

Knowledge, attitude and practices regarding Chronic kidney disease and estimated GFR in a tertiary care hospital in Pakistan

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Abstract

Objective: To assess knowledge, attitude and practices regarding Chronic kidney disease (CKD) and referral to Nephrologists on the basis of estimated Glomerular filtration rate (eGFR) reporting with Modification of Diet in Renal Disease (MDRD).

Methods: This is a cross-sectional study. It was conducted at Shifa International Hospital, Islamabad in January 2008. A questionnaire-based survey was conducted to achieve the study objectives. Study subjects included consultants and residents from medicine, surgery, urology, gynaecology and obstetrics, as they are the main referral source to Nephrologists. Participants were asked to give their views on 09 questions.

Results: A paper based questionnaire was used to survey 114 subjects. Majority of the study subjects (78.07%) were aware that eGFR is better than raised serum creatinine alone, in assessing severity of kidney disease. Though, 48.28% of the subjects were not aware when to refer, based on eGFR. However, 84.21% of the respondents knew implications of late referral (morbidity and mortality) but despite that, 55.26% would still not refer to nephrologists even if it was indicated. Residents were more likely to refer to a Nephrologist early as compared to consultants.

Conclusion: Our study shows that there is a need for continuing education and awareness among physicians regarding CKD management and benefits of timely referral to a nephrologist. This may have a significant impact on CKD management and outcome of these patients in a developing country with financial restraints (JPMA 60:342; 2010).

Introduction

In 2002, the National Kidney Foundation developed Kidney Disease Outcome Quality Initiative (K/DOQI) guidelines. Chronic Kidney disease (CKD) was classified into five stages on the basis of estimated glomerular filtration rate (eGFR).¹ These guidelines and staging were devised to facilitate early detection of CKD by general physicians, promote timely referral to Nephrologists, manage complications of CKD, and help nephrologists decide renal replacement therapy in a planned fashion.

CKD is a silent disease in majority of the cases. Most common causes of end-stage renal disease (ESRD) in Pakistan are uncontrolled Diabetes and Hypertension.² The risk factors for chronic kidney disease include an age more than 60 years, hypertension, diabetes, cardiovascular disease and a family history of CKD.^{1,3-5} The high prevalence of CKD in Pakistani population is therefore not unexpected since incidence of hypertension and diabetes in Pakistani population is one of the highest in the world.^{6,7} Patients are not aware of the importance of good control of these risk factors. An estimated GFR of less than 60mls per minute per 1.73m² is associated with a graded increase in the risk of each of the major adverse outcomes of chronic kidney disease which are impaired kidney function,

progression to kidney failure and premature death caused by cardiovascular disease.^{1,5,8-10}

It has been observed that physicians other than nephrologists are less likely to recognise CKD and differ in their clinical evaluation of CKD. In significant number of cases, CKD patients are referred to nephrologists much later than it would deem appropriate.¹¹ Late evaluation of CKD patients by nephrologists, especially those presenting in stage 5 CKD, is associated with suboptimal pre dialysis care and increase mortality.¹²⁻¹⁵

Traditionally, physicians have relied on serum creatinine for identifying kidney disease but this does not tell us the severity of kidney disease as well as the generation of creatinine is determined primarily by muscle mass and dietary intake therefore it is not a reliable tool for assessing severity of kidney function. In the past, Ccr has been estimated by measurement of creatinine excretion in a 24-hour urine sample. However, collection of urine for determining Ccr is difficult in clinical practice and is not suggested in international guidelines. Therefore, it is now recommended to use eGFR with an equation based on the level of serum creatinine (MDRD) to identify and stage patients with CKD.^{1,3-5}

Though, it is known that eGFR is better than serum

creatinine alone to assess kidney function in patients of CKD and is used world wide, it is still not a common practice in hospitals in Pakistan. Shifa International Hospital, Islamabad is the first hospital in Pakistan where eGFR reporting is used to assess kidney function in CKD. It is done by measurement of eGFR with Modification of diet in Renal Disease (MDRD) by using MDRD 2 equation.

We conducted this study to assess knowledge and attitudes regarding CKD management and referral practices to nephrologists among different group of physicians.

Subjects and Methods

A cross sectional study was conducted at Shifa International Hospital, Islamabad during January 2008. The study participants included all physicians (consultants and residents) from department of Medicine (including all specialities), General Surgery, Urology, Gynaecology and Obstetrics. These specialities are the referral base to the Nephrologist at Shifa International Hospital. Our aim of the study was to assess knowledge and attitude regarding early identification and managing CKD and changes in referral practices to Nephrologists after introduction of eGFR reporting with MDRD. In the absence of a validated questionnaire to meet our objectives, the questionnaire was designed to meet local needs. The instrument was piloted and was modified based on the feedback. The questionnaire consisted of 09 questions (variables) on CKD and eGFR,

conducted on the subsequent two days to include those subjects who were either absent or could not be contacted during the first visit. Overall 114 subjects out of 139 listed could be surveyed with a coverage rate of 82.01%. The data were analysed using SPSS (Statistical package for the Social Sciences, USA) software. Results are reported as frequencies and percentages and in addition, further data analysis was performed by Chi Square tests, using stratification based on level of participant's seniority (consultants vs. residents) and based on 3 specialities i.e. Medicine, Surgery and Gynaecology. The test was statistically significant if the p value was < 0.5.

Results

Questionnaire was given to 114 subjects including, 41 consultants and 73 residents. Overall, 41 consultants out of 52 listed and 73 residents out of 87 listed completed the survey with a response rate of 78.84% and 83.90% respectively. Out of forty one, 21 consultants were from department of medicine, 15 from surgery and 5 from gynaecology. Of 73 residents, 41 were from medicine, 22 from surgery and 10 from gynaecology. There were 73 male and 41 female participants in the study. The age range was 27-65 years.

Most of the study subjects (73.68%) were aware of the five stages of CKD and that each stage has its management plan (Table-1). This was statistically significant when compared between consultants and residents (p=

Table-1: Comparison of knowledge, attitude and practice regarding CKD and eGFR among consultants and residents.

Variables	Answered Yes	
	Consultants n (%)	Residents n (%)
Is eGFR a better way of assessing severity of kidney function than elevated serum creatinine alone?	35 (85.36%)	54 (73.97%)
Has eGFR helped in referral to a nephrologist where serum creatinine was not significantly elevated?	30 (73.17%)	55 (75.34%)
Can age related reduction in eGFR without kidney disease lead to low eGFR with normal serum creatinine, normal urine analysis and normal USG?	25 (60.97%)	54 (73.97%)
Are you aware that eGFR with MDRD formula is used world wide to asses kidney function in patients with kidney disease?	19 (46.34%)	22 (30.14%)
Are you are aware that there are five stages of CKD and that each stage has its management plan to help reduce complications and help slow down the progression of CKD?	27 (65.85%)	57 (78.08%)
Are you aware that studies have shown that late referral to a Nephrologist causes high morbidity, mortality and rate of hospitalisation in CKD patients?	35 (85.36%)	61 (83.56%)
Do you think your referral practice to Nephrologist has changed since introduction of eGFR?	17 (41.46%)	33 (45.20%)
Do you need more education on CKD and eGFR?	26 (63.41%)	67 (91.78%)

ranging from awareness of stages of CKD, management of different stages, significance of eGFR in diagnosis and management of CKD, level of eGFR for referral to a nephrologists, complications of late referral and need for more education. Each department, included in the study was visited separately. The subjects were requested to fill the questionnaire in front of the authors conducting the survey and return the filled form at the same time. Age and gender of each participant was recorded. A repeat visit was

0.021) and also when compared between specialities (p= 0.001). Major percentage (78.1%) of the subjects were aware that eGFR is a better tool for assessing severity of renal dysfunction. Most of the respondents felt that eGFR was helpful in patients where serum creatinine was not significantly elevated but 48.28% of these either did not know when to refer based on eGFR or will still do it based on serum creatinine. Around 84% (n=96) were aware that late referral would result in complications of CKD. This was

Table-2: Comparison of knowledge, attitude and practice regarding CKD and eGFR among different specialties of the study population.

Variables (%)	Answered Yes		
	Medicine n (%)	Surgery n (%)	Gynae n
Is eGFR a better way of assessing severity of kidney function than elevated serum creatinine alone?	52 (82.54%)	28 (75.67%)	9 (64.28%)
Has eGFR helped in referral to a nephrologist where serum creatinine was not significantly elevated?	48 (76.19%)	27 (72.97%)	10 (71.43%)
Age related reduction in eGFR without kidney disease can lead to low eGFR with normal serum creatinine, normal urine analysis and normal USG?	46 (73.01%)	25 (67.57%)	8 (57.14%)
Are you aware that eGFR with MDRD formula is used world wide to asses kidney function in patients with kidney disease?	27 (42.86%)	11 (29.73%)	3 (21.43%)
Are you aware that there are five stages of CKD and that each stage has its management plan to help reduce complications and help slow down the progression of CKD?	54 (85.71%)	24 (64.86%)	6 (42.86%)
Are you aware that studies have shown that late referral to a Nephrologist causes high morbidity, mortality and rate of hospitalisation in CKD patients?	59 (93.65%)	30 (81.08%)	7 (50%)
Do you think your referral practice to Nephrologist has changed since introduction of eGFR?	28 (44.44%)	12 (32.43%)	11 (78.57%)
Do you need more education on CKD and eGFR?	55 (87.30)	29 (78.38%)	8 (57.14%)

Table-3: Potential complications of late referral to a nephrologists.

- ◆ Progression to advanced stages of CKD
- ◆ Anaemia
- ◆ Increased cardiovascular morbidity and mortality
- ◆ Lipid abnormalities
- ◆ Malnutrition
- ◆ Metabolic
 - Hypocalcaemia
 - Hyperphosphataemia
 - Hyperparathyroidism
 - Metabolic acidosis
 - Uraemia and its complications
- ◆ Dialysis related
 - Emergency dialysis and temporary vascular access
 - Complication related to temporary dialysis catheters
 - Preferential choice of haemodialysis
 - Loss of opportunity of pre-emptive transplantation
 - Loss of opportunity of elective construction of AV fistula

statistically significant when compared between specialties ($p=0.001$). Interestingly, 48.28% would still not refer to a Nephrologist and would continue to treat the patient themselves. With regards to change in referral practice, 59% of consultant physicians, 73.3% consultant surgeons, 56% of medical residents, 64% of surgical residents and 30% of residents from gynae and obstetrics responded that their referral practice has not changed since the introduction of eGFR (Table-2). The percentage for that was higher among the consultants (56.09%) as compared to the residents.

More than half of the subjects (69.29%) responded correctly in interpretation of low eGFR. Residents were better (73.97%) in correct interpretation of low eGFR result than consultants. Small percentage of the respondents (14.03%) still believed in assessing kidney function impairment on the basis of serum creatinine alone. Before the introduction of eGFR, 42.98% of the subjects would be concerned at serum creatinine level in the range of 1.3-2 mg/dl and refer. The study range was 1.3-9 mg/dl. More than half of the subjects (64.03%) were not aware that MDRD equation is used worldwide to assess severity of

kidney disease in CKD. Majority (81.57%) of participants felt that they would benefit from more education on eGFR and management of CKD.

Discussion

Our study helps to highlights areas where we need to work on to improve outcomes for CKD patients in Pakistan. The results of our study suggest that there are gaps in knowledge and attitudes among physicians regarding management of CKD. Majority of the participants felt that eGFR measurement helped them in early identification, severity of CKD and were aware of the implications of late referral to nephrology service. Despite of this knowledge, they did not refer early. A significant number would still rely on the serum creatinine as a marker of severity and refer based on this test. The worrying finding was that some would refer very late based on creatinine as shown in our study. Our study also shows that residents were more likely to refer early as compared to consultants.

There is a high prevalence of CKD in Pakistan which is evident by high incidence of diabetes. The prevalence of diabetes is two to three times that reported in Western countries. The burden of hypertension is even higher. According to the 1990-1994 National Health Survey of Pakistan, hypertension affects one third of Pakistanis 45 years of age or older.¹⁶ Untreated CKD may progress to end stage kidney failure and is associated with increased cardiovascular morbidity, and all-cause mortality. Evidence suggests that some of these adverse outcomes can be prevented or delayed by early detection and treatment of CKD with ACE inhibitors and Angiotensin receptor blockers.^{3,17-20}

Evidence shows that eGFR measurement in Pakistani population by Cockcroft Gault or MDRD formula are better predictors of reduced GFR than serum creatinine alone.² Internationally available guidelines suggest eGFR measurement by MDRD in patients with CKD.²¹ However, eGFR has its limitations, which must be taken into account,

using these equations. MDRD based eGFR is not a sensitive measure to identify patients with stage 1 CKD (≥ 90 ml/min.1.73m²). It can give falsely low eGFR and thus results in over diagnosis of stage 2 CKD. Other markers of kidney damage i.e. urine, serum or radiological abnormalities should be taken into account when interpreting eGFR. MDRD GFR is more useful between stages 3-5 of CKD. In addition, eGFR should not be used in patients with amputations, pregnancy, extremes of weight and in acute kidney injury.

In Pakistan, chronic kidney disease is managed mainly by the Internists or primary care physicians until the patients reach advance renal failure when they are referred to a Nephrologist. It has been shown that patients referred late to a nephrologist have adverse outcomes²² (Table-3). Late referral to a nephrologist results in serious consequences, including increased mortality risk (relative risk 1.68 at 1 year), increased morbidity with lower use of antihypertensive, suboptimal management of bone and mineral metabolism, lower serum albumin, and more use of temporary vascular access with risk of infection, longer hospital stay and reduce access to renal transplantation.^{12,14} Timely referrals can only be made if physicians have better understanding of eGFR including the level of eGFR when referral is recommended.

Our survey showed that although physicians knew the importance of early referral and that eGFR had helped them identify the severity of CKD, but this did not influence their referral practices. There are few possible reasons for this. Most of the physicians believe that they would provide the same quality of care when compared to a Nephrologist. Studies have shown suboptimal CKD care provided by primary care physicians prior to referral and also shows clearly that care provided by nephrologists is better.^{23,24} In addition, it may be due to prevailing culture where physicians feel that by referring to specialists, patients may assume that the referring physician is not competent enough to treat them. Thirdly, this study was carried out in a tertiary care fee-for-service hospital and it is possible that conflict of interest may impact on referral practices. Other possible factors may be poor socioeconomic status or advanced age of CKD patients.

A recently published study also highlighted similar issues of identification, management and referral of CKD patients among internal medicine residents in the USA. The authors of this study have also highlighted the importance of early referral and continuing education of the medical residents.²⁵ Our study was conducted before this study was published.

While our study highlights some important issues, it has a limitation. It was conducted in one centre which is a private but a tertiary care hospital, where patients pay a fee to the physician for their consultation. The attitudes may be different in state run hospitals. However the attitude toward

referral seems to be an issue elsewhere in the world as well, as shown by the above US study.

In Pakistan, dialysis treatment is expensive and in majority of cases patients have to bear the expenses themselves. Cost of dialysis and drugs is more than \$ 4000 per patient per year. The disease has tremendous social and economic impact on patients and health care system. Only 0.8%-4% of GDP is spent on health and per capita income is US \$ 400 per year.¹⁶ Transplantation is also an expensive, costing approximately \$ 5000 and post transplant medication costs \$ 2000 annually. Transplantation is available to only 5-10% of the patients. Diabetes and hypertension are the main cause of end stage kidney disease and there is very good evidence that progression of CKD can be halted or delayed by good control therefore a very good reason to refer early. This is especially significant for a resource limited country like Pakistan

The knowledge, attitude and practices of physicians can be improved by arranging local and regional workshops, use of aids like posters and leaflets displayed in hospitals and by the use of local and national media (TV, newspapers, journals etc) to highlight the issues related to management of chronic kidney disease, especially the importance of early referral. Internationally available guidelines need to be disseminated to physicians and local guidelines incorporating local factors need to be developed for CKD patients in Pakistan.

Conclusions

CKD is a silent disease. Dialysis is costly and is not available to all. This can have significant financial impact on families in Pakistan. Prevention and early detection is the need of the hour. It is important to incorporate CKD management at medical student, postgraduate and continuing medical education (CME) levels for better quality of care and to develop positive attitudes among physicians. In addition, work needs to be done to improve education and attitudes of our patients.

Footnotes:

Abbreviations:

CKD: Chronic kidney disease

eGFR: estimated Glomerular Filtration Rate

MDRD: Modification of diet in Renal Disease

K/DOQI: National Kidney Foundation/ Kidney Dialysis Outcome Quality Initiative

ESRD: End-stage renal disease

Ccr: Creatinine clearance

SPSS: Statistical package for the Social Sciences, USA

GDP: Gross domestic product

CME: Continuing medical education

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