Associated Risk Factors of Chronic Kidney Disease in Jalalabad Afghanistan.

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ABSTRACT

BACKGROUND: Chronic kidney disease is a global health problem, affecting the majority of countries in the world. Its prevalence is approximately 10% and is associated mainly with Diabetes mellitus and hypertension. It is a condition in which the kidneys function or structural changes or GFR is reduced from / 1.7 sq.m 60ml / min for three months or longer and it is the leading cause of death in hospitals after cardiovascular disease, tuberculosis and malaria.

OBJECTIVES: Determine the Risk factors of chronic kidney disease, such as age, sex, Family history, Drug use, smoking, and socioeconomic status, and concurrent Disease, such as hypertension and Diabetes mellitus associated with chronic renal insufficiency.

METHODS: This is a Descriptive cross-sectional study conducted in Nishtar National Kidney and Rukhan Teaching Hospitals Jalalabad, Afghanistan, and was performed on 103 patients under Hemodialysis Departments from March through December 2019 and collect data from Individual health histories, Demographic characteristics (age, sex, Body weight, Height, Place of Residence and others factors) on social conditions and risk factors. A physical examination was performed, along with laboratory tests (blood chemistry) to measure renal function and detect markers for renal damage, the history of certain diseases and the presence or absence of certain habits have been investigated.

RESULT: The study included a total of 103 patients with chronic renal insufficiency. 61 (59.2%) were Males and 42 (40.8%) females with no significant difference in the number of gender. The majority of the patients were men and residents of Nangarhar province with an average age of (Mean± SD) 40.53 ± 18.06 years. The majority of patients were married, illiterate and of mid-level socioeconomic status. Three out of every four patients with renal insufficiency had a history of high blood pressure, as well as kidney stones, Diabetes mellitus and Dyslipidemia. In terms of habits, the use of other types of tobacco (such as naswar), smoking and the use of certain drugs have been found to be very addictive.

CONCLUSIONS: Chronic kidney Disease is alarming in communities, among both young and older age, men and women. Health services must be properly aligned to manage increased burden of chronic kidney disease, and preventive strategies should be implemented in a practical way.

Key words: Chronic renal failure, Risk factors, Hypertension, Diabetes mellitus, Age.

Introduction

Chronic kidney disease is a condition in which the kidneys function or structural changes or GFR is reduced from 1.7 sq.m 60ml/min for three months or longer and is a major global

health problem. In developing countries, the number of patients with chronic kidney disease is increasing, which requires renal replacement therapy (RRT) up to 0.3% per year. [1, 2]
According to the data, by 2030, 70% of patients with chronic renal insufficiency will be in developing countries. [3, 4]
Among the known environmental factors are exposure to heavy metals (lead, cadmium, arsenic, mercury and uranium). Some nephrotoxic substances such as Balkan aristholic acid found in star fruit (Averrohea carabola.L) and some herbal remedies are also thought to cause chronic kidney disease. [5] Other causes are NSAIDs, and the infections are leptosporis, malaria, leprosy, and other rare causes are heat stroke and subsequent rhabdomyolysis.
Because the kidneys are vital organs and excrete not only toxic substances from the body but also have other endocrine and hemostatic functions, in order to learn about the risk factors for the kidneys in our society, we conducted a study entitled "Explanation of patients with renal insufficiency". According to epidemiological studies, the prevalence of chronic kidney disease in various countries varies from 10 to 16% at different stages (these cases have been recorded in adults). [5, 6]
From the global Reports about chronic kidney Disease, it is indicated that 30-40% of people have Diabetes Mellitus, 25-30% hypertension, and age understood to be a risk factor. [1, 2, 7]
Nephrologic syndrome affects a variety of processes that lead to the onset of pathological processes, including: 1. GFR deficiency (azotemia), 2. Changes in urine sedimentation, 3. Abnormal protein excretion (protein urea), 4. Urine Volume change (Polyuria, oliguria, and anuria), 5. High blood pressure and edema, 6. Abnormality of electrolytes, 7. Some have fever and pain.
The combined presence of the above symptoms helps in the diagnosis of Major nephrologic syndrome, The GFR evaluation is an important assessment for the diagnosis of in-hospital (In patient Department) and out-of-hospital patients (Outpatient Department).
In end-stage kidney disease, protein urea, non-concentrated urine (iso osmotic with plasma), in ultrasound, the kidneys become smaller, acute renal insufficiency (ARF) can be caused by factors that affect the blood flow to the kidneys. (Pre Renal azotemia, intrinsic renal diseases (small vessels, glomerulus or tubular affects), or Post renal azotemia (blockage and stasis of urine in ureters).
Blocking of PGs by NSAIDs also leads to acute renal insufficiency, as deficiency of PGs leads to severe vasoconstriction, blockage of angiotensin receptor decreases efferent arterial tone and thus causes decrease of glomerular perfusion. Patients treated with NSAIDs or ARB or ACEI are more likely to get acute renal failure because of these hemodynamic changes. Persistent renal failure can cause ATN (acute Tubular Necrosis). [8]
Chronic kidney disease is a worldwide health problem, which could lead to end-stage renal disease (ESRD) and increased cardiovascular morbidity and mortality. According to the registries of different countries including the United States, chronic kidney Disease affects 10–16% of adults around the world. [10] Within the Turkish population the prevalence of CKD is 15.7%.[12] Identification of factors predisposing an individual to Chronic kidney disease is essential in terms of personal and community health, as some risk factors can be modified and can prevent or slow down progression to end stage Renal disease .[9,10,11]
Chronic kidney disease has received increasing attention as a major public health problem around the world. [12] The burden of Chronic kidney disease was not only reflected in the

needs for life-long dialysis or renal replacement therapy when entering end-stage renal disease, but also emphasized in association with a higher risk of morbidity (especially due to cardiovascular disease), mortality, hospitalization, and cognitive dysfunction. In 2010, the estimated number of patients receiving dialysis was 327,000 (442 pmp: per million people) in Europe, and the number was 441,000 (1273 pmp) and 909,000 (218 pmp) in North America and Asia, respectively [13]. In China, the prevalence of dialysis was 33.2 pmp in 1999, and the number had surged to 402.18 pmp in 2015, and the corresponding number of hemodialysis patients was approximately 553,000 [12]. A similar tendency was also present in other developing countries. Furthermore, patients with chronic kidney disease generally had relatively higher medical spending comparing with those who had other comorbidities. [14] Recently, with the rapid development of China's economy, the issue of aging population is becoming more prominent. The 2010 census data of China indicated that the population aged 60 or older accounted for 13.26% of the total population, which was 2.93% higher than that in 2000. [15] The Burden of Chronic kidney disease is likely to worsen with aging. [16, 17]

The 2015 Annual Data Report of the China Kidney Disease Network showed that nearly half of the patients with chronic kidney disease were 60 years of age or older. [14]

Levey et al. also pointed out that chronic kidney disease affected more than half of people older than 70 years [18] both findings suggested that the elderly population is a high-risk group for chronic kidney disease. Furthermore, early stages of chronic kidney disease generally have few symptoms and older people are at greater risk of complications and death. Therefore, it is necessary to pay close attention to the elderly population to reduce their chronic kidney disease burden. So far, many studies [16, 19–21] have been conducted around the world to inspect the occurrence of chronic kidney disease. However, almost all of those studies were focused on adults, while studies within the elderly population were relatively rare, especially in China. Qingdao is an important coastal city in eastern China with a population of 9.29 million. To the best of our knowledge, this is the first study to explore the prevalence of Chronic kidney disease and its risk factors among the elderly in China according to KDIGO's (Kidney Disease: Improving Global Outcomes)CKD guideline. [22] The results of the present study will help to identify appropriate interventional strategies for burden reduction in elderly patients with chronic kidney disease.

GENETIC**:** Genetic factors has role in Chronic kidney Disease, Ko ttgen et al. have determined genome-wide association studies to identify susceptibility loci for glomerular filtration rate (GFR), estimated by serum creatinine (eGFRcrea), cystatin C (eGFRcys), and chronic kidney disease (eGFRcrea o60 ml/min per 1.73m2) in European ancestry participants of four population-based cohorts (2388 chronic kidney disease cases). They tested for replication in 21,466 participants (1932 chronic kidney disease cases). Uromodulin (which encodes Tamm–- Horsfall protein in the urine) mutations were associated with differences in renal function. [23] Another identified mutation is related to APOL1. [24] An autosomal recessive pattern of inheritance is confirmed and associated with a significantly higher risk of end stage renal disease (10-fold higher risk of end stage renal disease due to focal glomerulosclerosis and 7-fold higher risk of ESRD due to hypertension). APOL1 (Apo lipoprotein L1) mutations are found exclusively among individuals of African descent and make them more prone to chronic kidney Disease , which results in a significant global health disparity for persons of African ancestry. APOL1 genetic variants account for much of the

excess risk of chronic and end stage kidney disease. [24] The involvement of renin–angiotensin system genes seems to be particularly relevant to chronic kidney disease. In a study by Su et al.,6 135 chronic kidney disease patients and 270 healthy controls among Han Chinese in Taiwan were genotyped for angiotensinogen (AGT-M235T, T174M, A-20C), angiotensin-I-converting enzyme (ACE-A2350G), and angiotensin II type 1 receptor (AGTR1-A1166C, C573T, C-521T) polymorphisms by polymerase chain reaction-restriction fragment length polymorphism analysis. Significant associations were observed in ACE-A2350G and AGTR1-C573T polymorphism in chronic kidney disease patients (P¼0.01 and P¼0.03, respectively). [25]

FAMILY HISTORY**:** Family members of chronic kidney Disease patients have a high prevalence of CKD and its risk factors. Song *et al.* have screened incident dialysis patients between 1 January 1995 and 31 December 2003 in the United States. The participants were asked to complete a voluntary questionnaire on family history of end stage renal disease. After the exclusion of patients with End stage renal disease due to hereditary disorders and urologic causes, nearly 23% of incident dialysis patients had close relatives with end stage renal disease. [26]

SEX**:** Various registries including the Japanese Society for Dialysis Therapy have demonstrated that end stage renal disease is more frequent among men. [27, 28] In one study, a total of 107,192 subjects over 18 years of age (51,122 men and 56,070 women) from Okinawa, Japan participated in a 10-year follow-up where odds ratio for end stage renal disease was 1.41 among male participants. [27] In contrast, the CREDIT study demonstrated that CKD is higher in women than in men (18.4vs. 12.8%) in Turkey. [13]

ETHNICITY**:** Several studies performed in the United States have confirmed an increased risk for the development of end stage renal disease in African Americans compared with Caucasians. [1] Moreover, the risk of hypertensive ESRD is approximately fivefold higher in African Americans.[2] In a recent study, it was found that the lifetime risk of End stage renal disease was 7.8% for 20 year old black Women, 7.3% for black men, 1.8% for white women, and 2.5% for white men. [14]

AGE: Renal function decreases with age in both men and women. [27] Among the elderly population, more than one-half of the subjects screened had chronic kidney disease stages 3–5 (GFRo60 ml/min per 1.73m2) according to the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines. [27] In the CREDIT study the odds ratios of chronic kidney disease ranged from 1.45 to 2.18 for every 10-year increase in age among subjects older than 30 years of age in Turkish population. [13]

LOW BIRTH WEIGHT: In the 1980s, Brenner and colleagues hypothesized that intrauterine growth restriction might cause a low nephron number, which could predispose to hypertension and renal disease (also known as the Barker hypothesis).[29] In support of this hypothesis, it has been shown that there is an increase in nephron numbers by 257,426 glomeruli per kg increase in birth weight.[30] Low nephron number leads to intraglomerular hypertension and hyper filtration in the available Nephrons and lower over-all GFR and higher urine albumin to-creatinine ratio.[31]

Method and Material:

This is a Descriptive cross-sectional study conducted in Nishtar National Kidney and Rukhan Teaching Hospitals Jalalabad, Afghanistan, and performed on 103 patients in Hemodialysis Departments from March through December 2019 and collected data from Individual health histories, Demographic characteristics (age, sex, Body weight, Height, Place of Residence and others factors) on Socioencomic status and risk factors. A physical examination was performed, along with laboratory tests (blood chemistry) to measure renal function and detect markers for renal damage, the history of certain diseases and the presence or absence of certain habits have been investigated. Patients were included in the study according to the following criteria:

Inclusion criteria:

- Voluntary research participants.
- All patients who come to the Hemodialysis Department.

The data from the patients in the study were collected from a pre-arranged questionnaire by a trained person.

The data collected in the study were analyzed by a computer's SPSS version 16.0 program. Descriptive statistics such as mean, percentage, SD as well as some statistical tests have sometimes been used such as one sample Test and Two sample t.Test. It uses Mean, SD, P.value, Frequency, Compute Variable, Chi-square Test and Compared Mean.

Result:

The study included a total of 103 patients with chronic renal insufficiency. Males were 61 (59.2%) and 42 (40.8%) females with no significant difference in the number of sexes (P.value = 0.076).

Table -1: Distribution of patients with chronic renal insufficiency by age and sex (n = 103)

Sex	Age (Mean±SD)	P.value
Male &female (103)	40.53±18.06	
Male (61)	44.05±17.90	0.016
Female (42)	35.40±17.24	

The average age of these patients was (Mean±SD) 40.53 ± 18.06 years, which was (Mean±SD) 44.05 ± 17.90 and 35.40 ± 17.24 years for males and females, respectively, meaning that the average age of males was higher than the average age of females and this difference was statistically significant.

Demographic characteristics of patients with chronic renal insufficiency are shown in Table 2 below.

Table -2: Distribution of patients with chronic renal insufficiency in terms of demographic characteristics.

Demographic characteristics**(n=103)**		Number	Percentage (%)	**P.value**
Sex	Male	61	59.2	0.076
	Female	42	40.8	
Residence	Nangarhar	80	77.7	0.000
	Laghman	10	9.7	
	Kunar	8	7.8	
	Kabul	3	2.9	
	Kapisa	1	1.0	
	Mazar-i -Sharif	1	1.0	
Marital status	Married	84	81.6	0.000
	Unmarried	19	18.4	
Education	Illiterates	77	74.8	0.000
	Literates	26	25.2	
Official job	No	97	94.2	0.000
	Yes	6	5.8	
Socioeconomic status	Good	6	5.8	0.000
	Intermediate	71	68.9	
	Worse	26	25.2	

Distribution of the patients according to the place, most patients were from Nangarhar (77.7%), Laghman (9.7%), Kunar (7.8%) and Kabul (2.8%), with only one patient coming from Kapisa and Mazar-e-Sharif each. Also most patients (81.6%) were married and a small number (18.4%) were unmarried (p = 0.000). Out of a total of 103 patients, only twenty-five (25.2%) were literate and the remaining 77 patients (74.8%) were illiterate (p = 0.000).

Nearly all patients (94.2%) did not have a formal job, only six patients (5.8%) who had a formal job showed up as a teacher. In terms of economic status, most patients (68.9%) showed moderate economic status, only 5.8% of patients had well, and 25.2% of patients had poor economic status.

Table -3: Distribution of patients with chronic renal insufficiency in terms of body mass index (BMI).

Body mass index (BMI)	Percentage (%)	Number of patients
<18.50 less	11.7	12
18.50-24.99	58.2	60
25.00-29.99	24.3	25
30.00-34.99	5.8	6
Total	100.0	103

In terms of body mass index or BMI, most patients (58.3%) were normal weight, 11.7% patients were under normal (BMI <18.5), 24.3% patients were overweight (BMI = 25.00-29.99), and only (5.8%) patients had obesity (BMI≥30).

Table -4: Distribution of patients with chronic renal insufficiency based on a history of certain diseases.

Disease	Patient's family members		Patients	
	Percentage (%)	Number of patients	Percentage (%)	Number of patients
Hypertension	48.5	50	76.7	79
Renal stone	18.4	19	26.2	27
Diabetes mellitus	19.4	20	16.5	17
Cardiovascular disease	19.4	20	16.5	17
Hyperlipidemia	14.6	15	12.6	13
Cerebral malaria	12.6	13	7.8	8
Tuberculosis	18.4	19	2.9	3
Total	100	103	100	103

A number of chronic diseases that were present in the patient himself or in his family are shown above in Table 4. The table shows that most patients (76.6%) had high blood pressure, in the second and third, respectively were important renal stones (26.2%), Diabetes mellitus (16.5%), and cardiovascular disease (16.5%).

Table -5: Distribution of chronic renal insufficiency patients according to the history of certain habits.

Habits	Percentage %	Numbers
Use of NSAIDs	55.3	57
Tobacco	25.2	26
Smoking	14.6	15
Other drugs	13.6	14
Total	100	103

Some of the habits that the patient has had in the past are shown in Table 5. The table shows that most patients (55.3%) had a history of persistent use of NSAIDs, as well as patients in the second and third steps, respectively, using other forms of tobacco, such as snap (25.2%) and smoking (14.6%) history. There was no history of past or present alcohol consumption in these patients.

Table 6-: A number of Biochemical examinations performed during the interview.

Biochemical parameters (mg/dl)	(Mean±SD)	Normal value*
Serum urea	139.51±106.92	10-50 mg/dl
Serum creatinine	9.13±3.29	0.2-1.2 mg/dl
Serum cholesterol	166.07±34.52	115-200 mg/dl
Serum Triglyceride	192.59±102.46	less than 150 mg/dl

*http://www.healthpages.org/health-a-z/normal-values-lab-tests/

The average amounts of some of the patients' Biochemical tests that were performed during dialysis are shown in Table 6. The table shows that the average levels of serum urea (139.51 ± 106.92) and creatinine (9.13 ± 3.29) in all patients were much higher than normal.

Discussion:

There were 103 participants in our study, out of which 61 were men and 42 were women. The mean age of the participants in the study was 40.53 ± 18.06. Males and females were 44.05 ± 17.90 and 35.40 ± 17.24 years old, respectively (*P*.value = 0.016).

Of the total patients, 16.5% had Diabetes and (19.4%) with family history of Diabetes, high blood pressure (76.7%), family history of high blood pressure (48.5%), dyslipidemia (12.6%) and family history of dyslipidemia. Kidney stones (14.2%), family history of kidney stones (18.4%), (24.3%) obese, (55.3%) use of NSAIDs, Infectious diseases such as cerebral malaria (7.8%), Tuberculosis (2.9%), with a family history of (18.4%), some habits such as snaps use (25.2%), smoking (14.6%) are positive events.

Our study showed significant causes of chronic renal failure are high blood pressure (76.7%) in the first step, kidney stones in the second step (26.2%) and diabetes in the third step (16.5%), while Carlos M. Orante et.al the main cause in the study has been shown to be diabetes mellitus.

The result of a research by Carlos M.Orante et.al shows the following findings: The median age of the participants was 39.2 years (39.4 years for women and 39.3 years for men). The study participants' diabetes was 22.9% and 40.3% had high blood pressure.

(The mean age of the patients in our study was 40.53 ± 18.06 years, which is similar to other studies, such as Carlos M. Orante etal. The study showed that the mean age of the patients was 39.2 years). [32]

Alcohol and tobacco use were higher among men than women (40.5% men, 4.6% women, 29.4% men and 1.4% women). NSAIDs were 76.9% in women and 71.2% in men. 28.6% of those infected with malaria, and 62% of participants had other infections (from intestinal parasites). [32]

High blood pressure in men and women was 56.8% and 36.3%, respectively. Diabetes (22.9%) of which 9.9% are males and 10.6% are females.

Their study also included overweight and obesity (the highest prevalence in females was 64.5% and 45.9% in female and male, respectively). [32]

Table -7: Table 7 of our research and Carlos M.Orante. Et.al compares the results of the study.

Parameters	*Carlos M.Ornate.et.al study[32]	Our study
	Percentage %	Percentage %
Diabetes mellitus	22.9	16
Hypertension	Male : 56.8 female 36.3	Male : 80.3 Female : 71.4
Use of NSAIDs	Male : 72 Female : 78.9	Male : 54.1 Female : 57.1
Malaria	28.6	7.8
Dyslipidemia	63.1	12.6

* www.medicc.org/mediccreview/pdf.php?lang=en&id=221

In Carlos M.Ornate.et.al study 63.1% of participants had dyslipidemia, which would be the most important cause of high cholesterol in women.

www.medicc.org/mediccreview/pdf.php?lang=en&id=221

Recommendations:

All patients with high blood pressure should see their doctor from time to time and recommend a functional kidney test.

Patients with diabetes are recommended to have a functional kidney test recommended at an appropriate time.

The area is a malaria endemic area, so doctors treating malaria, especially cerebral malaria, should consider renal function.

Avoid using painkillers unnecessarily.

Conduct further analytical research to find out the risk factors and causes of chronic renal insufficiency.

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