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ANALYSIS OF CHILDHOOD KIDNEY DISEASE AND RISK OF RENAL DISEASE AMONG LOCAL POPULATION OF PAKISTAN

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Abstract:

Introduction: *Chronic kidney disease and end-stage renal disease (ESRD) are global health problems with increasing prevalence. Early identification of persons at increased risk may allow for early interventions that might reduce the incidence of progressive chronic kidney disease and its associated complications.* ***Aims and objectives:*** *The basic aim of the study is to analyze the childhood kidney disease and risk of renal disease among local population of Pakistan.* ***Material and methods:*** *This study was conducted at hospitals of Vehari with the collaboration of Kasur hospital during 2018. All future conscripts are asked to provide copies of all available medical records, and their family physicians.* ***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. A history of any childhood kidney disease was associated with a hazard ratio for ESRD of 4.19 (95% confidence interval).* ***Conclusion:*** *It is concluded that the finding of a possible risk of ESRD associated with childhood kidney diseases implies that there is an even greater, albeit unmeasured, risk of the considerably more prevalent antecedent stages of chronic kidney disease.*

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INTRODUCTION:

Chronic kidney disease and end-stage renal disease (ESRD) are global health problems with increasing prevalence. Early identification of persons at increased risk may allow for early interventions that might reduce the incidence of progressive chronic kidney disease and its associated complications. World Kidney Day 2016 focused on childhood kidney disease as a source of chronic kidney disease in childhood and as a precursor to disease in adulthood [1]. Congenital anomalies of the kidney and urinary tract and glomerular disease are the most common diagnoses of kidney disease in childhood; the incidence of congenital anomalies of the kidney and urinary tract during the past decade has been estimated to be 0.4 to 4.0 cases per 1000 births, and the incidence of primary glomerular disease among children has been estimated to be 0.1 to 2.0 cases per 100,000 children per year [2]. Although most of these conditions have a favorable prognosis, the possibility of persistent kidney injury and a potentially increased risk of chronic kidney disease in adulthood may be underappreciated. Some case series and cross-sectional studies have addressed the outcomes of childhood kidney diseases, with an emphasis on congenital anomalies of the kidney and urinary tract [3]. The long-term kidney health outcomes of the broader spectrum of childhood kidney diseases remain largely unknown [4].

Aims and objectives

The basic aim of the study is to analyze the childhood kidney disease and risk of renal disease among local population of Pakistan.

MATERIAL AND METHODS:

This study was conducted at hospitals of Vehari with the collaboration of Kasur hospital during 2018. All future conscripts are asked to provide copies of all available medical records, and their family physicians are requested to provide a comprehensive health history summary on a structured form. 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.

Diagnoses of childhood kidney diseases

Diagnoses of childhood kidney diseases were assessed at baseline (the date of the medical board assessment) and were categorized as congenital anomalies of the kidney and urinary tract, pyelonephritis, or glomerular disease. A medical history of congenital anomalies of the kidney and urinary tract included congenital single kidney, unilateral renal hypodysplasia, renal ectopia, horseshoe kidney, hydronephrosis, hydroureter, ureteropelvic junction stenosis, ureterovesical junction stenosis, and other congenital kidney and urinary malformations not otherwise specified [5].

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:

We found that the risk of ESRD among adolescents with a history of pyelonephritis was nearly four times as high as the risk among those with no history of childhood kidney disease. Many studies have related chronic kidney disease to postinfection renal scarring and vesicoureteral reflux [6]. A 2011 review suggested that concomitant congenital anomalies of the kidney and urinary tract may contribute to poor outcomes among patients with pyelonephritis and emphasized a distinction between primary renal damage that precedes infection and scars related to urinary tract infections. Our current finding of an increased risk of ESRD among adolescents with a history of apparently resolved glomerular disease is consistent with the increased risk of hypertension in adulthood that we found in a subgroup of this population in a previous study [7,8]. Furthermore, as CKD is a progressive disease, most patients without treatment will develop ESRD and other metabolic complications. This not only exerts a great burden on the struggling economy, but also affects the productivity of a society. 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.

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% [9]. 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 [10].

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 [11]. On the other hand, smoking, again self-reported was significantly associated with kidney disease in our study. 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 the finding of a possible risk of

ESRD associated with childhood kidney diseases implies that there is an even greater, albeit unmeasured, risk of the considerably more prevalent antecedent stages of chronic kidney disease. Overall, our study suggests that childhood kidney diseases are possible risk factors for future ESRD

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