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# ANALYSIS OF PREVALENCE AND RISK FACTORS OF KIDNEY DISEASE AMONG LOCAL POPULATION OF PAKISTAN

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**Abstract:**

***Introduction:*** *Non-communicable diseases (NCDs) present a significant global health challenge in the current century and have replaced communicable diseases as the most common causes of morbidity and premature mortality worldwide.*

***Aims and objectives:*** *The basic aim of this study is to analyze the increasing risk factors of kidney disease among local population of Pakistan.*

***Material and methods:*** *This cross sectional study was conducted at Allama Iqbal Memorial Teaching Hospital, Sialkot during September 2017 to August 2018. The baseline survey included questionnaires, anthropometric measurements, physical examination as well as ultrasound and laboratory assessment. Apart from questions directly related to kidney disease, questions regarding family as well as personal history of diabetes, hypertension, coronary heart disease, hyperlipidemia, and stroke were also asked. Information on smoking, regular exercise, alcohol intake, dietary habits including extra-salt or fat intake were also asked.*

***Results:*** *Table 01 shows the prevalence of CKD. Among all, 218(74.40%) had GFR >90, 61(20.81) were in CKD stage 2 with eGFR 60-89, and 14(4.77%) in CDK stage 3 with eGFR 30-59. The socio-demographic and clinical factors independently associated with presence of CKD were older age, hypertension, diabetes, elevated SBP, raised fasting plasma glucose, raised triglycerides, and history of stroke.* ***Conclusion:*** *It is concluded that CKD was independently associated with older age, hypertension, diabetes, raised systolic BP, raised plasma fasting glucose, raised triglycerides, and history of stroke.*

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## INTRODUCTION:

Non-communicable diseases (NCDs) present a significant global health challenge in the current century and have replaced communicable diseases as the most common causes of morbidity and premature mortality worldwide. Initially, four NCDs (cardiovascular disease, cancers, chronic respiratory diseases and diabetes) were prioritized in the Global NCD Action Plan endorsed by the World Health Assembly in 2008 but systematic reviews of various population based studies have now revealed the significance of chronic kidney disease as a separate entity requiring emphasis on prevention, early detection and treatment.

The adverse outcomes associated with CKD including kidney failure, accelerated cardiovascular disease (CVD), and premature mortality have greater societal and economical impact in low- and middle-income countries. A glomerular filtration rate (GFR) level of less than 60 ml/min/1.73 $m^2$ (GFR stages G3a – G5), indicating CKD represents loss of half or more of the adult level of normal kidney function, the level below which the risk of adverse outcomes has been shown to increase. As demonstrated in a large meta-analysis of a large general-population cohort of 105,872 participants, albuminuria is an independent marker of increase CVD mortality [2-3].

In developing countries including Pakistan, the burden of CKD is growing and is exacerbated due to poor community awareness, a disproportionately higher burden of known CKD risk factors and poor access to renal replacement therapy [4]. In resource restricted settings, overcoming this scenario becomes further complex due to insufficient community-based data that could help with targeted prevention. Recent population based studies from Bhopal, India found an incidence rate of 150 cases of end stage renal disease per one million population (p.m.p). There is no incidence data for kidney disease available from Pakistan [5]. A recent survey from Karachi, Pakistan conducted on 300 adults ages 30 years and above showed some degree of reduced glomerular filtration rate (GFR) in 25.3% of the screened population, with 5% having a GFR <60 ml/min, whereas an earlier survey showed that approximately 15% to 20% of screened adults 40 years of age or older had a reduced estimated GFR <60 ml/min [6].

### Aims and objectives

The basic aim of this study is to analyze the increasing risk factors of kidney disease among local population of Pakistan.

## MATERIAL AND METHODS:

This cross sectional study was conducted at Allama Iqbal Memorial Teaching Hospital, Sialkot during September 2017 to August 2018 The baseline survey included questionnaires, anthropometric measurements, physical examination as well as ultrasound and laboratory assessment. Apart from questions directly related to kidney disease, questions regarding family as well as personal history of diabetes, hypertension, coronary heart disease, hyperlipidemia, and stroke were also asked. Information on smoking, regular exercise, alcohol intake, dietary habits including extra-salt or fat intake were also asked. A routine physical examination was performed and the following information collected: (i) smoking status, food frequency and physical activity (IPAQ, international physical activity questionnaire), co-morbidities (history of stroke, cardiovascular disease, known diabetes, known hypertension); (ii) anthropometry (height, weight and waist circumference); (iii) BP was measured thrice with a calibrated automated device. These all things were done for the selected population of the city.

### Analysis

Student's t-test was performed to evaluate the differences in roughness between groups. Two-way ANOVA was performed to study the contributions. A chi-square test was used to examine the difference in the distribution of the fracture modes (SPSS 19.0 for Windows, SPSS Inc., USA).

## RESULTS:

Table 01 shows the prevalence of CKD. Among all, 218(74.40%) had GFR >90, 61(20.81) were in CKD stage 2 with eGFR 60-89, and 14(4.77%) in CDK stage 3 with eGFR 30-59

**Table-1:** Chronic Kidney Disease prevalence.

| | Number | Percentage |
|---|---|---|
| GFR >90 | 218 | 74.40 |
| CKD stage 2 eGFR between 60-89 | 61 | 20.81 |
| CKD stage 3 eGFR between 30-59 | 14 | 4.77 |

CKD: Chronic Kidney Disease
GFR: Glomerular Filtration Rate
eGFR: Estimated GFR.

Table 02 shows adjusted odds ratios and 95% CI of factors associated with CKD. The socio-demographic and clinical factors independently associated with presence of CKD were older age, hypertension, diabetes, elevated SBP, raised fasting plasma glucose, raised triglycerides, and history of stroke, ($p < 0.05$ for each)

**Table 02: Multivariable regression models for Chronic Kidney Disease**

| **Characteristics** | **Adjusted OR (95% CI)** | **Adjusted OR (95% CI)** |
|---|---|---|
| Age in years | 1.35 (1.28 – 1.41) For each 05 year increase | 1.31 (1.24 – 1.38) For each 05 year increase |
| Physical activity | | |
| < 840 METs | 1.35 (1.04 – 1.75) | - |
| ≥ 840 METs | 1.00 | |
| Hypertension | | |
| Hypertensive | NA | 1.90 (1.40 – 2.57) |
| Non-hypertensive | | 1.00 |
| Diabetes mellitus | | |
| Diabetic | NA | 1.69 (1.18 – 2.43) |
| Non-diabetic | | 1.00 |
| Systolic BP, mm Hg | NA | 1.15 (1.09 – 1.22) For each 10 mm Hg increase |
| Fasting plasma glucose, mmol/L | NA | 1.08 (1. – 1.13) For each 1 mmol/L increase |
| Triglycerides, mmol/L | NA | 1.07 (1.01 – 1.13) For each 0.5 mmol/L increase |
| History of stroke | | |
| Positive | NA | 1.73 (1.03 – 2.92) |
| Negative | | 1.00 |

NA = Not applicable; METs = Metabolic Equivalents; BP = Blood Pressure

## DISCUSSION:

In our study, gender was not found to be significantly associated with kidney disease. Earlier literature in this regard has shown variable results. Some studies had not found a significant association between gender and CKD while others found CKD to be significantly associated with the female gender[5]. Interestingly enough, the risk factors of CKD such as coronary artery disease and smoking are more prevalent in males and are unlikely to explain the difference in CKD prevalence between genders[6]. The gender disparity might partly be the result of an inaccurate correction factor for females in the GFR estimating equation or due to the differences in glomerular structure, glomerular homodynamics, diet, production and activity of local cytokines and hormones, and/or the direct effect of sex hormones, between genders. Further investigation into the contribution of gender to CKD is required[7]. Evidence-based healthcare policies have been shown to be very successful in decreasing the burden of CKD in Brazil, Cuba and Bolivia

respectively, and serve as an excellent model for other developing countries[6].

Age was found to be the most strongly associated risk factor in our study. Several studies performed in elderly populations have shown the prevalence of CKD to be more than 20%[7]. In general, GFR declines by 1 ml/min/1.73 $m^2$ per year after the age of 30 years in healthy persons and the steep increase in the prevalence of CKD in the elderly might also be partly due to co-morbidities of CKD, such as cardiovascular diseases or diabetes, however, it is still unclear whether the decline in kidney function with increasing age represents pathology or is a part of the normal ageing process[8].

We could not find significant association between kidney disease and family histories of dyslipidemia, coronary artery disease, stroke, kidney stones, kidney failure, lower urinary tract symptoms, facial puffiness and pedal edema[9]. A probable explanation of this might be the limitation of our study that all medical histories were self-reported. On the other hand, smoking, again self-reported was significantly associated with kidney disease in our study[10-11]. The role of smoking as a risk factor for kidney disease is being increasingly recognized and similar findings have been noticed in our neighborhood Bangladesh. Factors such as quantity of cigarettes being smoked need to be standardized to establish the association of smoking with CKD as an independent risk factor[12].

## CONCLUSION:

It is concluded that CKD was independently associated with older age, hypertension, diabetes, raised systolic BP, raised plasma fasting glucose, raised triglycerides, and history of stroke.

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