Farah-Saeed¹*, Mansoor Ahmad², Kausar Perveen³, Syed Mahboob Alam⁴, Noor Jahan⁵ and Samitha Muhammad Ali⁶

¹Department of Pharmacognosy, Dow College of Pharmacy, Dow University of Health Sciences, Ojha Campus, Karachi-Pakistan.
²Research Institute of Pharmaceutical Sciences, University of Karachi, Karachi-Pakistan.
³Department of Pharmaceutical Sciences, University of Karachi, Karachi-Pakistan.
⁴Department of Sociology, University of Karachi, Karachi-Pakistan.
⁵Department of Pharmacology, Dow College of Pharmacy, Dow University of Health Sciences, Karachi-Pakistan.

*Corresponding Author: Dr. Farah-Saeed
Department of Pharmacognosy, Dow College of Pharmacy, Dow University of Health Sciences, Ojha Campus, Karachi-Pakistan.

ABSTRACT
Objective: To measure the impact of chronic kidney disease on patients’ quality of life, to assess the burden associated with it on our health care system; and to bring awareness in general public to avoid chronic kidney disease and to identify symptoms and get screening done in earlier phase. Method: Questionnaires were designed to assess the knowledge of undergraduates, patients’ perspective and clinicians approach for the diagnosis and treatment of chronic kidney disease and were implemented on patients, clinicians and students. Patients’ quality of life was assessed by using validated adaptation of the 36-Items Short Form Survey (SF-36) and the Kidney Disease Quality of Life Instrument (KDQOL). Clinicians questionnaire consist of 16 questions concerning their knowledge and treatment approach towards treating chronic kidney disease. Questionnaire consisting of 12 questions was implemented on under-graduate medical and pharmacy students to check their awareness of chronic kidney disease, renal replacement therapy and effects of end-stage renal disease on quality of life of patients.
Results: The filled questionnaires of patients, clinicians and students were interpreted carefully and they revealed significant observations. Conclusion: Our study exposed that the quality of life of patients is affected by the gradual advancement of chronic kidney disease to end-stage renal failure. Therefore effective preventive measures along with proper treatment of co-morbidities associated with renal disorder at earlier stage of chronic kidney disease may help in stopping renal failure progression to end-stage renal disease. Our study showed that the undergraduate students had good knowledge of chronic renal disease, dialysis and quality of life of patients. There is need of enhancing their information by arranging nephrologists lectures and encouraging them to attend seminars concerning chronic kidney disease in order to update their knowledge to become responsible professionals to serve the ailing society.

KEYWORDS: End-stage renal disease, hypertension, diabetes, dialysis.

INTRODUCTION
According to the United States Renal Data System (USRDS), by the year 2020, the number of patients with End-stage renal disease will increase to 534,000 at the current growth rate.[1]

Chronic kidney disease is emerging as a burden on the Pakistani population and health care system due to its direct association with increased health care expenditures, decreased quality of life and pre-mature mortality. Lack of awareness, delayed screening and identification may lead to end-stage renal failure requiring dialysis or transplantation.[2] In a survey conducted in 2011 in Karachi, it was found that 12.86 million Pakistanis above 30 years of age had some degree of renal impairment that is representative of a huge chronic kidney disease burden.[3] In three community based studies it was found that the burden of chronic kidney disease in Pakistani population was around 12.5%–25%.[4-6]

There is a potent underlying relationship between chronic hepatitis C infection and kidney disease especially those of glomerular origin. Several glomerular diseases including mixed cryoglobulinaemia, membranous nephropathy, membrano-proliferative glomerulonephritis
and polyarteritis nodosa are linked with hepatitis C.\textsuperscript{[7]} Prevalence of hepatitis C in hemodialysis patients in Pakistan is 23.7\%-56.6\%.\textsuperscript{[7-12]} According to a study carried out in Pakistan the end-stage renal disease may be due to chronic glomerulonephritis and diabetes mellitus (33\%) each, hypertension (12\%), renal stone disease (7\%), others were less frequently reported causes.\textsuperscript{[13]}

The objective of the current study was to evaluate the burden of chronic kidney disease in Pakistani population; in order to prevent stage 5 chronic kidney disease or end-stage renal failure. The study was carried out by preparing and applying three different questionnaires in three different population, that is, patients, physicians and students of medical and pharmacy.

\textbf{METHOD}

A prospective cross sectional study was designed based on validated survey questionnaires. Present study was conducted in Karachi, Pakistan. The study protocol was approved by Independent Ethics Committee; University of Karachi, Karachi-Pakistan. Three different questionnaires were designed.

First one was designed to assess the quality of life of 100 patients on dialysis. Quality of life was assessed using validated adaptation of the 36-Item Short Form Survey (SF-36) and the Kidney Disease Quality of Life Instrument (KDQOL).\textsuperscript{[14-16]}

Second questionnaire was designed to get feedback from general practitioners and consultants, 100 questionnaires were got filled. Physicians and consultants included in the study were divided in to different age groups: 30-40, 41-50 and 51-60 respectively.

Third questionnaire was designed for assessment of knowledge of under-graduate medical and pharmacy final year students Total number of questionnaires got filled by the students were 158 out of 200.

\textbf{Statistical Analysis}

The data collected from three different populations, that is, patients, clinicians and students were entered separately in Microsoft excel and their percentages were calculated for the interpretation of data.

\textbf{RESULTS}

\textbf{Results of Patients’ Questionnaires}

40\% of the patients had the general view about their health status as fair. Compared to one year back 41\% patients rated their general health better at the time of interview (Graphs 1A & 1B). Patients’ abilities to deal with their physical requirement of life, such as attending to personal needs, walking and flexibility were found to be limited a lot in most of the instances (Graph 2). Significant impact of patients’ emotional problems was found on their work and regular daily activities (Graph 3). 55\% patients noticed slight impact, while 40\% of the patients observed moderate effect of their physical and emotional problems on normal social activities with family, friends and neighbors, during the past 4 weeks (Graph 4).

Patients’ emotional perception of the things happening in their lives included: being nervous, felt down hearted and unhappy, felt calm and peaceful, felt tired some of the time. 50\% of the patients felt that they had energy a little of the time; whereas 36\% patients felt worn out, a good bit of the time (Graph 5). 55\% Patients’ suffering from kidney disease didn’t feel as healthy as a normal healthy person and 62\% patients were of the view that they feel unwell most of the time (Graph 6). Patients’ general statements concerning their kidney disease were that 64\% patients felt it interfered too much with their lives, had to spend too much time dealing with their kidney disease and felt frustrated with it (Graph 7).

Impact of kidney disease on sexual activity of renal impaired patients was to be not a problem in most of the cases and a little problem in few cases (Graph 10). 41\% patients rated their level of sleep half way between very bad and very good (Graph 11). Most of the patients were observed to be somewhat satisfied with their family and friends relations (Graph 12). 54\% of the patients rated their overall health half way between worst and best (Graph 13).

85\% circled hypertension to be the major cause of the kidney disease, followed by diabetes 61\%, polycystic kidney disease 21\%, chronic pyelonephritis and drug-induced renal failure 14\%, whereas, 7\% had glomerulonephritis, or the heredity factor as a cause of kidney disease (Graph 14).

34\% patients with kidney disease were matriculate, 27\% had university degree and 20\% had professional graduate degree (Graph 15). 57\% of the male population suffered from the kidney disease in comparison to the 43\% of female gender (Graph 16-A). 82\% patients were married, whereas 18\% were unmarried (Graph 16-B). Working status and approximate income of patients can be seen in Graphs 17, 18).
Results of Clinicians’ Questionnaire

55% physicians participated in the study belonged to age group 41-50 years; 35% belonged to 51-60 years, whereas 10% belonged to 30-40 years (Graph 19). 65% of the medical practitioners were female and 35% were male (Graph 20). 5% of the doctors had 7-9 years’ experience while 95% had 10 or above years of practice (Graph 21). In the study 5% cardiologists, urologists and nephrologists, 15% each of gynecologists and nephrologists and 55% of general physicians were included (Graph 22). 45% of the doctors see 101-150 patients per week, 40% see more than 150 patients while 15% see 51-100 patients/week (Graph 23). Nephrologists see 10% of the patients with 51-75% kidney failure and 5% patients with more than 70% renal impairment. 10% of the patients visited Gynecology clinic had 1-10% kidney failure, while 5% had 11-30% affected kidneys. 30% of the patients visited physician had 1-10% kidney failure, while 20% of the patients had 11-30% kidneys affected. 5% of the patients with 1-10% heart disease visited cardiologist. Urologists see 5% of 31-50% renal failure patients in their clinics. 5% patients with 11-30% damaged kidney visited hepatologists (Graph 24).

5% of the physicians opted serum urea and creatinine; while the other 5% were of the opinion that estimated glomerular filtration rate and serum creatinine for the measurement of end-stage renal disease. 70% of the clinicians considered 24 hours urine collection for creatinine clearance the best measure for ESRD (Graph 25).

In question concerning factors influencing risk for developing chronic kidney disease, following are the responses of the medical practitioners to the 10 items included in this question: cigarette smoking (30% - no influence. 30% - highly increased), recurrent urinary tract infection (85% - highly increased and 5% - minimally increased), 65+ age (20% minimally increased and 35% no influence), kidney stones (80% highly increased, 15% minimally increased and 15% no influence), lower urinary tract obstruction (55% highly increased, 20% no influence), recovery from acute renal failure (minimally increased 20%, no influence 35%), chronic heart failure (70% highly increased, 15% no influence), body mass index (55% no influence), African – American race (15% minimally increased, 40% no influence), Hispanic ethnicity (15% minimally increased, 40% no influence), family history of kidney disease (10% no influence, 15% minimally increased, 60% highly increased), Auto-immune disease (15% no influence, 75% highly increased), hypertension (5% minimally increased, 90% highly increased), diabetes (95% highly increased) (Graph 26).

Blood pressure goal of clinician for a patient with a creatinine clearance of 40 ml/min was less than 125/75 by 5% physicians, less than 130/80 by 5% practitioners and less than 120/70 by 65% clinicians (Graph 9). In patients with mild to moderate chronic kidney disease, the first line anti-hypertensive agents preference of clinicians to slow the progression of kidney disease (5% Non-dihydropyridine, calcium channel blockers; 5% Angiotensin receptor blockers; 10% Angiotensin-converting enzyme inhibitor, 10% Thiazide diuretics and 80% dihydropyridine, calcium channel blockers, β blockers) (Graph 27).

Response of the clinicians to the conditions that may be a consequence of chronic kidney disease are as follows: 85% anemia, 65% metabolic acidosis, 65% respiratory acidosis, 90% secondary hyperparathyroidism, 95% worsening hypertension, 75% increased serum potassium, 95% dyslipidemia, 75% malnutrition, 80% volume overload and 65% obesity (Graph 28).

Clinician opinion of creatinine clearance level for screening patients with metabolic acidosis was as follows: 5% didn’t screened, 15% screened below 30 ml/min and 65% below 15 ml/min. The level of creatinine clearance preferred by clinicians for screening anemic patients (5% don’t screen; 15% below 60 ml/min; 70% below 15ml/min). Creatinine clearance level considered by the medical practitioners for screening malnutrition patients (5% don’t screen; 15% below 60 ml/min and 70% below 15 ml/min). Secondary hyperparathyroidism patients were preferred to be screened at the following level of creatinine clearance: 5% don’t screen; 15% below 30 ml/min and 70% below 15 ml/min (Graph 29).

In an anemic, chronic kidney disease patient with a creatinine clearance of 40 ml/min, 100% clinicians prefer to intervene at 8 g/dl hemoglobin concentration. In secondary hyperparathyroidism patients with creatinine clearance of 40 ml/min, clinicians would like to intervene at the following intact PTH concentration: 15% didn’t know; 15% intact PTH above 150 pg/ml and 70% intact PTH above 110 pg/ml (Graph 30).

15% clinicians’ selection of the combination of serum calcium, serum phosphates and PTH, in case of development of secondary hyperparathyroidism, in a patient with a creatinine clearance of 40 ml/min was low calcium, high phosphates and high PTH (Graph 31). Referral of diabetic nephropathy patient by primary physician to the nephrologist should be done at the following level of kidney function: 5% - as soon as serum creatinine is abnormal, 5% as soon as microalbuminuria is present regardless of creatinine clearance, 15% in case GFR or CrCl is less than 90 ml/min and 70% at GFR or CrCl less than 30 ml/min (Graph 32).

Opinion of clinicians concerning level of GFR or CrCl for placement of vascular access in the chronic kidney disease patients for initiation of hemodialysis; 10% not sure, 15% GFR or CrCl less than 15 ml/min and 70% GFR or CrCl less than 25 ml/min (Graph 33).
In 37 years old hypertensive patient with microalbuminuria and a BP (145/95 mm/Hg) and taking thiazide diuretic. Clinicians’ opinion on adding ACEI (20% Yes and 35% No) (Graph 34).

**Results of Students’ Questionnaire**

Questionnaire was prepared to check the awareness of under-graduate medical and pharmacy students concerning chronic kidney disease, renal replacement therapy and effects of end-stage renal disease on quality of life of patients. Among them 21.51% were male students while 78.48% female students.

12 questions were framed to test the general concept and facts about chronic kidney disease. 65.82% students knew the difference between chronic kidney disease and end-stage renal disease. 52.53% students had the knowledge that anemia is a usual co-morbidity associated with kidney failure. 37.97% students believed that impaired kidney patients are mild to moderate anemic; 28.48% students think that chronic kidney disease patients are anemic, whereas, 16.65% students were of the opinion that chronic kidney patients are not anemic. Probable age of occurrence of kidney impairment is between 30-50 years, according to 43.03% students; and more than 50 years by 42.40%. 58.22% students were of the opinion that male gender suffered more from kidney disease. 77.84% students opined that married patients suffered more from impaired kidney disease. 81.01% students had the knowledge that hypertension, diabetes and coronary heart disease are the most frequently occurring co-morbidities associated with impaired kidney disease. Students’ response was 75.94% to the statement that cardiovascular diseases are more commonly found in end-stage renal disease patients’ in comparison with general population. 69.62% students had the knowledge that erythropoietin therapy aims to restore hemoglobin level. 44-30% marked that end-stage renal disease occurs when GFR is less than 10ml/min. Serum creatinine and BUN were opted by 49.36% students as the diagnostic test for monitoring GFR and renal function (Graphs A-G).

8 questions were included in questionnaire concerning the dialysis therapy for CRF/ESRD patients. Mostly in the age group of 40-50 years renal replacement therapy is initiated; and 59.49% students marked it correct. 44.30% students were of the opinion that 10 years is the expected range of life span, once renal replacement therapy is initiated. 74.05% students knew that hemodialysis is the most practiced type of dialysis in Pakistan. 51.89% students had the correct knowledge that frequency of dialysis therapy is 3 times/week. 44.93% students were of the opinion that dialysis patients are more exposed to Hepatitis C, though these patients are more exposed to Hepatitis B. Whereas, response of students of keeping Hepatitis C patients in special isolation area in dialysis unit was 54.43%. Most frequently occurring complication during hemodialysis is infection was known to 43.67% students. Kidney transplantation as the best treatment of choice was marked by 58.86% students (Graphs A-H). 10 questions were placed in questionnaire regarding quality of life evaluation of end-stage renal disease patients on dialysis. 89.24% students were of the opinion that more worse quality of life was found in late diagnosis group of impaired kidney patients. 77.87% were of the opinion that quality of life is difficult to improve in case of elderly patients. Transplantation was marked by 41.77% of the patients as the treatment of choice for improving health related quality of life of kidney patients. 65.82% students had the knowledge that age and diabetes strongly influenced quality of life kidney patients. 60.12% students were aware of the fact that post-dialysis care is of outstanding importance for maintaining better quality of life in kidney patients. 63.29% students had knowledge that physical health and social functioning are restricted in impaired kidney disease patients on dialysis. 60.12% students were well aware that impaired kidney disease has effect on emotional health of patients. 56.32% admitted that mental health is affected in CKD/ESRD patients. 50% of the students opined that mental health is best preserved in adult-onset ESRD, contrary to the fact that mental health is best preserved in pediatric onset ESRD. 32.91% students marked sodium chloride as an important part of renal diet, although protein is considered an important part of renal diet (Graphs A-E).

**GRAPHICAL REPRESENTATION OF THE QUESTIONNAIRE FILLED BY PATIENTS’ INTERVIEW**

**Graph 1-A:** Shows the patients’ views about their general health.

**Graph 1-B:** Shows the patients’ comparison of their current health with the one year back health status.
Graph 2: Shows the patients’ health limitation in carrying out typical day activities.

Graph 3: Shows the impact of patients’ emotional problems on their work or other regular daily activities.

Graph 4: Shows the effect of physical health or emotional problems on patients’ normal social activities with family, friends, neighbors, during the past 4 weeks.

Graph 5: Shows the patients’ emotional perception of the things happening in their lives.

Graph 6: Shows the patients’ perception about their health status.

Graph 7: Shows the statements chosen by patients’ that best describes their health status.
Graph 8: Show the effects of signs and symptoms associated with chronic renal failure on dialysis patients.

Graph 9: Shows the effects of Kidney disease on the patients' daily life.

Graph 10: Shows the effects of kidney disease on patients' sexual activity.

Graph 11: Shows the patients' rating of their level of sleep.

Graph 12: Shows the satisfactory level of patients with their family and friends.

Graph 13: Shows the Patients’ overall, rating of their health.
Graph 14: Shows the causes of kidney disease.

Graph 15: Shows the highest level of education completed by the patients.

Graph 16-A: Shows the gender of the patients.

Graph 16-B: Shows the marital status of the patients.

Graph 17: Shows the working status of patients.

Graph 18: Shows the approximate income of the patients.

Graph 19: Shows the age group of Clinicians’.
Graph 20: Shows the gender of the Clinicians’.

Graph 21: Shows the clinicians’ years in practice.

Graph 22: Shows the professional titles of Clinicians.

Graph 23: Shows the number of patients Clinicians sees per week.

Graph 24: Shows the number of patients in Clinicians’ practice that have any degree of kidney failure.

Graph 25: Shows the best measure of kidney function.

Graph 26: Shows the risk factors for developing chronic kidney disease.
Graph 27: Shows the blood pressure goal for a patient with a creatinine clearance of 40 ml/min.

Graph 28: Shows the clinicians' preference of First-line anti-hypertensive agent/s to slow the progression of kidney disease.

Graph 29: Shows the percentage occurrence of conditions that may be a consequence of Chronic Kidney Disease.

Graph 30: Shows the level of creatinine clearance for screening different conditions associated with chronic kidney disease.

Graph 31: Shows the clinician intervention in a patient with a creatinine clearance 40 ml/min and secondary hyperparathyroidism associated with chronic kidney disease.

Graph 32: Shows the level of kidney function for referring a patient with diabetes to a nephrologist.

Graph 33: Shows the placement of vascular access for initiation of hemodialysis in chronic kidney disease patients.
Graph 34: Shows the response to the case history of 37 years old hypertensive (145/95 mm/Hg), microalbuminuria (40 mg/day) patient is taking a thiazide diuretic. Clinicians’ opinion on addition of an angiotensin converting enzyme inhibitor.

GRAPHICAL REPRESENTATION OF UNDERGRADUATE QUESTIONNAIRES

Graph 35-A: Shows the awareness of under-graduate students about chronic kidney disease.

Graph 35-B: Shows the awareness of under-graduate students about chronic kidney disease.

Graph 35-C: Shows the awareness of Undergraduate students about chronic kidney disease.

Graph 35-D: Shows the awareness of Undergraduate students about chronic kidney disease.

Graph 35-E: Shows the awareness of Undergraduate students about chronic kidney disease.
Graph 35-F: Shows the awareness of Undergraduate students about chronic kidney disease.

Graph 35-G: Shows the awareness of Undergraduate students about chronic kidney disease.

Graph 36-A: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-B: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-C: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-D: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.
Graph 36-E: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-F: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-G: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 36-H: Shows the awareness of undergraduate students about dialysis therapy for CRF/ESRD patients.

Graph 37-A: Shows the quality of life evaluation of ESRD patients on dialysis by under-graduate students.

Graph 37-B: Shows the quality of life evaluation of ESRD patients on dialysis by under-graduate students.
DISCUSSION

Patients’ Questionnaires

All of the kidney disease patients were on regular prescription medicines by the doctors for treatment of their particular medical condition. Approximately 6 – 7 prescription medicines were being taken by the patients. All the above mentioned information was self-reported by the patients.

In Pakistan, along with other Asian states like Singapore, the prevalence of end-stage renal disease and the number of patients on dialysis is increasing. Patients’ health-related quality of life is now recognized as an important outcome measure of the ESRD patients, as it is a good assessment tool concerning patients’ feelings and satisfaction.\textsuperscript{[17]}

Our results are in confirmation to a cross-sectional study of a dialysis–targeted health measures in Singapore carried out by Joshi et al. 2010 and another study on assessment of quality of life in chronic renal failure patients in India by Kurikose et al. 2012.\textsuperscript{[18-19]} Chronic renal failure is now considered as a major and rapidly growing health burden world-wide. It has been found to affect health related quality of life of families along with patients.\textsuperscript{[18, 20]}

The major aim of the study was to reduce chronic kidney disease burden and suffering by improving the overall wellbeing of the patients and to improve their quality of life.

Clinicians’ Questionnaire

The National Kidney Foundation has developed KDOQI clinical practice guidelines for management of chronic kidney disease. It recommends earlier detection, monitoring progression, assessment of complications and timely referral of chronic kidney disease patients to a nephrologist.\textsuperscript{[21]}

Our work support the surveys carried out by McClellan et al. 2009, Nissonson et al. 2001, Cleveland et al. 2002 and Boulware et al. 2006 that primary care physician and clinician specialized in other than nephrology may not be able to provide the optimal care required by the chronic kidney disease patients.\textsuperscript{[22-25]} Deficiencies in the knowledge of primary care physicians were observed. Awareness should be created in the general physician and other medicinal practitioner for the timely referral of the patients to the nephrologists, in order to avoid the growing burden of end-stage renal disease and complication associated with it.\textsuperscript{[26-27]}

The following are the guide line for general physicians and specialists other than nephrologists to understand and recognize signs and symptoms of chronic kidney disease to treat and to refer the patients to a nephrologist in earlier stages of CKD to avoid need of dialysis and transplantation. The first most important consideration in the diagnosis of chronic kidney disease is creatinine level which might vary among different laboratories and some patients were observed to have very low kidney function.
although their serum creatinine level was within the range [28-29]. Muscle mass, age sex, height and limb amputation also should be considered while carrying out interpretation of serum creatinine. Physicians should be aware of the medications that might cause significant rise in serum creatinine level [30]. Proper evaluation by performing positive urine dip test should be carried out in patients with decreased GFR or proteinuria. [31-32] Once chronic kidney disease is diagnosed, better in early stage, it is necessary to get periodic lab evaluation and interpretation done to slow the progression of kidney disease and to avoid the development of complications in cases of negligence. [33] ACEI or ARB may not be discontinued in case of small rise in the serum creatinine or potassium level. [33-34] Routine evaluation may be carried out in patients on Erythrocyte-Stimulating agents to avoid overtreatment of anemia in chronic kidney disease patients. [35-36] Caution may be practiced while prescribing phosphate containing bowel preparations that might lead to acute renal failure or worsening of chronic kidney disease. [37] Over the counter antacid preparations containing magnesium, aluminum should be avoided in patients with advanced stage of CKD. Concomitant use of citrate containing compound and aluminum hydroxide might be hazardous. [38-39] Physician should be vigilant to diagnose probable secondary cause of hypertension in patients with chronic kidney disease. [40] In patients with recurrent stone problem, metabolic evaluation should be carried out in order to prevent further chances of stone formation which is also one of the causative factors of renal failure. [41] The medications given to the patients with renal allografts should be carefully monitored to avoid any interaction with transplant medications. [42]

**Students’ Questionnaire**

Our observation is in conformity of the KHA Fact Sheets; Fast Facts on CKD in Australia published in 2013 that individuals with chronic kidney disease have a 2-3 times greater risk of cardiac death than with chronic kidney disease. [43] In current era, renal replacement therapy, which includes hemodialysis, peritoneal dialysis and kidney transplantation, has played a pivotal role in prolonging the lives of patients. [44] Hemodialysis is preferred over peritoneal dialysis due to peritonitis and more cost. [45]

Several scales were used to assess mental health, activities of daily lives and family relationships. [46-49] According to Jungers et al. 1993 and Eadington 1995, a late diagnosis group may have adverse consequences in terms of inappropriate treatment of hypertension and metabolic disorders of uremia, as well as, lack of preparation for dialysis. [30-31] According to Kurkawa 2002; Transplantation is the best option available to the patients with end-stage renal disease. [45]

Non-availability of health insurance, limits the ability of patients to afford costly ESRD care. To enhance quality of impaired kidney patients, improvement in ESRD care is required which includes keen support of government, community awareness of the need of timely referral of chronic kidney disease patients to the nephrologists, appropriate pre-dialysis education and development of ESRD treatment facilities network for proper implementation of renal replacement therapy to improve impaired kidney patients’ quality of life outcomes. [52]

According to National Chronic Kidney Disease Fact Sheet, 2014, adults with chronic kidney disease have higher incidence of premature death from its all causative factors including cardiovascular disease. According to US Renal Data System, 2011, for kidney failure treatment, 67% patients selected hemodialysis. Transplantation was opted by 30% and peritoneal dialysis by 3% of chronic kidney disease population. Most of the dialysis patients are able to resist poorly and die within 2-3 years. Although some dialysis patients are able to carry out their routine activities and able to survive longer than 5-10 years. [45]

**CONCLUSION**

**Patients’ Questionnaires**

Our study exposed that the quality of life of patients is affected by the gradual advancement of chronic kidney disease to end-stage renal failure. Therefore, effective preventive measures along with proper treatment of co-morbidities associated with renal disorder may help in stopping renal failure progression to end-stage renal disease.

**Clinician’ Questionnaires**

Our study revealed that the early diagnosis and timely referral of chronic kidney disease patients by primary care physician to nephrologist is essential for reducing the progression of chronic kidney disease to end-stage renal failure and hence decreasing the burden of end-stage renal disease on our health care system.

**Students’ Questionnaires**

Our study showed that the undergraduate medical and pharmacy students had good knowledge of chronic renal disease, dialysis and quality of life of chronic kidney disease patients. But still their information may be enhanced by guest lectures by nephrologists or encouraging them to attend seminars concerning chronic kidney disease to enhance and update their knowledge to be responsible professionals to serve the ailing society.

**LIMITATIONS OF STUDY**

The larger study population may be under-taken. More feedback questions may be designed to assess patients concerns. Similarly, clinician may be asked about their opinion to help halting progression of chronic kidney disease to end-stage renal failure.

**ABBREVIATIONS**

CKD = Chronic kidney disease
BP = Blood pressure
GFR = Glomerular filtration rate
NKF = National Kidney Foundation
KDOQI = Kidney Disease Outcomes Quality Initiative  
ACEI = Angiotensin converting enzyme inhibitor  
AKD = Acute kidney disease  
AKI = Acute kidney injury  
BMI = Body mass index  
CHF = Chronic heart failure  
CrCl = Creatinine clearance  
CRP = C-reactive protein  
eGFR = estimated glomerular filtration rate  
ESRD = End-stage renal disease  
Hb = Hemoglobin  
HBV = Hepatitis B virus  
KDIGO = Kidney Disease: Improving Global Outcomes  
MI = Myocardial infarction  
PTH = Parathyroid hormone  
RRT = Renal Replacement Therapy  
USRDS = US Renal Data System  
WHO = World Health Organization  
CAD = Coronary artery disease  
KHA Fact Sheets = Kidney Health Australia fact sheets

CONFLICT OF INTEREST
There is no conflict of interest.

REFERENCES


42. Magee CC. Pharmacology and side effects of cyclosporine and tacrolimus. UpToDate Online 16.3.http://uptodateonline.com/online/content/


51. Eadginton DW. Delayed referral for dialysis: higher morbidity and higher costs. Semin Dial, 1995; 8: 258-260.