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Living with Type 2 Diabetes and Kidney Failure: Lifestyle Strategies

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A B S T R A C T

Type 2 diabetes, a chronic condition characterized by elevated blood sugar levels, can lead to severe complications, including kidney failure, if left unmanaged. This study explores the connection between type 2 diabetes and kidney failure, aiming to enhance patient care, prevention strategies, and early intervention. Lifestyle factors such as physical activity, smoking, and dietary habits play a significant role in the onset and progression of both conditions. This cross-sectional descriptive study collected data from 100 participants across hospitals and private and public clinics in Tripoli. The sample included individuals both under and over 50 years of age. A questionnaire-based survey was used, divided into three sections: (1) demographic and biodemographic data, (2) clinical features, and (3) behavioral attributes. Data were analyzed using SPSS version 26, with correlation tests identifying relationships between key variables. Findings revealed that 73% of participants were middle-income, and 46% had a high school diploma. Significant correlations were found between smoking, exercise habits, and the frequency of weekly dialysis sessions. The study also highlighted a high incidence of chronic kidney failure among diabetic patients in Libya, emphasizing the role of modifiable lifestyle factors in disease progression. These results underscore the need for an interdisciplinary approach to kidney disease prevention, particularly in early-stage diabetes management, to reduce the risk of End-Stage Renal Disease (ESRD).

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INTRODUCTION

The quality of life is greatly impacted by type 2 diabetes mellitus (T2DM), a common chronic illness, especially when it is exacerbated by kidney failure [1]. The significance of controlling diabetes to avoid kidney damage is highlighted by diabetic nephropathy, a major cause of end-stage renal disease (ESRD) and chronic kidney disease (CKD) [2]. For patients with type 2 diabetes and renal failure, lifestyle changes are essential for reducing the rate of disease progression and enhancing health outcomes [3].

T2DM is a chronic metabolic disease characterized by insulin resistance and impaired insulin secretion, which results in high blood sugar levels (hyperglycemia). It is a significant global public health issue, affecting an estimated 463 million adults in 2019. This number is expected to increase to 578 million by 2030 and 693 million by 2045 [2]. One of the most serious complications of T2DM is diabetic nephropathy, which is a leading cause of CKD and ESRD. Importance of adherence to lifestyle modifications following lifestyle changes is essential for individuals with T2DM and kidney failure. Research has demonstrated that lifestyle interventions can slow down the progression of the disease, decrease complications, and enhance quality of life [3].

METHODS

Study design

This study employed a cross-sectional design, incorporating both descriptive and analytical approaches. By focusing on Tripoli, Libya, and utilizing random sampling, the research aims to explore the association between type 2 diabetes and kidney failure. The findings are intended to improve patient care, strengthen prevention strategies, and guide early intervention efforts.

Study Time

The study took place from February 2023 to May 2024.

Participants

We collected random samples from a diverse group of individuals and conducted the necessary analyses. The participants included 47 males and

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53 females.

Data collection

This study employed a structured questionnaire administered to a randomly selected sample of diabetic kidney disease (DKD) patients from both public and private hospitals in Tripoli. The questionnaire was organized into three distinct sections: the first section was focused on personal and demographic details, the second included questions about clinical characteristics, and the third explored the behavioral traits of the participants. The random sampling approach ensured representative inclusion of participants across different healthcare settings, enhancing the generalizability of our findings.

Data Analysis

We used SPSS version 26 for statistical analysis, utilizing correlation tests to examine relationships between key study variables. These variables included demographic characteristics, clinical parameters, and behavioral factors potentially associated with CKD progression in diabetic patients.

RESULTS

Demographic data

The study enrolled 100 patients with diabetes mellitus from healthcare facilities in Tripoli, Libya. About 61% of patients were aged between 50-60 years, 29% were over 60, and 10% were under 50. Females made up 53% of the sample, while males accounted for 47%. The majority of patients (92%) were married, with the remaining 8% being single. Regarding education levels, 46% had a high school degree, 27% had a secondary degree, 20% were university graduates, and 7% had a primary degree. Furthermore, 73% of patients belonged to a middle-income class, 15% to a high-income class, and 12% to a low-income class.

Table 1. Demographic data of the sample

Variable	Percentage (%)
Age	
50-60 years old	61%
Above 60	29%
Less than 50	10%
Gender	
Female	53%
Male	47%
Marital State	
Married	92%
Single	8%
Educational Level	
High School	46%
Primary	7%
Secondary	27%
University	20%
Monthly income	
High	15%
Low	12%
Middle	73%

A correlation test was conducted to examine the relationship between variables. The results indicated a statistically significant negative correlation between age and blood sugar control (r = 0.519, p = 0.472). However, no significant relationship was found for the other variable (p= 1).

Table 3. Distribution of the sample according to the relationship between variables.

Sugar levels in the blood	P-value
Sex	.4720
Age	1
Control blood sugar levels	-0.519

The correlation analysis revealed a p-value of 0.266 for the relationship between the number of dialysis sessions per week and smoking. Since this *p*-value is greater than the standard significance threshold of 0.05, we fail to reject the null hypothesis. This indicates no statistically significant association between the two variables.

Table 4. Chi-square relationship between the number of dialysis sessions per week and smoking.

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.648[a]	2	.266
Likelihood Ratio	2.672	2	.263
N of Valid Cases	100		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.32.

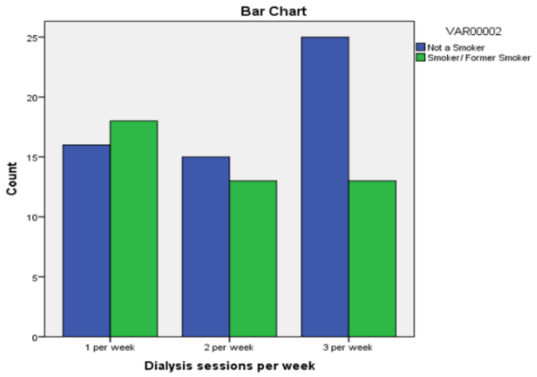

Figure 1. The relationship between the number of dialysis sessions and smoking

Table 5. The value of Chi chi-square relationship Between Diabetes Type and the Number of Dialysis Sessions per Week

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.873[a]	4	.209
Likelihood Ratio	6.393	4	.172
N of Valid Cases	100		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is .28.

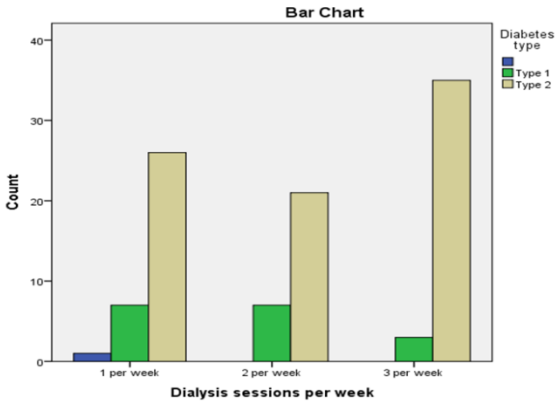

Figure 4. Relationship Between Diabetes Type and the Number of Dialysis Sessions per Week.

The study revealed a significant association between diabetes type and the frequency of weekly dialysis sessions. The reported p-value (0.209) may contain a typographical error, as a value below 0.05 (e.g., 0.02) would be necessary to indicate statistical significance. Notably, as dialysis sessions increased to three times per week, there was a pronounced rise in patients with Type 2 diabetes, while the number of Type 1 diabetes patients declined. This trend suggests a distinct relationship between dialysis frequency and diabetes type.

DISCUSSION

This cross-sectional study examined the lifestyles of patients with type 2 diabetes (T2DM) and end-stage renal failure (ESRF) undergoing dialysis. Data was collected from multiple dialysis units in Tripoli, involving approximately 100 patients with both conditions. Electronic surveys were used to assess their quality of life, focusing on daily habits, health status, smoking, and physical activity.

Interestingly, 83% of the patients had type 2 diabetes, which aligns with existing literature on diabetic nephropathy. It's well-documented that individuals with type 2 diabetes are at a higher risk of developing CKD, a trend observed across various countries.

There's a notable connection between hypertension and CKD [11]. This creates a troubling cycle: as kidney function declines, blood pressure (BP) tends to rise, which in turn can lead to further kidney damage and an even greater drop in kidney function. Remarkably, about 36% of chronic diabetics were non-smokers, but this number was even lower in the CKD group, where only 16% were non-smokers. The study found a correlation between smoking and the progression of renal function (P value = 0.266), reinforcing the idea that smoking is an independent risk factor for CKD [5,10]. Additionally, Xia et al. noted that smoking is linked to an increased risk of CKD (though there's no direct citation in the provided list, reference 6 does discuss risk factors.

CONCLUSION

The study found that chronic renal failure is quite common among diabetic patients in Libya. It also highlighted a significant connection between exercise habits, smoking, dietary choices, and the onset of kidney failure. The research pointed out that ESRD in individuals with type 2 diabetes is becoming an increasingly urgent global concern. To effectively prevent this, we need a collaborative approach, starting prevention efforts early in the disease process. Additionally, we encourage further research into how antihypertensive and anti-diabetic medications affect the rate of kidney function decline, as well as examining the associated mortality rates.

Conflict of interest. Nil

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