

# Chronic kidney disease and aging: The theme of world kidney day in 2014; nephrologist will become the professional geriatrist

The worldwide population is aging, and the number of people above 85 years of age is growing faster than any other age group.<sup>[1]</sup> As the people continue to age, physicians encounter growing number of older patients with chronic kidney disease and hence, renal failure to be a global challenge as a noncommunicable epidemic.<sup>[1-3]</sup> Chronic kidney disease is either defined as a low estimated glomerular filtration rate of less than 60 mL/min/1.73 m<sup>2</sup>, or normal estimated glomerular filtration plus evidence of renal damage (most common: albuminuria, hematuria and abnormal renal ultrasound for three or more consecutive months), regardless of age.<sup>[4-8]</sup> It has been shown for many years that glomerular filtration rate decreases with increasing age and this downhill movement necessitates much attention, while some drugs such as analgesic are nephrotoxic, particularly when considered in large amount in long duration and in a susceptible elderly. In 2014, the world kidney day will focus on chronic kidney disease and aging. Nowadays, nephrologists, across the world, are gradually moving toward more managing the more elderly patients.<sup>[1,3,5,8]</sup> This is owing to the burden of chronic disease in the aging population and specifically chronic kidney disease (CKD). At the older age CKD rarely occurs as an isolated phenomenon, but rather, it is a part of more general deregulated condition, from other chronic situations and can often be a marker of these conditions themselves. Risk factors predisposing the elderly to CKD is ill-understood.<sup>[1,3,5,8]</sup> In fact, most studies show that the preponderance of patients either affected with microalbuminuria or age-related gradual reduced glomerular filtration rate reduction are the elderly (>65 years). Cardiovascular disease also has a significant influence on CKD in this population and all affects the CKD progression, in this age group.<sup>[5,8-10]</sup> It is still not apparent whether CKD in elderly is only due to age-related changes in renal function or it is a genuine renal disease that will progress to end-stage kidney failure.<sup>[5,7-10]</sup> Nonetheless, a minority of elderly patients with CKD will progress to end-stage kidney failure too. In addition, the majority will have morbidity but their mortality, majorly is related to cardiovascular

disease, rather than end-stage kidney failure itself.<sup>[5,7-10]</sup> Additionally, end-stage kidney failure patients, suffer a syndrome of accelerated aging indicated by a 10- to 100-fold increase in cardiovascular and all-cause mortality when matched to age-matched controls.<sup>[1,3,5,10-12]</sup> Recently various investigations have shown that CKD is a common situation that stimulates cellular senescence and premature aging through toxic alterations in the internal milieu. This occurs through various mechanisms, comprising DNA and mitochondria damage, increased reactive oxygen species (ROS) generation, stem cell exhaustion, phosphate toxicity, and persistent inflammation and telomere attrition. However, no specific beneficial interventions have been shown to improve this dismal outcome, while we somehow are aware about the major role-player including mineral and bone disorder (CKD-MBD) and inflammation<sup>[12-17]</sup> and decreased renal expression of klotho expression.<sup>[7-12]</sup> Age-related decline in glomerular filtration rate is associated with disturbed concentrating capability, vascular sclerosis, global glomerular sclerosis, and tubular atrophy with thinning of kidney cortex and reduction in the renal size. However, these changes are considered pathological if observed in younger individuals.<sup>[1,3,9,11,14,18]</sup> The progression of CKD is variable among older patients depending on its severity and on its underlying etiology. It seems that, subjects with diabetes mellitus had the greatest decline in the glomerular filtration rate. High blood pressure was another contributing factor of decline in the glomerular filtration rate. Various studies have shown that systolic hypertension and diabetes mellitus have the highest influence on progression of CKD in older persons. Also microalbuminuria and low glomerular filtration rate < 30 mL/min/1.73 m<sup>2</sup> are risk factors and the progression of the disease can be moderated by treating these cardiovascular risk factors.<sup>[9-12]</sup>

The rising prevalence and incidence of CKD, with poor outcomes, has high cost in the world. Moreover, statistics show that numbers of the patients with end-stage kidney failure on kidney replacement therapy, in Japan, United States, and most European countries have profoundly increased.<sup>[9-12]</sup> However, we should not be surprised that, this trend has a faster past in developing countries. It is anticipated that by 2030, over 70% of patients with end-stage kidney failure will be populations of developing countries probably related because of the quick rising trend of obesity and diabetes as the major risk factors of CKD in these countries.<sup>[9-12]</sup>

The significance of CKD is also important due to its relationship with cardiovascular with other important disease. In older individuals, CKD is also linked to

the development of cognitive impairment and functional disability, and people with CKD are at increased risk of cardiovascular morbidity and mortality considerable as those with diabetes.<sup>[9-12]</sup> It has been shown that the presence of chronic renal failure CKD is an independent provider to the risk factor for decline in physical and cognitive functions in older patients too. Chronic renal failure CKD affects 45% of subjects older than 70 years of age and can two-fold the risk for physical impairment, cognitive dysfunction, and frailty.<sup>[9-12,18-23]</sup> Indeed, our world gradually became an arena of old population. We are living in an obesogenic environment and we are also surrounded by multiple renal risk factors additionally major progresses in the field of interventional cardiology, interventional neurology, cancer therapy, and intensive care medicine prolongs the age of elders. It seems that nephrologists have a great work to do in the near future and they would become also responsible as geriatrist.

The incidence of CKD is high in older persons and seems to be increasing. Normal renal function promotes effective aging, while CKD with evidence of kidney injury, such as albuminuria, may be related to unsuccessful aging, while the decline in renal function is correlated with factors that accelerate poor health. These factors consist subclinical cardiovascular disease, increasing levels of oxidative stress, and inflammation. Hence, screening for CKD should not only focus on in search of reduced glomerular filtration rate, but also should comprise measurement of albuminuria. Policies intended at slowing progression of renal disease should deem underlying risk factors. Low-risk patients can be handled by general practitioners. However, it is evident that, high-risk patients should receive a rigorous treatment of their cardiovascular risk factors and should be managed by nephrologists.<sup>[24]</sup>

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