



Risk Factors Associated With Chronic Kidney Disease: An Overview

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ABSTRACT

Provides an overview of the risk variables connected with kidney illness. Chronic kidney disease is a global public problem and causes increased morbidity and mortality. Risk variables of chronic kidney disease are connected with a high risk of unfavourable results. Gradual fall of kidney function caused by a number of physiological changes and early detection; correction of these changes helps to reduce the co-morbid burden of renal illness. Aging is a main risk variable for chronic kidney disease, followed by diseases like hypertension and diabetes mellitus. Smoking is a preventable risk factor. Awareness is low among the common people and the leads to late detection. Early identification of patients with kidney failure helps for the management of chronic renal failure.

Keywords: Chronic kidney disease, Risk Factors, Kidney failure.

INTRODUCTION

Renal failure is a worldwide public health issue and has as increased incidence and prevalence along with high costs, and poor outcomes. Chronic kidney disease (CKD) has unfavourable results like kidney failure, cardiovascular disease and premature death. Chronic Kidney disease is defined as kidney damage as glomerular filtration rate (GFR), $<60\text{ml}/\text{min}/1.73\text{m}^2$ for 3 months or more, irrespective of causes. It is essential to build up the efficiency of utilizing experienced specialists and assets in enhancing the care and outcomes of chronic kidney disease, but risk factor and resources for care vary from place to place.¹

The most useful outcomes of chronic kidney disease to treat kidney failure are treatment with dialysis or transplantation. Different markers of kidney damage like proteinuria, abnormal urinary sediment or variations on imaging studies are utilized to ascertain the kidney damage. Kidney biopsy is also done. The presence of chronic kidney disease can be done by finding proteinuria and it also helps to find out the type of kidney disease. Proteinuria is connected with prognosis of kidney disease progression and cardiovascular disease development.² Undetection of kidney dysfunction in early stages, causes for its high number of late referrals. Progressive loss of kidney function caused by number of physiological changes. Slow progression of chronic kidney disease and delay for the need of dialysis can be done only by early detection and correction of these changes. Early detection helps to reduce the co-morbid burden of renal illness, and can avoid the use of nephrotoxic drugs or tests in high risk individuals. Awareness of the risk variables that are common to cardiac and kidney disease like diabetes, hypertension, anemia, proteinuria helps the patient.³

RISK FACTORS FOR CHRONIC RENAL FAILURE

Risk variables of CKD connected with high risk of unfavourable outcomes. The Kidney Disease Quality Outcome Initiative (K/DOQI) guidelines focus on finding out susceptibility and initiation factors to identify people at increased risk for developing CKD, and progression factors to identify people at high risk of worsening kidney damage and finally the loss of kidney function. Individuals with onset of kidney disease at older age, high death rate due to CVD do not develop kidney failure. But, low GFR leads to complication like hypertension, anemia, malnutrition, bone, neuropathy and low level of quality of life. Complications of kidney function and slow progression of kidney failure can be prevented by therapeutic interventions at earlier stages. Prevention, detection and treatment of CKD at its first stage help to reduce adverse outcomes and also helps to improve the quality of life of individuals with CKD.^{1,4}

Risk factors for chronic renal failure can be of four types.

- (1) Susceptibility factors, increased susceptibility to kidney damage. This include older age, gender, family history of CKD, reduction in kidney mass, low birth weight, racial or ethnic minority status, low income and education.
- (2) Initiation factors, will directly initiate kidney damage and include diabetes, high blood pressure, autoimmune diseases, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstruction, drug induced toxicity and hereditary diseases.
- (3) Progression factors, this cause worsening kidney damage and include high level of proteinuria, poor glycemic control in diabetes, smoking and dyslipidemia.
- (4) Other factors include anemia, NSAID, CAD, and late referral to nephrologist.⁴



1. Age -Gender

Urine markers of renal and vascular damage was found to be twice in men than in women. The occurrence of tubulointestinal damage is supported more by proteinuria and pattern of microalbuminuria predominance rather than glomerular etiology. Eventhough there is no sex difference in renal physiology in all age groups, GFR is lower in men than those of women. Studies shows that absolute loss of renal function is more in men than in women and it begins in youth. The drop in renal work with age was more in men than women and men reached renal failure earlier than women.⁵

2. Low Birth Weight /Racial or Ethnic Minority Status /Low Income /Education

People from low income resources, minority ethnic communities and racial suffer from unrecognized and untreated CKD. Poor are more affected by this because of lack of access to hospitals and services. Elements, related to poverty like poor sanitation, risky water, pollution, infection transmitting vectors add to development of CKD in low income /developing countries. Exposure to agrochemicals increases CKD in male farm workers. Use of herbal medicines is also associated with CKD in poor. Ethnic minorities like African Americans is at greater risk for CKD. Low income and education, make poor have limited accesses to resource and those undergoing treatment experience a high health care expenditure ,leading to job losses and interruption in education of their children etc.⁶

Low birth weight in adult cause an increased risk for chronic disease like renal failure, BP, CVD. Studies show that low birth weight is associated with relapses of nephrotic syndrome in children.⁷

3. Blood Pressure

High blood pressure is an crucial risk variable for CKD and is also considered as an absolute risk factor for cardiovascular disease. Aging and obesity is one of the reason for increasing prevalence of hypertension in CKD patients. Studies shown that African americans develops hypertensive CKD more often than caucasians.⁹

4. Diabetic Kidney Disease

The prevalence of diabetes mellitus worldwide is expected to be approximately 366 million by the year 2030,its found to be two times that from year 2000.Diabetes mellitus is associated with aging ,obesity, tobacco use, physical inactivity and urbanization.¹⁰ Certain ethnic and racial populations like African Americans ,Mexican Americans ,American Indians have higher diabetic end-stage renal disease(ESRD). The people aged 64 years old have diabetic ESRD and are connected with an increased morbidity and fatality. DKD is caused by the agents that block the renin angiotensin –aldosterone system causes DKD, and if time is left untreated, it causes progression of asymptomatic mesangial extracellular matrix accumulation, microalbuminuria,

macroalbuminuria and proteinuria and nephropathy. Hypertension may be found in patients starting dialysis for ESRD due to DKD. Membranous nephropathy and IgA nephropathy may also co-exist with DKD. In adults, the main cause for CKD is diabetic nephropathy and hypertension and children with CKD found to have inheritent or congenial kidney disorders. Eventhough some patients has balanced kidney function for years, for others it may drop rapidly.¹¹

5. Drug Induced Chronic Kidney Disease

Kidneys are a common site for drug toxicity and the main cause for Acute Tubular Injury (AKI) is drug induced nephrotoxicity. This AKI can lead to chronic drug toxicity and ESRD. When renal dysfunction is seen in patients, medication list must be carefully examined for nephrotoxic agents. Nephrotoxicity must be recognized at its early stage for the effective intervention and treatment. Renal biomarkers helps us to provide with tools for detection of drug induced nephrotoxicity on their early stages.¹² Macrolide toxicity have a clinical manifestations in CKD patients, and dialysis patients. These antibiotics are now prescribed frequently for respiratory tract infections.¹³

6. Dyslipidemia

DLP is a well-known risk variable for CKD and CVD.¹⁴ Patients with CKD have reduction in lipoprotein lipase activity and hepatic triglyceride lipase. CKD progression is accompanied by the changes in certain alterations of the lipoprotein metabolism. Early detection of thyroid and lipid metabolism helps to slow down the gradual increase of CKD, and also helps to slow down the chances of CVD development later.¹⁵ Studies have shown that lipid may induce glomerular and tubulointerstitial injury.¹⁶

7. NSAIDS

The use of analgesics, especially the over –the –counter products has been a cause for CKD. The use of NSAIDS is characterized by renal papillary necrosis and chronic interstitial nephritis. Heavy use of analgesics and NSAIDS cause CKD. Acetaminophen, it is the major metabolite of phenacetin, has created a great concern with renal disease.¹⁷

8. Anemia

Anemia develops at early stages of CKD and its early detection improve quality of life of patients and survival in CKD and helps to stop the renal failure progression .Anemia correction using erythropoiesis stimulating agent shown to improve renal outcomes. Measuring plasma level of erythropoiesis helps to detect renal anemia. When GFR decreases, anemia develops in a patient by the blood loss.¹⁸

9. Smoking

Smoking is an essential risk variable for kidney failure. Smoking susceptibility is diverse in men and women and an increased risk caused by use of tobacco is weakened in



elderly. The consequences of cigarette smoking for CKD patients will be severe and it leads to progression of CKD and CVD.19Studies have shown that smokers had an increased risk for macroalbuminuria, which leads to non-reversible kidney damage related to smoking. It is also seen that smokers have high creatinine clearance than nonsmokers, and men being more susceptible to the unfavourable renal effects of smoking.²⁰

10. Cardiovascular Disease (CAD)

The risk for developing renal failure after coronary interventions is between 1-2%, It is seen that patient receiving iodixanol is at risk for re-hospitalized with renal failure diagnosis. The studies shown that CM with low viscosities has low risk for renal failure development.²¹

11. Obesity/Lifestyle

Obesity is found to have an opposing effect on renal diseases. In middle aged men and women, relationship between obesity and urinary albumin excretion has been reported. Obesity is found to be a predictor for proteinuria development and ESRD. Ethnicity also plays a role in obesity and metabolic impairment of CKD.²⁰

CONCLUSION

Among the risk factor, aging was a significant predictor for renal failure in both males and females, but more prominent in males. Hypertension and diabetes mellitus, main cause among diseases for causing renal failure. Awareness among people is very low and therefore improving the education and early detection of CKD is very important. Those primary care physicians should be stressed for taking care of diabetic and hypertensive patients to check for early kidney damage .Smoking is a preventable risk variable. Risk variables existing for loss of kidney failure and kidney dysfunction extent are often under-recognized. Early identification of patient with kidney failure and timely referral to nephrologist helps for the management of chronic renal failure.

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