing the practice of patients regarding renal rehabilitation.

**Section F: Association between Pretest Knowledge Score Regarding Renal Rehabilitation and Demographic Variables**

**Table 10:** Association between Pretest Knowledge and Demographic Variables (N = 60)

| Sl. No | Demographic Variables | $\chi^2$ Value | df | Table Value (0.05 Level) | Significance |
|---|---|---|---|---|---|
| 1 | Age in years | 13.66 | 6 | 12.59 | S |
| 2 | Gender | 0.35 | 2 | 5.991 | NS |
| 3 | Occupation | 3.79 | 6 | 12.59 | NS |
| 4 | Marital status | 12.45 | 6 | 12.59 | NS |
| 5 | Education | 4.82 | 10 | 18.31 | NS |
| 6 | Monthly income of the family | 18.3 | 12 | 21.02 | NS |
| 7 | Type of family | 25.02 | 2 | 5.99 | S |
| 8 | Relationship with family members | 6.12 | 6 | 12.59 | NS |
| 9 | Co-morbid illness | 3.36 | 6 | 12.59 | NS |
| 10 | Number of hemodialysis per week | 8.34 | 4 | 9.48 | NS |
| 11 | Duration of illness | 4.61 | 6 | 12.59 | NS |

S - Significant; NS - Not Significant

Table 10 shows the association between pretest knowledge regarding renal rehabilitation and selected demographic variables among patients with chronic kidney disease. There was a statistically significant association between pretest knowledge and age as well as the type of family. Older patients and those from joint families displayed variations in knowledge levels. No significant association existed with variables such as gender, occupation, marital status, monthly income, comorbidities, or dialysis frequency.

**Table 11:** Association Between Pretest Practice Scores on Renal Rehabilitation and Selected Demographic Variables Among Chronic Kidney Disease Patients

| Demographic Variable | $\chi^2$ Value | df | Table Value (0.05 Level | Significance |
|---|---|---|---|---|
| Age | 5.38 | 6 | 12.59 | Not Significant |
| Gender | 0.58 | 2 | 5.991 | Not Significant |
| Occupation | 8.09 | 6 | 12.59 | Not Significant |
| Marital status | 5.25 | 6 | 12.59 | Not Significant |
| Education | 6.66 | 10 | 18.30 | Not Significant |
| Monthly income | 12.38 | 12 | 21.02 | Not Significant |
| Type of family | 5.82 | 2 | 5.99 | Not Significant |
| Relationship with family | 11.46 | 6 | 12.59 | Not Significant |
| Co-morbid illness | 3.19 | 6 | 12.59 | Not Significant |
| No. of dialysis/week | 25.46 | 4 | 9.48 | Significant |
| Duration of illness | 3.38 | 6 | 12.59 | Not Significant |

The data in the table 11 shows the association between pretest practice score regarding renal rehabilitation among chronic kidney disease patients and demographic variables The calculated value was less than that of the table value except for number of dialysis per week So there was no significant association between pretest practice score regarding renal rehabilitation among chronic kidney disease patients and the variables like age, monthly income of family, gender, occupation, type of family, education,marital status, relationship with family members co-morbid illness and duration of illness.

**Section H: Description of correlation between knowledge and practice regarding renal rehabilitation among chronic kidney disease patients.**

**Table 12:** Description of correlation between posttest knowledge and practice regarding renal rehabilitation among chronic kidney disease patients. (N=60)

| Post test | Mean | SD | <r=Karl Pearson correlation coefficient |
|---|---|---|---|
| Knowledge | 20.383 | 6.21 | 0.44 |
| Practice | 38.266 | 6.73 | |

The correlation coefficient was found to be 0.44 indicating a weak positive correlation between the posttest knowledge and practice score

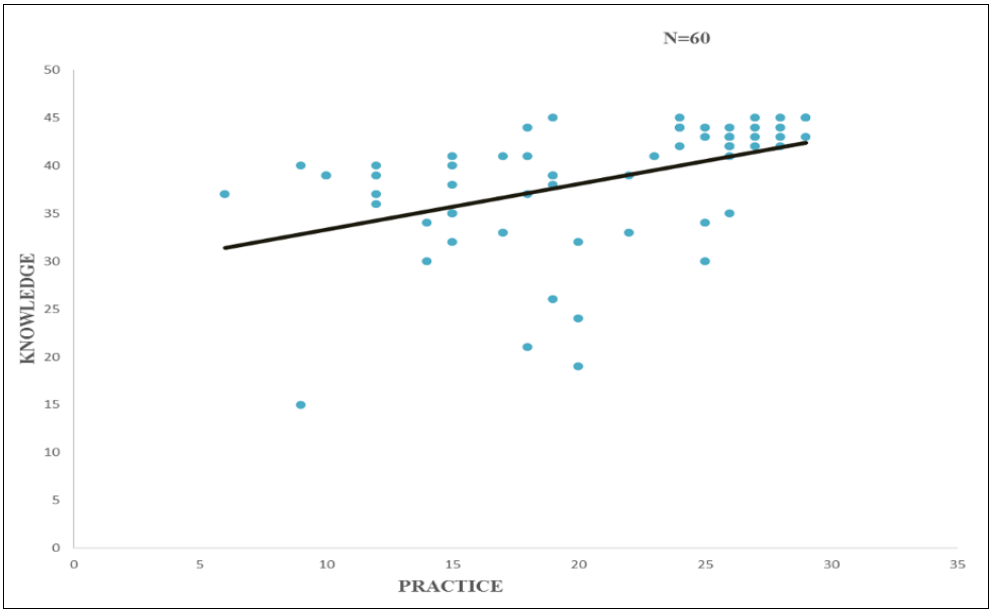


**Fig 14:** Correlation between posttest knowledge and practice score, (N=60)

The data in the figure 14 shows that since the t value was 0.44 there was weak positive correlation between posttest knowledge and practice score. Thus the research hypothesis $H_7$ which states that there is a significant correlation between knowledge and practice regarding renal rehabilitation among chronic kidney disease patients was accepted.

**Discussion**

The study evaluated the effectiveness of a structured teaching programme on knowledge and practice regarding renal rehabilitation among chronic kidney disease patients. In the pretest, most patients in both groups demonstrated only average knowledge, which aligns with findings from a Japanese study where early-stage CKD patients exhibited

moderate knowledge, self-efficacy and self-management levels, indicating a clear need for structured educational support [11].

Pretest practice scores in both groups were generally good or average, similar to an Indian study where CKD risk patients showed low knowledge but moderate practice and positive correlations among knowledge, attitude and practice [12]. This highlights that awareness alone may not be adequate, and reinforcement through teaching is necessary.

The structured teaching programme significantly improved knowledge in the experimental group, as reflected in higher posttest scores compared to pretest and control group scores. This supports prior findings from Kanyakumari, where renal rehabilitation education significantly improved knowledge among hemodialysis patients [13]. Practice scores also improved significantly following the intervention. Although the supporting study on cryotherapy assessed a different outcome, it demonstrated that structured interventions lead to measurable improvements in patient outcomes, reinforcing the value of planned educational programmes [14].

Association analysis showed significant relationships between pretest knowledge and age and type of family, and between pretest practice and number of dialysis sessions per week. This is supported by previous studies indicating that demographic and clinical exposure (e.g., dialysis frequency) influence baseline self-care behaviours [15, 16]. The study also found a weak positive correlation between posttest knowledge and practice, suggesting that increased knowledge contributes to improved practice. Similar correlations between knowledge, function, and performance have been reported in renal rehabilitation literature [17]. Overall, the findings indicate that structured teaching programmes are effective tools for improving knowledge and practice in CKD patients and should be integrated into routine patient education.

## Conclusion

The structured teaching programme was effective in significantly improving knowledge and practice regarding renal rehabilitation among chronic kidney disease patients. The findings highlight the importance of planned, consistent educational interventions as part of routine patient care to enhance self-management, prevent complications and improve overall wellbeing.

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## Conflict of Interest

Not available.

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