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Frequency of Chronic Kidney Disease (CKD) in Diabetic Cancer Patients

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ABSTRACT

Objective: To determine the frequency of chronic kidney disease in diabetes mellitus associated cancer patients. **Design of Study:** Cross-sectional study. **Place and Study Duration:** Department of Medicine, Shaukat Khanum Memorial Hospital and Research centre, Lahore. From January 2024 to December 2024. **Methodology:** A total of 96 individuals, both male and female, aged 18 to 60, with diabetes and cancer were included. Cases involving known non diabetic patients and patients with type 1 diabetes were excluded. The fundamental variables include age (in years), gender, and the type of cancer were noted down via a patient information sheet. Diabetes, hypertension, glomerulonephritis, or genetic predisposition are some of the underlying factors that can lead to impaired waste and fluid regulation in the body. Kidney damage indicators such as albuminuria and a persistent decline in GFR below 60 mL/min/1.73 m² are indicators of CKD, which is characterized by a progressive loss of kidney function. **Results:** The study's participants ranged in age from 18 to 60, with a mean age of 47.30 ± 8.64 years. The majority of the 71 patients, or 73.96%, were in the 41–60 age range. With a male to female ratio of 1.7:1, 61 (63.54%) of the 96 patients were men and 35 (36.46%) were women. In our investigation, the average duration of DM was 5.86 ± 2.65 years. 37 (38.54%) of the cancer patients in our study who had diabetes mellitus also had chronic renal disease. **Conclusion:** According to the study's findings, cancer patients with diabetes mellitus have a very high prevalence of chronic renal disease.

INTRODUCTION

The main cause of chronic kidney disease (CKD) in the US and other nations is diabetes mellitus. Of those without established type 2 diabetic mellitus (T2DM), 34.5–42.3 percent have chronic kidney disease. Most cases of chronic kidney disease are identified in stage 1 or stage 2.[1,2] Moreover, 30–40% of all cases of end-stage renal disease in the US are caused by diabetes.[1,3] Two significant public health concerns that are on the rise both domestically and internationally are cancer and chronic kidney disease (CKD).[4-6] An estimated 11.5% of Americans have reduced eGFR and/or proteinuria, and more than 13.5 million have stage 3 or higher chronic kidney disease. The prevalence of CKD is rising in the US.[7,8]

An estimated 577,000 people will die from cancer in 2012, and over 1.5 million people will receive their first cancer diagnosis.[4] Cancer is still one of the main causes of morbidity and death, despite a modest decline in incidence since 2000. Not much research has been done on the relationship between cancer risk and chronic kidney disease. Even though several studies have shown that those with ESRD who need dialysis or a kidney transplant have a higher chance of developing cancer.[9-11] Whether less severe renal impairment is associated with cancer is still unknown.[12]

The prior study's limitations were small sample numbers, a lack of diversity, and an inability to sufficiently account for potential confounding variables. Determining whether the presence of CKD are strongly associated with the risk of later developing cancer, or more specifically, whether the degree of kidney function is differentially associated with different types of cancer, may have significant public health implications for cancer screening and early detection in CKD patients. We plan to assess the relationship between the prevalence of diabetes cancer and chronic renal illness in a large, community-based study linked to a regional cancer registry in order to close this information gap.

METHODOLOGY

A cross-sectional study was conducted in the Medicine Department of Shaukat Khanum Memorial Hospital and

Research Center in Lahore between July 2024 and December 2024. Data was obtained using a non-probability sampling method. Part of the data collecting process were thorough physical exams, detailed medical history analyses, and required laboratory testing. The Institutional Review Board (IRB) accepted the study, hence it was carried out in line with ethical guidelines. Every participant bought written informed permission. The sample size for the study was calculated as 96 patients by keeping the following considerations: Prevalence: 42.3%[1]. Precision: 10% and Level of confidence: 95%

Inclusion Criteria: Patients suffering from diabetes and cancer with age 18-60 years of both genders.

Exclusion Criteria: Cases involving known non diabetic patients and patients with type 1 diabetes were excluded.

The study's objectives were explained to the diabetic cancer patients who were recruited, and they received guarantees that the information they submitted would be kept confidential. The possible dangers of the study were explained. A patient information sheet (Annexure-1) was used to record the basic characteristics, which include age (in years), gender, and the type of cancer. Diabetes, hypertension, glomerulonephritis, or genetic predisposition are some of the underlying factors that can lead to impaired waste and fluid regulation in the body. A progressive decline in kidney function, typically indicated by a persistent drop in glomerular filtration rate below 60 mL/min/1.73 m² and the presence of kidney damage indicators such as albuminuria, are hallmarks of chronic kidney disease (CKD).

All data was entered into SPSS version 20.0 and analysed. Age and duration of disease were presented as mean ± standard deviations. Qualitative variables i.e. gender and CKD were analyzed by computing their frequencies and percentages. The categorical data was examined using the chi-square test by stratification of variables i.e., age, gender and duration of diabetes. A p-value ≤0.05 was taken as significant.

RESULTS:

The study's participants ranged in age from 18 to 60, with a mean age of 47.30 ± 8.64 years. The majority of the 71 patients, or 73.96%, were in the 41–60 age range. With a male to female ratio of 1.7:1, 61 (63.54%) of the 96 patients were men and 35 (36.46%) were women. In our investigation, the average duration of DM was 5.86 ± 2.65 years (Table I).

37 (38.54%) of the cancer patients in our study who had diabetes mellitus also had chronic renal disease (Figure I). Table I displays the stratification of CKD by age, gender, and length of DM.

Table I

Distribution of patients with confounding variables (n=96)

Confounding variables		Frequency	%age
Age (yrs)	18-40	25	26.04
	41-60	71	73.96
Gender	Male	61	63.54
	Female	35	36.46
Duration (years)	≤10	88	91.67
	>10	08	8.33

Figure I

Frequency of chronic kidney disease in diabetes mellitus associated cancer patients (n=96).

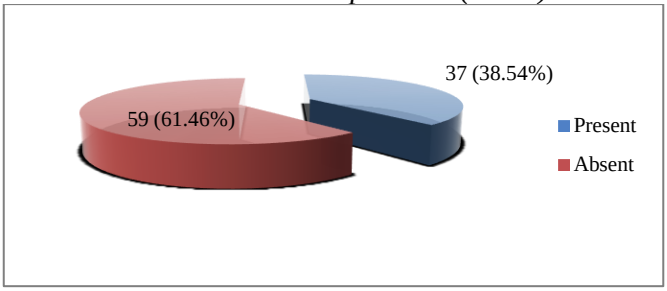

Table II

Stratification of CKD with respect to age, gender and duration of DM.

		Present (n=37)	Absent (n=59)	P-value
Age (years)	18-40	09 (36.0%)	16 (64.0%)	0.761
	41-60	28 (39.44%)	43 (60.56%)	
Gender	Male	22 (36.07%)	39 (63.93%)	0.510
	Female	15 (42.86%)	20 (57.14%)	
Duration (years)	≤10	34 (38.64%)	54 (61.36%)	0.949
	>10	03 (37.50%)	05 (62.50%)	

DISCUSSION

This study looked at the prevalence of DM and CKD among cancer patients. With 38.54% of the patients showing some degree of reduced GFR, the results showed a worrying prevalence of CKD. Furthermore, the study found a strong correlation between CKD risk and variables such age, gender, and the length of DM.

The results of this study are more than the 26.3% reported prevalence of CKD among diabetes individuals in Northeast Ethiopia.[13] Furthermore, the prevalence is higher than that found in Northern Thailand (24.4%)[14], although pooled frequency was found in the Middle East (28.96%) and Africa (24.7%).[15,16] The results of the current study were greater than those of previous Ethiopian studies: 16.7% in Bahir Dar[17], 14.3% in Gondar[18], 2.7% in Jinka[19], and 18.2% in Butajira.[20] The observed disparities may result from variations in the criteria used to identify CKD and the equation used to

calculate eGFR. On the contrary, our study's findings were consistent with the 39.8% prevalence in Southwest Nigeria.[21] The observed inconsistencies could have been caused by variations in the study setting, sample size, and ethnicity.

It's interesting to note that the study found that baseline creatinine and GFR varied by gender, with females having higher mean levels than males. In order to determine the underlying molecular or behavioral explanations of this observation, more research is necessary. The study's findings, which show a high correlation between obesity—especially grade II obesity—and elevated albuminuria, are consistent with existing research. Likewise, it was discovered that age increased the incidence of albuminuria.

The results of this study on the prevalence of chronic kidney disease (CKD) were either somewhat higher or similar to those of other global surveys. For example, after adjusting for albuminuria persistence, the US National Health and Nutrition Examination Survey 2009-2014 revealed that 26.2% of individuals with diabetes had CKD. While the prevalence of persistent albuminuria was similar in younger age groups, low eGFRs were significantly more common in those 40 and older.[22] In 2008[23], a comparable survey conducted in Shanghai, China, found that 33.5% of individuals with diabetes had CKD. Among a multiethnic population of type 2 diabetic primary care patients in Singapore, the prevalence of chronic kidney disease was 53% between 2011 and 2013. High-risk CKD patients were older, Malay, had had diabetes for longer periods of time, and had higher blood pressure, lipid levels, BMIs, and HBA1Cs.[24]

The length of diabetes and the risk of developing chronic renal disease are strongly correlated, according to the literature. Numerous studies have demonstrated that diabetics' renal function is negatively impacted by the duration of their diabetes.[25] The findings of this study regarding the association between therapy and the risk of CKD are intriguing and warrant further research. Further research is necessary to understand the mechanisms underlying the gender disparity in CKD risk as well as the potential impacts of different medication combinations and treatment approaches on the progression of CKD.

Study Limitations

This study's cross-sectional design is its main drawback since it makes it more difficult to prove a link between type 2 diabetes and the onset of CKD. Understanding the evolution and temporal interaction between these factors is limited by the fact that such a design only offers a moment in time. Furthermore, selection bias results from the study's dependence on medical data from a single center, as the sample may not be representative of all type 2 diabetic cancer patients, particularly those who do not frequently visit these clinics or reside in various areas. The findings' applicability to all diabetic patients is further limited by the age restriction (18–60 years), especially for the elderly, who are more likely to have both diabetes and CKD. Furthermore, the 96-patient sample size may not be sufficient to identify subtler but still clinically meaningful relationships.

CONCLUSION

According to the study's findings, cancer patients with diabetes mellitus have a very high prevalence of chronic renal disease. Patients with diabetes-related cancer should undergo routine CKD screening in order to diagnose the disease early and slow its progression. Patients who have had diabetes for a long time should receive extra care.

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