

Renal educator: role and responsibilities and applicability in Arab countries

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A renal educator (RE) is a specialized healthcare professional who focuses on teaching and empowering patients, their families, and sometimes other healthcare staff about kidney disease and its management. We aimed to highlight the role of the RE among patients with kidney disease. We have collected more than 100 manuscripts that address renal education issues, with a special focus on randomized controlled trials, review articles, and guidelines. We have summarized the possible role of a new specialized healthcare work that might be helpful in the field of nephrology among our patients in Arab countries concerning kidney disease, at different stages, and its management together with its risk factors. The RE is an advanced practice clinician who is essential to a high-performing, patient-centered nephrology program. RE should have a deep understanding of pathophysiology, behavioral science, and educational theory, and be validated by a robust evidence base for patients with kidney disease. Renal nurses' educators, best to do such job-coordinate patient care across different services and are vital in helping patients understand all treatment options.

Keywords:

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Definition and role overview

A renal educator (RE) is a specialized healthcare professional, typically a highly qualified registered nurse who focuses on teaching and empowering patients, their families, and sometimes other healthcare staff, about kidney disease and its management. They are a cornerstone of the multidisciplinary team in nephrology (nephrologists, dietitians, social workers, and technicians). Their primary goal is to translate complex medical information into palatable understandable knowledge, enabling patients to make informed decisions and actively participate in their care, ultimately improving their quality of life and clinical outcomes.

The critical importance of the role of renal educator

The value of a dedicated RE is well-documented and multifaceted, as it includes the following.

Improved patient outcomes: education leads to better adherence to fluid restrictions, medication regimens, and dietary plans, which can slow the progression of chronic kidney disease (CKD) and reduce hospitalizations [1–3]. An intense nutrition education program contributed to reducing protein intake in patients with stages 3–5 CKD over and above our standard dietary counseling. Nutritional education programs are effective in increasing patient adherence to protein intake recommendations [3].

Informed decision making: innovating services to meet clinical guidelines on enhancing shared

decision-making processes means enabling all stakeholders to use decision aids to meet their goals within kidney pathways at individual, service, and organizational levels [4].

REs guide patients through the discouraging process of choosing a treatment modality (e.g. hemodialysis, peritoneal dialysis (PD), transplantation, or conservative management). Modality decision making is a complex process, influenced by the patient's health literacy, willingness to accept information, predialysis lifestyle, support systems, and values. Patient education requires the flexibility to individualize the delivery of a standardized CKD curriculum in partnership with a patient–health care team, to fulfill the goal of informed, shared decision making [5].

Reduced anxiety and fear: a knowledgeable patient is an empowered patient. Understanding the disease process and treatment options significantly reduces anxiety and fosters a sense of control. Early detection with a prolonged course of wellness despite kidney disease, after effective secondary and tertiary prevention programs, should be promoted. World kidney day 2021 continues to call for increased awareness of the importance of preventive measures

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throughout populations, professionals, and policy makers, applicable to both developed and developing countries [6].

Developing evidence denotes that the proper care of risk factors for CKD as diabetes, hypertension, and glomerulonephritis remain unaddressed despite the availability of consensus statements and guidelines. Lack of awareness among the medical community as well as the public related to the recent preventive and therapeutic advancements is reported in many studies [7]. CKD risk factors, such as diabetes, obesity, and hypertension, are prevalent in the Middle East countries with a lack of awareness about the influence of these risk factors on CKD in Arab countries [8].

Enhanced self-management: for patients on modalities like PD or home hemodialysis, the educator is responsible for ensuring they can perform their treatment safely and independently. Therefore, effective patient education is crucial in ensuring that patients are equipped with the knowledge and skills necessary for both peritoneal and hemodialysis catheter care [8].

Key points provided by renal educators during dialysis procedures

The findings highlighted the importance of employing multifaceted strategies with support from health professionals including nurses, families, and peer support to develop self-efficacy in patients undergoing home dialysis [9].

Provide modality-specific technical training: the RE teaches the unique skills required for either home hemodialysis or PD.

Before home hemodialysis: RE provides how the patient and relatives perform self-cannulation, vascular access care, machine setup, and handling emergency situations like severe bleeding or sudden blood pressure drops.

Before PD: the RE provides many topics to be considered for catheter care (cleaning and dressing changes), managing fluid exchanges, and proper disposal of supplies. Moreover, there emphasize infection prevention with special stress on the importance of sterile technique during all aspects of the treatment to prevent serious complications like peritonitis. In addition, RE instructs on complication monitoring by training patients to recognize and respond to signs of mechanical problems, such as catheter dysfunction or bleeding, and infectious complications. As a basic knowledge, RE educate on overall management by covering other essential self-management skills beyond the procedure itself, such as monitoring vital signs,

taking medications, and following dietary and fluid restrictions. As a part of strengths-based approach, RE focuses on empowering patients by building their knowledge and skills so they can gain greater control over their health and feel more confident in managing their condition especially in emergency situations.

Cost-effectiveness of renal education: by preventing complications and hospital admissions, effective patient education reduces the overall cost of care for the healthcare system. Patient education empowers individuals to better manage their conditions, reducing the risk of developing complications that require costly medical interventions. Educated patients are more likely to adhere to treatment plans, leading to fewer emergency room visits and hospitalizations. Reducing hospital readmissions is a major driver of healthcare cost savings. By avoiding costly readmissions, patients also save money on out-of-pocket costs like copayments and deductibles. Effective education helps ensure patients and their families use healthcare resources appropriately, which is especially true for high-risk and complex patients with chronic diseases like CKD. The implementation of effective patient education programs is a quality improvement initiative that leads to better patient outcomes and more efficient healthcare delivery.

Haines *et al.* [10] in their study, found that by providing intensive patient education to all patients would cost a health service A\$1192 to prevent 3.67 patients from being a faller (i.e. experiencing 1 or more falls) during their admission for every 100 patients treated (incremental cost-effectiveness = A\$325 per faller prevented), whereas providing this intervention only to patients identified as being at high risk by their physiotherapist saved A\$2704 and prevented 2.2 patients from becoming fallers for every 100 patients treated [all costs in Australian Dollars (A\$)].

Treatment of CKD stages 4 and 5 with Clinical Pharmacy Education was more effective and cost-effective compared with treatment of CKD stages 4 and 5 without Clinical Pharmacy Education. The incremental cost-effectiveness ratio indicated that extra costs were required to increase life saved in both stages [11].

The cost-effectiveness of the multidisciplinary patient education highly depends on the level of kidney function, and the intervention may be cost-effective in maintaining patients with mild kidney dysfunction in the work force [12].

Detailed responsibilities of renal educator

The scope of a RE's work depends on the stage of the patient's kidney disease [13].

For patients with early-stage CKD (stages 1–4) (Fig. 1).

Normal physiology and disease process: RE has to explain what kidneys do, what CKD is, and what causes it [14,15]. The progression of CKD can often lead to numerous complications – hypertension, cardiovascular disease, mineral bone disorder, anemia, and volume overload along with acid–base and electrolyte abnormalities – that can interact with each other and worsen kidney function, eventually resulting in morbidity, poor quality of life, and mortality [16]. However, there are several gaps related to the appropriate identification and management of CKD are primarily related to awareness [17].

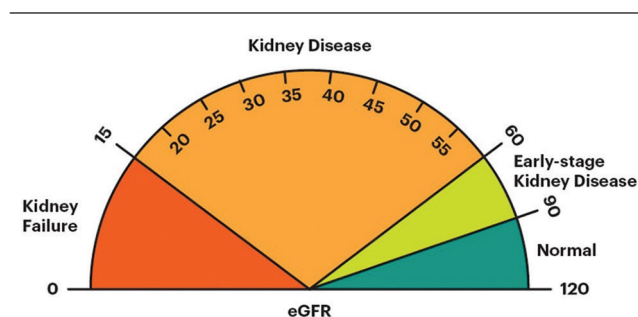
Slowing progression of CKD: education on blood pressure control, glycemic control (for diabetics), and use of nephroprotective medications like ACE inhibitors/ARBs, GLP1-RA, finerenone, and SGLT2i.

From a preliminary report by Othman *et al.* [18] in their randomized controlled study evaluating the effect of structured diabetes education (SDE) on patients' self-care activities and metabolic control variables, they found that diabetes knowledge was deficient among diabetic CKD transplant recipients. They recommended seminars, counseling sessions, and workshops to be arranged periodically to improve their low level of diabetes knowledge.

Further report from the same group [19] found that SDE was associated with reduced diabetic nephropathy but had no significant effects on other microangiopathy or macroangiopathy. However, they recommended education for all kidney transplant recipients with diabetes.

Moreover, they added that SDE improved lifestyle knowledge, self-care diabetes management, and metabolic control variables among kidney transplant recipients with posttransplant diabetes. In addition, they found that SDE resulted in partial reversibility of the present early diabetic nephropathy.

Figure 1



Stages of chronic kidney diseases according to estimated glomerular filtration rate.

Laboratory values: RE teaches patients what their eGFR, creatinine, and urine albumin levels mean [20–22].

Lifestyle modifications: detailed guidance on renal diet (by reducing sodium intake to < 6 g – about one teaspoon – per day, restrict potassium, phosphorus, optimize fluid intake based on the kidney function status, and moderate protein intake) [22].

Medication management: reviewing all the prescribed medications, highlighting those that may be harmful to the kidneys (e.g. NSAIDs), and ensuring understanding the action of different prescribed medications. Moreover, optimization of herbal use is another important issue that can be tackled by RE so that avoiding the adverse effects and interactions with other medications.

Medication reconciliation and medication management services that could consistently and systematically identify and resolve medication-related problems would be likely to improve end-stage kidney disease patient outcomes and reduce total cost of care. In the same way, Pai *et al.* in their review provide evidence and recommendations for optimal delivery of medication management services to end-stage kidney disease patients in a dialysis facility-centered model [23].

Medication management is essential to minimize the risks associated with CKD medications, including adverse drug reactions and interactions, and the inadvertent use of nephrotoxic drugs. It requires a collaborative effort from a diverse team of healthcare providers, all of whom have distinct but interconnected roles in ensuring that CKD patients receive the right medications, at the correct dosages, and with proper monitoring. By working together, they can help CKD patients achieve better health outcomes and an improved quality of life. Health map offers a proven solution for achieving not only effective medication management but also overall improvements in kidney health management [24].

For patients approaching end-stage renal disease/ chronic kidney disease (stage 5)

The RE will focus on how to select the optimal modality – based on a neutral, comprehensive overview – of all renal replacement therapy options (including the advantages and disadvantages of each modality):

Hemodialysis: in-center versus home, vascular access (fistula, graft, catheter), and the procedure itself. Moreover, the RE can increase awareness about the proper care of vascular access before during and after

dialysis procedure.

- (1) PD: how it works, the catheter placement, the daily cycle process, different types of PD in addition to increasing awareness of proper hygiene and disinfection procedure during the PD procedure.
- (2) Access preparation: emphasizing the critical importance of creating a fistula months before it is needed. Through careful planning and smooth interdisciplinary cooperation, it is possible to implement an education and support program that helps patients choose a form of RRT that is most suited to their needs. This may result in benefits in quality of life and clinical outcomes [25].

The selection of dialysis modality is influenced by patient motivation, desire, education, medical history, physician, and/or nurse bias and the ability to tolerate volume shifts [26,27]. Knowledge of home dialysis among nonrenal healthcare professionals is poor and they lack the confidence to discuss treatment modalities with CKD patients. There is a clear need for further education about home dialysis, which can be facilitated by the nephrology department in different formats. This is likely to increase the number of multimorbid CKD patients opting for home therapy and therefore may improve the patient's outcome and quality of life [28].

Conservative kidney management must be offered, and the "Renal Replacement Therapy Professional Instructor" is also required to participate in them. It is hoped that a comprehensive medical system centered on Renal Replacement Therapy Professional Instructors will be created to meet the increasingly diverse needs of patients with end-stage kidney disease and their families, with the aim of providing support that will enable them to lead richer lives [29].

- (1) Kidney transplantation: the RE has a critical role started before transplantation during the evaluation process and if the patient is fit or not; then during waitlist period and issues to be considered during this period; selection of donor either living or deceased, and finally life posttransplant. This will increase awareness about the possible complications faced by the patient after transplant such as infections, CVD, bone disease, metabolic complications, rejection and malignancy. Of course, this can be prevented by regular follow-up and screening.
- (2) Conservative management: discussing the option of nondialytic care focused on symptom management and quality of life.

For patients on dialysis

REs explain how dialysis works, including the removal

of waste and excess fluid, and discuss potential side effects like decreased blood pressure. They provide information on various treatment options, such as hemodialysis, PD, and transplantation, often using multimedia resources, demonstrations, and facility tours to support patient understanding. For patients who can perform dialysis at home, educators provide instructions on how to perform exchanges and manage the process in their own environment. Regular lifelong education reinforcement is needed with special stress on continual education on diet, fluid management, and medication adherence.

For acute dialysis patients

Research on the utilization of formal education for acute dialysis starts with multimedia provision of information and interactive experiences. Motivational interviewing techniques and individual counseling skills are used to explore patient's priorities and wishes. Family and a support network are of utmost importance and should be involved early in the education process [25]. The education material should include booklets, flipcharts, manuals, videos, and photographs [30]. Demonstration of dialysis modalities and physical tours of the facilities have also been shown to be helpful [27]. Some centers have organized for patients to meet up with those established on various dialysis modalities, as well as group sessions for peer support [31]. All published studies in this area have involved the one or a group of trained specialist nurses as the lead educators. They provided information over a period of usually three to five sessions; with one study having a median education time was 5.6 h (interquartile range: 1.5–9.2 h) over the median of eight visits per patient [31,32].

Key roles and responsibilities of renal educators among patients posttransplant

The RE teaches patients about the importance of their regular follow up visits and what, immunosuppressive medications, including dosage, usage, timing, and potential side effects, as well as the importance of strict adherence. Also, explaining the signs and symptoms of organ rejection and what to do if they occur, and how to manage posttransplant complications. Moreover, they provide education on lifestyle adjustments like diet, exercise, and food safety to prevent infections and manage long-term health risks such as heart disease and osteoporosis. In addition, they work with other members of the transplant team, such as pharmacists, dietitians, and social workers, to address the patient's specific physical, emotional, and financial needs. They can help patients develop self-efficacy and the knowledge and skills to manage their health independently through ongoing, tailored, and patient-centered education. Leonforte and colleagues

reported that low socioeconomic conditions and educational level had a negative impact on kidney transplant outcomes. Improving access to education and providing targeted educational support and health literacy could enhance treatment adherence and reduce disparities in transplant outcomes [33].

Kidney transplant recipients with a higher educational level had better survival than patients with a lower education level; the Weibull model fitting confirmed these differences, with the event of death occurring ~1.5 times faster in patients with a lower education level than those with a higher education level. Similar findings were found in graft survival: kidney transplant recipients with a higher education level had better graft survival compared with recipients with a low educational level.

Kidney transplantation could help, in principle, to remove the barrier that prevents one from working effectively; a recent study [34] demonstrated that transplanted patients had an employment rate of 56%, and this was strictly correlated with higher education level, preemptive transplantation, and receiving a living donor transplant [34,35]. This was confirmed in this study, where 66% of patients with high educational status were employed after transplantation in contrast with the 32.5% of patients with a low educational status ($P < 0.001$). A higher educational level is correlated with better access to healthcare, better treatment adherence, and better posttransplant outcomes [36]. Patients with a lower level of education are often less informed and less able to manage the complex therapeutic regimens required after transplantation, which could lead to a higher incidence of complications and reduced graft survival [37]. Kidney transplant recipients with a low educational level had a longer time on dialysis and delayed access to the transplant health system, and these factors could negatively influence the posttransplant outcomes. Lower educational status has been associated with lower health literacy, which can affect a patient's ability to manage their health effectively and adhere to posttransplantation treatment protocols [33]. In contrast, higher educational status is often linked to better health outcomes due to better access to healthcare resources, increased social support, and a greater ability to comply with medical advice [38,39].

Essential skills and competencies

The RE should be highly qualified with experience in the field of nephrology, with excellent communication skills with patients and other nephrology teams. RE should have the ability to explain complex topics to patients in simple, understandable terms. They must

be able to assess health literacy and adapt; accordingly, work with patients facing a life-altering chronic illness requires immense emotional intelligence. Moreover, they should respect and incorporate patients' cultural, religious, and personal beliefs into the care plan and help patients overcome denial, fear, and resistance to necessary lifestyle changes.

Who should do the job of renal educator

In many healthcare settings, nurses generally have more time for one-on-one interactions with patients. This allows them to better understand the patient's individual educational and psychosocial needs. So, they can provide individualized education and support for managing a chronic condition. Butler *et al.* [40] showed that nurses spent about 33% of their time in direct patient interactions compared to physicians' 14–18%. Another study found that in an ICU, nurses spent 86.14% of the time when a healthcare worker was in the patient's room, compared to 13.11% with physicians. Increased contact time with nursing staff is associated with better patient outcomes, such as a reduction in in-hospital mortality. Tafti *et al.* [41] found a statistically significant association between contact time, measured as the total number of minutes in a day the patient is in contact with nursing staff, and in-hospital mortality. A 10-min increase in contact time is associated in our data with a 0.05% reduction in mortality.

The ability to spend more time with patients allows nurses to better understand and address the patient's "individual educational and psychosocial needs," a key component of patient-centered approach. However, despite their role, nurses face challenges that reduce their direct patient care time, such as time spent on documentation, nonclinical tasks, and unscheduled appointments.

Moreover, renal nurse education programs have been shown to significantly improve aspects of patient well-being, including sleep quality, energy levels, symptom control, and depression [42]. Renal nurse educators coordinate patient care across different services and are vital in helping patients understand all treatment options, including dialysis choices, transplant, and conservative management, to make informed decisions [43].

The goal of self-management education is to identify strategies that can be used to help patients manage their condition(s) while leading full, active, and productive lives. For those living with CKD, self-management behaviors range from medication adherence, health monitoring, and symptom monitoring to lifestyle

modifications (e.g. increasing physical activity and eating an appropriate diet), which reduce cardiovascular, CKD progression, and general health risk factors [44]. Learning to live with and coping with the emotional consequences associated with CKD are important in looking after one's mental health [45] and can facilitate an optimistic view and positive attitude towards their condition, health, and life [46]. Engaging in self-management behaviors can reduce symptom burden, improve quality of life, and potentially slow the progression of CKD [47,48]. To help people with CKD self-manage, it is widely recommended that individuals are aware of their diagnosis, involved in shared treatment decisions, provided access to their medical data, and given information on blood pressure control, exercise, diet, medication management, and smoking cessation [49].

Nurses often focus on the practical, daily self-management aspects of living with kidney disease, which can lead to higher patient adherence to treatment plans. Nurse-led interventions integrating psychosocial support with skill-building may enhance self-management, reduce hospitalization, and improve quality of life in PD populations [50].

Patients often prefer doctors as educators for complex medical topics due to their perceived credibility and expertise. This preference is linked to the trust built within the physician–patient relationship, with some studies showing that 46% of patients prefer a doctor's perspective. This preference stems from the belief that an in-person interaction with their doctor is an indicator of quality care and is especially valued when discussing complex diseases or personal health information. Some studies show patients prefer doctors for medical education, while satisfaction with nurses is higher for routine care and support [51].

Therefore, nephrologists as educators will focus on advanced medical knowledge, diagnosis, and treatment plan and determine the overall medical strategy, which can include teaching patients about their specific diagnosis (e.g. polycystic kidney disease) and its medical implications. They can provide medical expertise that nurses then help translate to patients. In the same direction, nephrology nurses as educators will focus on patient and family support, skill-building, and day-to-day management of kidney disease. They can act on practical aspects of care, such as diet, medication adherence, dialysis procedures, and home care management. Moreover, they can cover a broad range of topics including symptom management, diet, lifestyle adjustments, and the psychological aspects of living with chronic illness.

Conclusion

The modern RE is a sophisticated, advanced practice clinician whose role is integral to a high-performing, patient-centered nephrology program especially among Middle East countries. Their work, grounded in a deep understanding of pathophysiology, behavioral science, and educational theory, and validated by a robust evidence base, is a critical determinant of both the quality and cost of care for patients with kidney disease. Increased contact time with nursing staff is associated with better patient outcomes, such as a reduction in in-hospital mortality. Renal nurses' educators coordinate patient care across different services and are vital in helping patients understand all treatment options. Renal nurse education programs have been shown to significantly improve aspects of patient well-being, including sleep quality, energy levels, symptom control, and depression.

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Conflicts of interest

There are no conflicts of interest.

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