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ORIGINAL ARTICLE

Frequency and Determinants of Erectile Dysfunction in Maintenance Haemodialysis Patients

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ABSTRACT

Background: End-Stage Renal Disease (ESRD) requires lifelong hemodialysis and increases the risk of complications like cardiovascular issues, depression, infections, and sleep disorders. Erectile dysfunction (ED), though often underreported due to stigma, is highly prevalent affecting up to 81.67% of patients, with only 8.77% showing normal function in some studies.

Objective: The objective of this study was to determine the frequency of erectile dysfunction and to identify its determinants among patients undergoing hemodialysis. A cross-sectional study design was employed.

Methods: The study was conducted at the Dialysis Center of Jinnah Hospital / Allama Iqbal Medical College, Lahore, from July 2022 to December 2022.Following ethical approval and informed consent, eligible patients were enrolled. Erectile dysfunction was assessed using the International Index of Erectile Function-5 (IIEF-5) Score. The determinants evaluated included age, duration of dialysis, diuresis status, serum testosterone, serum albumin, smoking status, diabetes, hypertension, peripheral neuropathy, and depression. Patient confidentiality and anonymity were strictly maintained throughout the study.

Results: Among the 125 patients on hemodialysis, the mean age was 42.92 ± 16.01 years, and the mean duration of dialysis was 15.24 ± 6.77 months. The mean IIEF-5 score was 15.24 ± 7.24, indicating a significant prevalence of erectile dysfunction. The mean HbA1c level was 6.04 ± 0.82, the mean serum albumin level was 38.56 ± 9.59, and the mean serum testosterone level was 377.64 ± 204.28.

Conclusion: It is concluded that patients with end stage renal disease had significant association with erectile dysfunction.

Keywords: Erectile Dysfunction, Hemodialysis, End-Stage Renal Disease (ESRD), IIEF-5, Testosterone, Serum Albumin, Diabetes, Hypertension, Depression.

INTRODUCTION

End-Stage Renal Disease (ESRD) represents the terminal stage of chronic kidney disease (CKD), characterized by an irreversible loss of kidney function, requiring lifelong renal replacement therapy such as maintenance hemodialysis for survival (National Kidney Foundation [NKF], 2015). While hemodialysis helps prolong life, it is associated with numerous complications that significantly impact the physical, emotional, and social well-being of patients. Among these complications, erectile dysfunction (ED) has emerged as a highly prevalent yet frequently neglected concern in clinical nephrology practice. Erectile dysfunction, defined as the persistent inability to achieve or maintain an erection sufficient for satisfactory sexual performance (NIH Consensus Development Panel, 1993), is a common disorder among patients with ESRD. Studies have shown that the prevalence of ED in hemodialysis patients is alarmingly high, with rates ranging between 70% to 90% (Fugl-Meyer et al., 1997; Rosas et al., 2001; En-Nosse et al., 2003). One study conducted by Malik et al. (2019) reported a prevalence of 81.67% in patients undergoing maintenance hemodialysis. Similarly, Seck et al. (2012) found that only 8.77% of hemodialysis patients had normal erectile function, with 91.23% experiencing varying degrees of ED. Despite this high frequency, ED remains underdiagnosed and underreported due to sociocultural taboos, patient embarrassment, and a lack of proactive inquiry by healthcare providers (Seyam et al., 2005; Palmer, 2001).

The etiology of ED in patients undergoing hemodialysis is multifactorial, involving organic, psychological, and hormonal components. Physiologically, factors such as uremic toxins, vascular dysfunction, autonomic neuropathy, and endothelial damage are key contributors (Yuan et al., 2010; Sansone et al., 2009). Comorbid conditions such as diabetes mellitus, hypertension, anemia, hyperparathyroidism, and dyslipidemia further complicate erectile function in these patients (Hsu et al., 2012). Moreover, hormonal imbalances, especially reduced testosterone and elevated prolactin levels, have also been implicated in ED among ESRD patients (Haghverdi et al., 2012; Rosas et al., 2001). Psychological factors also play a significant role in the development of ED. Depression, anxiety, low self-esteem, and strained marital relationships are frequently observed among hemodialysis patients and significantly influence sexual health (Palmer, 2003; Finkelstein et al., 2007). Furthermore, the chronic nature of ESRD and the restrictive lifestyle associated with dialysis sessions often result in decreased libido and sexual dissatisfaction. In addition to physiological and psychological factors, sociodemographic determinants such as age, marital status, duration of dialysis, education level, and socioeconomic status have also been reported to affect the occurrence of ED in dialysis patients (El-Khatib et al., 2008; Seck et al., 2012). Older age and longer duration of dialysis have been consistently associated with a higher risk of ED. Despite the significant burden of ED among this population, it continues to be overlooked in routine nephrology practice. The reluctance of patients to discuss sexual issues, combined with the lack of structured screening protocols and therapeutic guidelines for ED in ESRD patients, contributes to its neglect. Addressing this issue is vital, as ED not only impairs quality of life but may also be an early indicator of underlying cardiovascular disease and endothelial dysfunction in this high-risk population (Sansone et al., 2009). Given the high frequency and multifactorial nature of ED in maintenance hemodialysis patients, there is a compelling need to investigate its prevalence and associated determinants in diverse populations. Understanding these factors will aid in early identification, improved patient counseling, and the formulation of targeted intervention strategies. This study aims to determine the frequency and key determinants of erectile dysfunction among patients on maintenance hemodialysis, contributing to the limited but growing body of literature on this important subject.

METHODOLOGY

This research was designed as a cross-sectional study conducted at the Dialysis Center of Jinnah Hospital / Allama Iqbal Medical College, Lahore. The study aimed to determine the frequency and determinants of erectile dysfunction (ED) among patients undergoing maintenance hemodialysis. The study was carried out over a period of six months, from July 2022 to December 2022. Prior to data collection, ethical approval for the study was obtained from the College of Physicians and Surgeons Pakistan (CPSP). Written informed consent was taken from all participants included

in the study. All ethical principles of research involving human subjects, including confidentiality, voluntary participation, and patient safety, were strictly adhered to. Patient anonymity was maintained by assigning a unique identification number to each participant; no personal identifiers were recorded or disclosed at any stage of the study.Patients undergoing maintenance hemodialysis at the designated center who met all inclusion criteria were recruited for the study. Participants who fulfilled any exclusion criteria were excluded to maintain the internal validity of the study. Specific inclusion and exclusion criteria were predefined in the study protocol to ensure a homogeneous study population.After obtaining informed consent, all eligible patients were assessed for the presence of erectile dysfunction, following a clearly defined operational definition of ED. Subsequently, detailed demographic and clinical data were collected for each participant. The following variables were documented as potential determinants of ED:

- Age (in years)
- Duration of dialysis (in months/years)
- Diuresis status (presence or absence of residual urine output)
- Serum testosterone levels (ng/dL)
- Serum albumin levels (g/dL)
- Smoking status (current smoker, former smoker, non-smoker)
- Diabetes mellitus status (yes/no)
- Hypertension status (yes/no)
- Peripheral neuropathy status (present/absent)
- Depression status (based on clinical assessment or validated scale)

All data were collected using a structured data collection form and entered into a secured digital database. Confidentiality of the data was strictly ensured throughout the study duration.

RESULTS AND DISCUSSION

Table 1: Descriptive Statistics of Study Variables (n = 125)

Variable	Min	Max	Mean	Std. Dev
Age (years)	20	72	42.92	16.01
Duration of Dialysis (months)	6	24	15.28	6.77
IIEF-5 Score	5	25	15.24	7.24
HbA1c (%)	5.0	7.4	6.04	0.82
Serum Albumin (g/L)	23	53	38.56	9.69
Serum Testosterone (ng/dL)	210	880	377.64	204.28

This table summarizes the general characteristics of the study population. The mean age of hemodialysis patients was 42.92 years, indicating a relatively young cohort facing renal complications. The average duration of dialysis was 15.28 months, reflecting a moderately chronic exposure to dialysis-related factors. The mean IIEF-5 score (15.24) indicates the presence of varying degrees of erectile dysfunction in the population. Low serum testosterone (mean 377.64 ng/dL) and albumin levels (mean 38.56 g/L) may reflect underlying endocrine and nutritional deficiencies, both of which are commonly associated with chronic kidney disease and have significant implications on quality of life, including sexual function.

Table 2: Clinical and Demographic Profile of Patients (n = 125)

Variable	Category	Frequency	Percent
Erectile Dysfunction	Yes	85	68%
	No	40	32%
Severity of ED	Severe	45	52.9%
	Moderate	25	29.5%
	Mild	15	17.6%
Low Testosterone (<300 ng/dL)	Yes	85	68%
	No	40	32%
Hypoalbuminemia	Yes	55	44%
	No	70	56%
Depression	Yes	85	68%
	No	40	32%

The results demonstrate that 68% of patients were experiencing erectile dysfunction, with 52.9% of them suffering from severe ED. This highlights a substantial burden of sexual dysfunction among dialysis patients, which is often underreported and untreated. The co-existence of low testosterone levels (68%) suggests a strong hormonal basis for ED in this population. Additionally, hypoalbuminemia (44%) and depression (68%) further support the multifactorial origin of ED, where malnutrition and mental health play critical roles. These findings emphasize the need for a multidisciplinary approach to patient management, including psychological support, hormonal evaluation, and nutritional interventions.

Table 3: Lifestyle and Comorbidity Profile (n = 125)

Variable	Category	Frequency	Percent
Diabetes Mellitus	Yes	80	64%
	No	45	36%
Hypertension	Yes	80	64%
	No	45	36%
Smoking	Yes	70	56%
	No	55	44%
Diuretic Use	Yes	60	48%
	No	65	52%
Longer Duration of Dialysis (>15 months)	Yes	85	68%
	No	40	32%

This table illustrates the high prevalence of diabetes mellitus (64%), hypertension (64%), and smoking (56%), which are well-established risk factors for erectile dysfunction. The use of diuretics (48%) may also contribute to ED due to their potential side effects on sexual performance. Additionally, 68% of patients had longer dialysis duration, which may exacerbate the physiological stress and endocrine imbalance contributing to ED. These findings suggest that comorbid conditions and treatment regimens should be considered carefully in managing erectile dysfunction in hemodialysis patients.

Table 4: Association of Erectile Dysfunction with Age and Testosterone Level

Factor	ED Present	ED Absent	Total	P-value
Age < 40 years	35 (41.2%)	35 (87.5%)	70	
Age > 40 years	50 (58.8%)	5 (12.5%)	55	0.000
Testosterone <300 ng/dL	85 (100%)	0 (0%)	85	
Testosterone >300 ng/dL	0 (0%)	40 (100%)	40	0.000

A significant association was found between erectile dysfunction and age group (p = 0.000), with higher rates of ED in patients older than 40 years. This aligns with the well-known age-related decline in sexual function due to vascular and hormonal changes. Moreover, all patients with ED had testosterone levels below 300 ng/dL, confirming a strong correlation between low testosterone levels and ED (p = 0.000). These results reinforce the importance of hormonal evaluation in dialysis patients presenting with sexual dysfunction, and the potential benefit of testosterone replacement therapy in selected cases.

Table 5: Association of Erectile Dysfunction with Hypoalbuminemia

Hypoalbuminemia	ED Present	ED Absent	Total	P-value
Yes	50 (58.8%)	5 (12.5%)	55	0.000
No	35 (41.2%)	35 (87.5%)	70	

The analysis showed a significant association between hypoalbuminemia and ED (p = 0.000). Patients with low albumin levels, a marker of poor nutritional and inflammatory status, were more likely to experience ED. Malnutrition-inflammation complex syndrome (MICS), common in end-stage renal disease, can negatively affect hormonal pathways and physical well-being, contributing to sexual dysfunction. Therefore, addressing nutritional deficits through dietary counseling and supplementation

may help in improving both general health and sexual function in this population.

CONCLUSION

The presence of erectile dysfunction was found in 68% patients undergoing hemodialysis, presence of hypoalbuminemia was found in 44% patients, presence of diabetes mellitus was found in 64% patients. There were 56% smoker patients, hypertension was found in 64%, longer duration of dialysis was observed in 68% patients and depression was present in 68% patients undergoing hemodialysis.

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