

Educational Needs Assessment and the Management of Chronic Kidney Disease in a Malaysian Setting: A Review

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ABSTRACT

Chronic kidney disease is among the top ten causes of mortality in Malaysia. An increase in the pattern of dialysis recipients has been observed, rising from 325 per million population in 2001 to 762 per million population in 2010. Chronic kidney disease is characterised by irreversible loss of renal function for at least three months, and the risk factors for chronic kidney disease include diabetes mellitus, hypertension, cardiovascular disease, dyslipidaemia, and lifestyle risk factors such as poor dietary patterns, lack of exercise or physical activity, smoking, and increased alcohol intake. Thus, appropriate educational needs assessment is required to begin modifying these risk factors via educational intervention to delay disease progress and to prevent patients reaching end stage renal failure. The aim of this article is to provide a review of the existing literature on the chronic kidney disease process, based on recommended primary and secondary management from both medical aspects and lifestyle modification requirements, highlighting the importance of patient education.

KEYWORDS: Chronic kidney disease, Education needs, Risk factors, Lifestyle modification, Management

INTRODUCTION

Kidney dysfunction is classified into several categories including acute renal failure (ARF), chronic kidney disease (CKD), and end stage renal failure (ESRF). Its causes include glomerulonephritis, polycystic kidney disease (PKD), Immunoglobulin A (IgA) nephropathy, lupus nephritis, nephrotic syndrome, and kidney cancer. Of these, CKD is most commonly recognized as a public health problem worldwide, and it has become a major issue in both developed and developing countries, including Malaysia.

Table I illustrates the staging of CKD according to Malaysian standard guidelines. CKD is defined as kidney damage with a glomerular filtration rate (GFR) of less than 60 ml/min/1.73m² for at least three months. Lee, Wu, and Hsieh (2016) mention that CKD is associated with an increased risk of death by cardiovascular disease, as well as influencing individual's psychological and physical well-being, affecting their quality of life, and posing a heavy burden on the nation's health care system (1).

In Malaysia, the Ministry of Health Malaysia (2011) noted that the ratio of patients with CKD is trending upwards, and this is predicted to continue. There are likely to be more than 5,000 new patients diagnosed with kidney failure every year, and thus the number of Malaysians dependent on

dialysis was predicted to increase to more than 30,000 by the end of 2015 (2). This statistic highlights the need to prevent the deterioration of CKD to end stage renal failure (ESRF), and this requires collaborative preventive measures from multidisciplinary healthcare professionals. Thus, further research should be carried out to assess the educational needs of CKD patients at risk of ESRF, in line with the Ministry of Health's (MOH) requirement that each healthcare professional (HCP) must play a role in advising, educating, and empowering self-care management tailored to the needs of patients (3, 4).

Table I: Staging of chronic kidney disease

Stages of CKD		
Stage	GFR (ml/min/1.73m ²)	Description
1	≥90	Normal or increased GFR, with other evidence of kidney damage
2	60 - 89	Slight decrease in GFR, with other evidence of kidney damage
3A	45 - 59	Moderate decrease in GFR, with or without other evidence of kidney damage
3B	30 - 44	
4	15 - 29	Severe decrease in GFR, with or without other evidence of kidney damage
5	<15	Established renal failure

(Source: Malaysia Ministry of Health, Clinical Practice Guideline, 2012)

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Risk factors for developing chronic kidney disease

There are two major types of risk factors for CKD, non-modifiable and modifiable. Non-modifiable risk factors as a term refers to genetically inherited diseases such as hypertension (HTN), diabetes mellitus (DM), cardiovascular disease (CVD), and hyperlipidaemia (HPL), while modifiable risk factors include lifestyle related factors such as smoking, alcohol intake, central obesity, physical inactivity, low socio-economic status, and consuming herbal medicine containing aristolochic acid, which is commonly used in Chinese herbal medicine. There are also several other conditions linked to CKD such as autoimmune disease, nephrolithiasis, anaemia, hyperuricaemia, and nocturia (5); however, this review paper only has space to discuss certain prominent conditions based on well-established literature.

A. Diabetes mellitus

Diabetes mellitus is the most prominent risk factor for CKD in Malaysia (6, 7). According to the co-Chair of International Congress of the International Society for Haemodialysis (2015), 58 percent of diabetic patients could eventually develop kidney failure (2). Diabetes mellitus contributes to the development of CKD by affecting the glucose levels in the vascular system after insulin regulatory mechanism failure, contributing to insulin resistance and hyperglycaemia (8).

Tight glycaemic control (Hb A1c < 6%) should be maintained to reduce micro vascular, and possibly macrovascular, complications (9, 10). Optimal blood glucose control would also have the added effect of further improving the symptoms of polyuria and polydipsia among CKD patients (8). Thus, all CKD patients with DM should be encouraged to adopt therapeutic lifestyle changes such as increasing physical activity and practicing healthy dietary patterns.

B. Hypertension

In the Malaysian setting, HTN is the second lead cause of kidney disease, with up to 95% of the 165,000-people affected having been reported as having CKD (11). It is thus highly recommended that CKD patients aim to achieve optimum blood pressure control of less than 140/90 mmHg, with potassium levels ranging between 5.5 to 6.0 mmol/L to minimise cardiovascular and other diabetic complications (8). Two or more drugs may be necessary for the retardation of renal disease progression, especially among those with diabetes (4), to reduce the onset of diabetic nephropathy which is often associated with metabolic syndrome, obesity, insulin resistance, and hyperlipidaemia.

C. Cardiovascular disease

Cardiovascular disease is one of the complications associated with increased mortality among patients with CKD (11). The NKF (2016) supports the findings of Hill et al. (2016), who stated that kidney disease is the 9th leading cause of death in the United States of America (USA), with associated higher risks of morbidity and mortality. It is also well known that CKD causes anaemia that may lead to worsening ischaemia, and eventually heart failure, in patients with concomitant CVD (5). CKD patients with severe atherosclerotic diseases may also develop cerebrovascular accidents (CVA) or

have strokes due to higher levels of tumour necrotic factor- α (TNF- α), interleukin 1 (IL 1), and interleukin 6 (IL 6) in their blood. Cytokines are also prominent factors in the development of malnutrition-inflammatory-atherosclerosis (MIA) syndrome in ESRF patients (12).

D. Smoking

There is a clear epidemiological evidence that links smoking with increased risk of cardiovascular events (13). Furthermore, smoking has been associated with accelerated progression of diabetic and non-diabetic renal disease, thereby necessitating early cessation of smoking, which can ameliorate the decline of renal function. To date, there have been no randomized clinical trials (RCTs) to show the impact of smoking cessation on the progression of CKD; nevertheless, smoking cessation is necessary to retard the progression of renal disease, especially among those with diabetic nephropathy (8).

E. Dyslipidaemia

CKD is associated with dyslipidaemia, a known risk factor for CVD. It is also common for diabetic patients to have abnormal lipid profiles with raised serum triglycerides and cholesterol and decreased high-density lipoprotein (HDL) cholesterol levels. Thus, full lipid profile should be performed at least annually in adult diabetics, regardless of their pre-morbid lipid profiles (4).

F. Other risk factors

There is lack of evidence on the effectiveness of lifestyle modification in terms of preventing renal or cardiovascular end-points (4, 8). Studies on the effects of alcohol consumption on CKD have also been inconclusive. Nevertheless, it is prudent to adopt lifestyle changes such as reducing central obesity and cigarette smoking. Certain risk factors are also linked with CKD development, such as having an autoimmune disease, nephrolithiasis, anaemia, hyperuricaemia, and nocturia. In terms of social factors, those with low socio-economic status, low birth weights of < 2,500g, and users of herbal products containing aristolochic acid as a routine regimen may be at greater risk of developing CKD.

Medical management of kidney disease

There are several important steps in the medical management of CKD, which include fluid restriction and close monitoring of glucose and blood pressure levels. Renal replacement therapy (RRT) may be prescribed by physicians if the patient's condition deteriorates further and they fulfil the strict criteria for RRT.

A. Fluid restriction

Fluid restriction, especially in advanced and end-stage CKD, is not limited to liquids drunk directly by CKD patients but also includes the fluid content of foods such as soup and the juice content in fruits and vegetables. A cohort study conducted among 188 respondents from 14 dialysis centres in Malaysia found that most respondents were non-compliant with dietary (63.8%) and fluid (51.6%) restrictions, being only slightly more compliant with medications (49.5%), but rigorous in dialysis attendance (8.5%). The barriers causing non-compliance include lack of knowledge or information, unfavourable food preferences, lifestyle alteration resistance, and treatment complexity (14).

B. Glucose and blood pressure control

Patients with CKD are required to control their blood pressure and glucose levels within tight parameters in order to effectively retard CKD progression (8). Patients are recommended to limit their protein intakes to reduce albuminuria and to lower their HbA1c levels to approximately 6.5% to 7% to prevent diabetic nephropathy. However, a recent study by Seok HK et al (2015) highlighted that monitoring HbA1c only is inadequate. An inverse relationship using a regression model was observed between the estimated glomerular filtration rate (eGFR) and HbA1c, wherein a decrease of eGFR was associated with an increase in HbA1c levels (15). Thus, HbA1c may be underestimated in patients with advanced CKD. Regular capillary glucose measurements are thus required for accurate assessment of glycaemic control (4), and hence it is advisable for each CKD patient with diabetes to keep a record of their capillary glucose readings throughout the day.

C. Renal Replacement Therapy

Renal replacement therapy (RRT) includes peritoneal dialysis, haemodialysis, and renal transplant, and it is highly recommended that continuous RRT is adopted in the medical and nursing management of patients with ESRF (16).

i) Peritoneal dialysis

In 2014, staggering 7,980 patients in Malaysia underwent peritoneal dialysis treatment, with a recorded incidence of CKD of almost 1,182 per million population in that year (2, 17). Although this spike in incidence may yet prove to be an aberration, as its causes are still largely unknown, it does fit into the general trend of increasing CKD in the population (18).

ii) Haemodialysis

Haemodialysis is a treatment that uses a dialyzer as an artificial kidney to remove fluid and waste products from the blood. Haemodialysis is still the predominant mode of treatment for ESRF patients in most countries, including Malaysia (19). This is supported by statistical findings that highlight the fact that almost 27,600 patients received haemodialysis in Malaysia throughout 2014 (2).

iii) Renal transplant

A transplanted kidney may come from either a living or cadaveric donor. Increased precautions are needed when performing renal transplants in diabetic patients due to their risk of mortality being two to four times higher compared to non-diabetic patients (including patients with cardiovascular disease) (4). Although having a transplanted kidney will remove the need for dialysis in patients with ESRF, they will still need to control their other diseases and risk factors causing ESRF,

Lifestyle modification among CKD patients

To date, no major study has been conducted to determine whether lifestyle modification is relevant for primary or secondary prevention in CKD patients (4). Nevertheless, patients with CKD should be encouraged to exercise or become more physically active, practise healthy dietary intake patterns, reduce excess weight, and avoid smoking to reduce their risk of developing ESRF.

A. Physical activity

Research has highlighted that exercise improves physical activity levels and sleep quality among CKD patients receiving long-term haemodialysis, thus indirectly enhancing quality of life. Furthermore, regular exercise has the added benefit of reducing obesity rates (13). Several studies have also highlighted the prevalence of poor physical activity levels amongst dialysis patients in Malaysia, especially among less literate patients (20). This may be due to the side effects of dialysis, which include fatigue that can lead to low physical activity levels, as highlighted by Maniam et al (21).

B. Dietary modification

In a study conducted by Nor Baizura et al (2013), it was found that haemodialysis was highly associated with malnutrition (19). Thus, CKD patients need to follow dietary guidelines provided by physicians and dieticians to prevent complications such as anaemia, bone disease, metabolic acidosis, hyperkalaemia, and hyperparathyroidism disease (5). A dietician is best placed to decide on the prescription for macronutrient and micronutrient intakes after a complete assessment has been performed by a physician.

Information needs of CKD patients

Most CKD patients have many concerns regarding their disease process, risk factor management, complication management, self-care management, treatment options, and logistical matters, which include financial assistance, transportation, and waiting lists for renal transplants (17, 22).

A. General information on CKD

The type of information needed by CKD patients varies according to the severity of kidney damage. According to Rose, Groenhoff, and Zin (2004), as cited in Lewis, Stabler, and Welch (2010), in the earlier stages of being diagnosed with CKD, patients will focus their informational needs on the disease process (23). At this stage, CKD patients require an understanding of the definition, classification, causes, and symptoms of CKD; generally, patients at this stage are asymptomatic, as found in studies by Kumaradivel et al (2016) and Siti Noorkhairina et al (2014) among patients in Malaysia (24, 10), and it is important that CKD patients follow the prescriptions given by healthcare professionals (HCP).

B. Risk factor management

DM and HTN are the common causes of CKD. However, a recent study by Ng, Lee, and Goh (2016) indicated that the Malaysian population is inadequately informed about CKD, even among those who are at risk of encountering CKD complications. It is also important to monitor patients with systemic lupus erythematosus (SLE), glomerulonephritis, obstructive nephropathy, and polycystic kidney who are at risk of developing CKD (25).

C. Complication management

CVD is a known complication of kidney disease, and the number one killer of patients with CKD (11). CKD patients need to be educated to recognise the tell-tale signs of CVD such as oedema. They should also be on the lookout for signs of other common complications such as anaemia,

hyperparathyroidism, and bone disease (Malaysia Ministry of Health, Clinical Practice Guideline, 2011). Highlighting this issue during patient education will enhance patients' knowledge and compel them to take preventive measure.

D. Self-care management

Pre-dialysis and self-care education is important for improving patient outcomes, especially for patients with stage four CKD. Lewis, Stabler, and Welch (2010) stated that the top four educational needs amongst patients prior to starting dialysis were knowledge of kidney disease (96%); graft, fistula, and catheter insertion and care (83%); treatment options (83%); and taking medications correctly (80%) (23). Thus, each HCP should shoulder the responsibility of delivering all the necessary information prior to patients' discharge.

E. Treatment options

Pre-dialysis education is important for improving patient outcomes, especially for patients with stage four CKD. Harwood et al (2005), as cited by Lewis and Stabler (2010) (25), mentioned that patients with CKD have specific stressors prior to the initiation of dialysis such as physical symptoms, psychosocial issues, logistical problems regarding the clinic itself (e.g. scheduling, multiple appointments, and waiting lists), and lack of information on the dialysis procedure. Lederer et al (2016) reported that patients most desired information about treatment options for kidney failure (including dialysis and kidney transplants) and the relationship between CKD and other chronic medical conditions (26). Thus, dissemination of information by multidisciplinary HCPs may increase the level of patients' knowledge and awareness of preventative care; increase compliance with medication, especially in terms of the prescription of aspirin and lipid lowering agents for secondary prevention of CVD; decrease hospitalization; lead to improvement in disease-specific outcomes; and, eventually, contribute to greater patient

Role of nurses as educator

Patient education has long been considered a major component of the standard care given by nurses. Nursing is usually the health care profession in closest proximity with patients, and studies have highlighted that patients receive additional information about healthcare from nurses (25). According to Bastable (2008), the purpose of patient education is to increase the competence and confidence of patients in terms of self-management, and to prepare patients for self-care (27). Furthermore, effective teaching by HCPs, including physicians and nurses, has the potential to increase satisfaction, improve quality of life, ensure continuity of care, decrease patient anxiety, effectively reduce the complications of illnesses, and energize and empower patients to become actively involved in planning of their own care (28,29). Carpenter and Bell (2002) proposed that the education process should be enacted within a framework that facilitated a participatory, shared approach to teaching and learning (27).

The importance of educational needs assessment

Educational need is the gap between what a person knows and what they need or want to know.

There are several important steps in the assessment of educational needs:

1) identifying the learner; 2) choosing the right setting; 3) collecting data about the learner; 4) collecting data from the learner; 5) involving a multidisciplinary healthcare team; 6) prioritising patient needs; 7) determining the availability of educational resources; and 8) assessing the demands on the organisation (13, 27, 30, 31). These information needs may be obtained via informal conversations, structured interviews, focus groups, self-administered questionnaires, specific tests, observations, and patient charts (31). As HCPs, the entire HCP team is responsible for empowering patients and their family members to achieve self-management prior to hospital discharge and before being referred for further follow up, thus, increasing their involvement in the caring process associated with better health outcomes, as well as improving the healthcare service as highlighted in the KPI set by MOH Malaysia.

CONCLUSION

The increasing rate of CKD occurrence in Malaysia highlights a gap in care which allows a majority of patients to remain non-compliant towards dietary practice changes, fluid restriction, medication usage, dialysis attendance, and maintaining an overall healthy lifestyle, all of which if adhered to could delay the disease reaching ESRF. More effective strategies of patient education intervention thus need to be adopted as routine to improve compliance behaviours and quality of life among patients and their family members. Detailed educational needs assessments must be conducted to ensure effective patient education, which should then further increase satisfaction among patients in terms of their treatment and lead to better self-care and disease management.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare with regard to this work.

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