# Introduction

Chronic renal failure refers to an irreversible deterioration in renal function which classically develops over a period of years. Initially, it is manifest only as a biochemical abnormality. Eventually, loss of the excretory, metabolic and endocrine functions of the kidney leads to the development of the clinical symptoms and signs of renal failure, which are referred to as uraemia. When death is likely without renal replacement therapy it is called end stage renal failure ***(Turner et al., 2002).***

In routine daily practice, when the time comes to consider dialysis for patients with end stage renal disease, the question is whether a given individual will really benefit from dialysis. In most cases, the answer is simply yes, however in a minority, the patients age, clinical conditions and level of self-sufficiency make it douptful whether they will genuinely gain or whether dialysis may be futile or even significantly worsen their quality of life, or be tantamount to over-medicalizing the dying process ***(Fenwick et al., 2004).***

The proportion of older patients undergoing hemodialysis is rapidly increasing ***(Bethesda, 2006).*** Greater access to kidney care for elderly people has driven part of this increased incidence of dialysis. Older and sicker patients have been referred for hemodialysis in Asia, Europe, and North America because of perceived improvements in quality of life on dialysis and cultural factors. Once referred for dialysis, older patients have been surviving longer with renal replacement therapy as

dialysis adequacy has increased and kidney transplant outcomes have improved) ***(Unruh et al., 2005)***.

As a result of improvements in technology and greater access to dialysis, the increased prevalence of older adults undergoing renal replacement therapy generally mirrors the aging trend of the general population. Healthcare providers are increasingly called on to advice older patients on the prospect of life supported by renal replacement therapy and care for older patients supported by hemodialysis. Individual experience largely drives these judgments, because there is a paucity of evidence regarding the outcomes of older persons undergoing hemodialysis. Although improving health-related quality of life may be the most important role of healthcare in elderly patients with chronic illness ***(Unruh et al., 2005),*** long term health related quality of life data in elderly patients undergoing hemodialysis are lacking ***(Kutner and Brogan, 1992).***

Despite the increasing numbers of older patients undergoing hemodialysis, information on health related quality of life in the elderly population undergoing hemodialysis has been conflicting, with some studies relating impaired health related quality of life and others failing to find impairement. Early studies of older patients undergoing dialysis have shown markedly lower functional status than in older community-dwelling adults without kidney disease ***(Kutner and Brogan, 1992)***.

In addition, patients undergoing hemodialysis are now more likely to be older, have limited functional status, and

multiple comorbid illnesses ***(Bethesda, 2006)***.Other studies of older patients undergoing hemodialysis have demonstrated preserved health related quality of life ***(Parsons and Harris,1997),*** particularly when compared with end-stage renal disease ***(Rebollo et al., 2001).***

# Aim of the Work

To study the quality of life in elderly patients suffering from renal failure whether on conservative treatment or chronic hemodialysis regarding functional status, self perception and health related quality of life.

# Chronic Kidney Disease

## Introduction

As the world's population ages, a major challenge is to unravel the pathways to disease and disability in older persons. The elderly are the fastest growing subset of the population, with the number of adults over 65 years of age expected to approach approximately 20% of the population by 2030 ***(Centers for Disease Control and Prevention, 2003).***

Age-associated increases in chronic disease and disability have led to a significant financial burden on the health care system, due to increases in testing, medication usage, hospitalizations, and institutionalization ***(Reed et al., 1998)***.

Chronic kidney disease (CKD) is a major public health problem that often goes unrecognized until late-stage disease ***(Weiner, 2007).*** Although low and deteriorating physical function are increasingly recognized as key characteristics of CKD, assessment of physical function does not yet form part of the routine clinical monitoring of this patient group. This is somewhat surprising as measures of physical function, from across the entire functional measurement spectrum, have been shown to be related to clinically important outcomes (morbidity, quality of life and increasingly survival) in patients being treated for CKD ***(Koufaki and Mercer, 2009).***

## Definition

The Kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation (NKF) defines chronic kidney disease as either kidney damage or a decreased kidney glomerular filtration rate (GFR) of less than 60 mL/min/1.73 $m^2$ for 3 or more months. Whatever the underlying etiology, the destruction of renal mass with irreversible sclerosis and loss of nephrons leads to a progressive decline in GFR ***(Arora and Verrelli, 2010).***

Chronic kidney disease (CKD) is a progressive condition marked by deteriorating kidney function over time. Typically, kidney function is quantified by glomerular filtration rate (GFR); with GFR most frequently estimated using equations that incorporate serum creatinine along with demographic data ***(Stevens et al., 2006).*** Renal failure refers to the decline in renal excretion of sufficient severity to result in retention (in blood and extracellular spaces) of nitrogenous waste products, acids, potassium, sodium, and water. Clinically, it is designated as either acute or chronic. Normally,one-third of the nephrons can eliminate all normal waste products from the body and prevent their accumulation in body fluids. When the number of active nephrons falls to 10% to 20% of normal, urinary retention and death follow ***(Timiras and Leary, 2007).***

## Epidemiology

The incidence and prevalence of the disease have doubled in the past decade, most likely because improved treatments for hypertension, diabetes mellitus, and coronary

disease have increased longevity in affected patients and, therefore, their likelihood of developing chronic kidney disease ***(United States Renal Data System's annual data report, 2000).***

**Scope of the problem in Egypt**

Kidney disease is a growing problem in Egypt associated with an increase in the prevalence of dialysis patients the statistics show a sharp rise in dialysis patients from 10/million population (PMP) in 1974 to 165/million pop in 1995 ***(Barsoum, 1996).*** Recent data points to an increasing trend accounting for 483/million pop in 2004. Improved medical care for patients with chronic renal disease has contributed to annual increases in the numbers of patients who survive with end stage renal disease (ESRD) ***(Egyptian Renal Registry, 2004).***

The incidence of ESRD is growing. The estimated number of ESRD patients in Egypt was 14,636 in 1998, and increased to 35,751 recently ***(Egyptian Renal Registry, 2004).***

**Risk Factors for and pathophysiology of CKD**

Chronic renal failure results from slow progressive and generally irreversible deterioration of renal function due to destruction of nephrons ***(Timiras and Leary, 2007).*** Major risk factors for development and progression of CKD include diabetes, hypertension, older age, and being African American. Nearly 45% of incident kidney failure is attributed to diabetes and another 20% is attributed to chronic hypertension ***(USRDS, 2005).*** Other less common but important causes include

primary glomerulonephritis, lupus, and polycystic kidney disease ***(Weiner, 2007)***.

Several lines of evidence suggest that vascular disease, specifically microvascular disease, may be an important cause of CKD in the elderly. Hypertension and diabetes are associated with specific renal vascular lesions ***(Paisley et al., 2003).***

The pathology includes decreased urinary output to (20-200) mL/day (oliguria), renal tubular necrosis, scattered basement membrane disruption, presence of protein, red blood cells, epithelial cells, and brown casts in the urine, and signs of uremia (nausea, vomiting, diarrhea, hypertension, and others) ***(Timiras and Leary, 2007).***

## Classification of Kidney Disease

The early stages of CKD (stages 1 and 2) are manifested by kidney damage and are generally asymptomatic; the kidney functions are normal but the risk for progressive disease is significant. As kidney disease worsens, kidney function begins to deteriorate (stages 3 and 4 CKD). Eventually, kidney failure (stage 5 CKD) ensues and kidney replacement therapy is required ***(NKF-KDOQI, 2002).***

The classification of kidney disorders has undergone a major revision over the past few years. A consensus committee, sponsored by the National Kidney Foundation, published new clinical practice guidelines in February 2002. The traditional chronic renal insufficiency (CRI) has become chronic kidney

disease (CKD) and end-stage renal disease (ESRD) has become kidney failure. CKD is defined as either kidney damage or decreased kidney function for 3 or more months. Kidney failure is defined as a GFR of less than 15 mL/min or the need to start kidney replacement therapy. Along with renaming kidney disease, the committee also developed a system of staging ***(Wiggins and Patel, 2009).***

**Stage description according to GFR (mL/min/1.73 m2)**

1. Kidney damage with normal or increased GFR>90
2. Kidney damage with mild reduction in GFR 60-89
3. Moderate decrease in GFR 30–59
4. Severe decrease in GFR 15–29
5. Kidney Failure <15 (or dialysis)

***(Wiggins and Patel, 2009).***

## Clinical Picture

### Symptoms

Patients with chronic kidney disease stages 1-3 (GFR >30 mL/min) are generally asymptomatic and do not experience clinically evident disturbances in water or electrolyte balance or endocrine/metabolic derangements. Generally, these disturbances clinically manifest with chronic kidney disease stages 4-5 (GFR <30 mL/min). Uremic manifestations in patients with chronic kidney disease stage 5

are believed to be primarily secondary to an accumulation of toxins, the identity of which is generally not known.

Some of the endocrine (or metabolic) derangements are:

1-Hyperkalemia:

Hyperkalemia usually develops when the GFR falls to less than 20-25 mL/min because of the decreased ability of the kidneys to excrete potassium. It can be observed sooner in patients who ingest a potassium-rich diet or if serum aldosterone levels are low, such as in type IV renal tubular acidosis commonly observed in people with diabetes or with use of angiotensin-converting enzyme (ACE) inhibitors or nonsteroidal anti-inflammatory drugs (NSAIDs). Hyperkalemia in chronic kidney disease can be aggravated by an extracellular shift of potassium, such as that occurs in the setting of acidemia or from lack of insulin. Hypokalemia is uncommon but can develop among patients with very poor intake of potassium, gastrointestinal or urinary loss of potassium, diarrhea, or diuretic use. Metabolic acidosis often is mixed, normal anion gap and increased anion gap, the latter observed generally with chronic kidney disease stage 5 but with the anion gap generally not higher than 20 mEq/L. In chronic kidney disease stage 5, accumulation of phosphates, sulphates, and other organic anions are the cause of the increase in anion gap. Metabolic acidosis has been shown to have deleterious effects on protein balance, leading to a negative nitrogen balance, increased protein degradation, increased essential amino acid oxidation, reduced albumin synthesis, and a lack of adaptation to a low protein

diet. Hence, this is associated with protein-energy malnutrition, loss of lean body mass, and muscle weakness.

2-Normochromic normocytic anemia:

It starts early in the course of disease and becomes more severe as the GFR progressively decreases with the availability of less viable renal mass. Tendency of bleeding is increased from the uremia-induced platelet dysfunction. Anemia is associated with fatigue, reduced exercise capacity, impaired cognitive and immune function, and reduced quality of life. Anemia is also associated with the development of cardiovascular disease, the new onset of heart failure, or the development of more severe heart failure. Anemia is associated with increased cardiovascular mortality.

3- Salt and water handling by the kidney is altered in patients with chronic kidney disease. Extracellular volume expansion and total-body volume overload results from failure of sodium and free water excretion. This generally becomes clinically manifested when the GFR falls to less than 10-15 mL/min, when compensatory mechanisms have become exhausted. As kidney function declines further, sodium retention and extracellular volume expansion lead to peripheral and, not uncommonly, pulmonary edema and hypertension. At a higher GFR, excess sodium and water intake could result in a similar picture if the ingested amounts of sodium and water exceed the available potential for compensatory excretion.

4- Skeletal (due to hypocalcemia and hyperphosphatemia):

Renal bone disease is a common complication of chronic kidney disease and results in both skeletal complications (eg, abnormality of bone turnover, mineralization and linear growth) and extraskeletal complications (eg, vascular or soft tissue calcification). Different types of bone disease occur with chronic kidney disease, as follows: (1) high turnover bone disease due to high parathyroid hormone (PTH) levels; (2a) low turnover bone disease (adynamic bone disease); (2b) defective mineralization (osteomalacia); (3) mixed disease; and (4) beta-2-microglobulin(dialysis-related amyloidosis from beta-2-microglobulin accumulation in patients who have required chronic dialysis for at least 8-10 years is another form of bone disease that manifests with cysts at the ends of long bones).

5-Other manifestations of uremia in ESRD, many of which are more likely in patients who are inadequately dialyzed, include the following:

- Pericarditis - Can be complicated by cardiac tamponade, possibly resulting in death.
- Encephalopathy - Can progress to coma and death
- Peripheral neuropathy
- Restless leg syndrome
- GI symptoms - Anorexia, nausea, vomiting, diarrhea
- Skin manifestations - Dry skin, pruritus, ecchymosis
- Fatigue, increased somnolence, failure to thrive

- Malnutrition
- Erectile dysfunction, decreased libido, amenorrhea
- Platelet dysfunction with tendency to bleeding

**Signs**

The physical examination often is not very helpful but may reveal findings characteristic of the condition underlying chronic kidney disease (e.g. lupus, severe arteriosclerosis and hypertension) or complications of chronic kidney disease (eg, anemia, bleeding diathesis, pericarditis) ***(Arora and Verrelli, 2010).***

**Consequences of CKD in the elderly**

There is substantial evidence for health risks associated with decreased GFR and albuminuria in the elderly. The median age of new dialysis patients is now 65 years and the fastest growing group of new dialysis patients are those older than 75 years of age ***(US Renal Data System, 2008).*** Traditionally recognized complications of decreased GFR include hypertension, anemia, malnutrition, bone and mineral disorders, neuropathy, and decreased quality of life, which are common in elderly patients with estimated GFR less than 30 mL/min/1.73 $m^2$ (CKD stages 4-5) ***(National Kidney Foundation, 2002).***

Recent studies also demonstrate increased prevalence of traditional age-related conditions such as cognitive impairment and frailty in elderly individuals with decreased eGFR

***(Kurella et al., 2005).*** There is a strong association between decreased eGFR or albuminuria and higher rates of cardiovascular disease and mortality in the elderly ***(Shlipak et al., 2005)***. Indeed, this is particularly true among elderly individuals with CKD, even in those with CKD stage 4. In addition, susceptibility to acute kidney injury and other side effects of medications or diagnostic and therapeutic procedures, such as imaging studies, are more common in patients with decreased GFR and are a major source of morbidity and cost in the elderly ***(Steinman et al., 2006)***. In the general population, therapeutic interventions can prevent or ameliorate many of the complications of decreased GFR ***(National Kidney Foundation, 2007)***. Comorbid conditions are frequent in the elderly, however, which may modify the effectiveness of these interventions ***(Stevens et al., 2008).***

**Management**

Management depends on identification of the mechanism that is responsible for the failure. Pivotal measures of management include (i) treatment of the underlying cause; (ii) monitoring of fluid, electrolytes, and acid–base balance; (iii) prevention of infections, and (iv) alterations of the diet: not more than 40 g/day protein with sufficient (at least 3000) calories to prevent endogenous catabolism. Other interventions include dialysis treatment and kidney transplantation ***(Timiras and Leary, 2007).***

Renal replacement therapy in elderly people is a challenge. They need more medical and nursing time than younger people, but when successful the results can be very rewarding. There is an increased prevalence of comorbidity in an older population, especially cardiovascular disease. The elderly rigid vascular system is very sensitive to fluid changes during haemodialysis, predisposing to dialytic hypotension with rebound hypertension between dialyses. The old ischaemic heart does not cope with fluid overload and pulmonary oedema easily develops. Many older people are unfit for major surgery and thus transplantation is not a treatment option, as there is a relatively high post-transplant mortality. Overall, therefore, older patients are more difficult and more expensive to treat than younger patients. Survival of older patients is less than that of younger patients ***(Valderrabano et al, 1995).***

Among patients with ESRD aged 65 years and older, the mortality rates are 6 times higher than in the general population. The highest mortality rate is within the first 6 months of initiating dialysis, which then tends to improve over the next 6 months, before increasing gradually over the next 4 years ***(Arora and Verrelli, 2010).***

The mortality rates associated with hemodialysis are striking and indicate that the life expectancy of patients entering into hemodialysis is markedly shortened. At every age, patients with ESRD on dialysis have significantly increased mortality