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Erectile Dysfunction in Hemodialysis Patients in Al-Kadhimiya and Al-Kindey Hospitals A cross-Sectional Study (November 2011 – January 2012)

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Abstract: **Background:** Erectile Dysfunction (ED) is defined as the inability to attain or maintain an erection sufficient for satisfactory sexual performance. There is a very high prevalence of ED among dialysis patients. **Aim of the study:** To identify the prevalence of erectile dysfunction in a uremic patient undergoing haemodialysis at Al-kadhimiya and Al-Kindey Teaching Hospitals to find the association between Erectile Dysfunction with age, haemoglobin, diabetes mellitus, albumin, urea, creatinine, systolic blood pressure, hepatitis C infection, HBV infection, smoking and the duration of dialysis. **Patients and methods:** Descriptive, cross-sectional, hospital-based study conducted from the 1st of November 2021 to the 27th of January 2022 in the Haemodialysis unit of Al-Kadhimiya and Al-Khindy teaching hospitals in Baghdad City. All male patients of end-stage renal disease (ESRD) on maintenance haemodialysis therapy, whose spouses are alive, were included in the study. Patients with acute renal failure and those with cognitive and communication deficits were excluded from the study. International index of erectile function-5 (IIEF-5) was used for the determination of the prevalence of erectile function. Patients are divided into two groups according to the international index of erectile function 5, the first group with erectile dysfunction for those with a score of 21 and less, and the second group without erectile dysfunction for those with a score of 22 and more (total score is 25). **Results and discussion:** Total numbers of patients were fifty-three. Prevalence of erectile dysfunction in our study sample was 84.9 %. Factors responsible for erectile dysfunction are diabetes mellitus (73.3% of patients with erectile dysfunction had diabetes mellitus), increasing age (75.5% of patients with erectile dysfunction were of the age group of more than 35 years), high pre-dialysis urea level (82.2% of patients with erectile dysfunction had urea level of 150mg/dl or more). In this study, smoking, hepatitis B virus surface anti-gene state, hepatitis C virus antibody state, systolic blood pressure, albumin, creatinine, haemoglobin, and the duration of dialysis are not related with ED. **Conclusion:** Majority of the patients suffering from ESRD, on maintenance haemodialysis, are having Erectile Dysfunction. Major factors responsible for Erectile Dysfunction are diabetes mellitus, increasing age, and high pre-dialysis urea.

Keywords: Haemodialysis, erectile dysfunction, diabetes mellitus, age, international index of erectile function 5.

INTRODUCTION

Chronic kidney disease in adults is defined by The Kidney Disease Outcomes Quality Initiative (K/DOQI) as; where evidence of structural or functional kidney abnormalities (abnormal urinalysis, imaging studies, or histology) that persist for at least three months, with or without decreased GFR (as defined by a GFR of less than 60 ml/min per 1.73 m2) [Dean, R.C. *et al*., 2005- Shen, Y.C. *et al*., 2014]. The most common manifestation of kidney damage is persistent albuminuria, including microalbuminuria. Moreover, CKD was classified into five stages, which are the first stage is Normal GFR (greater than 90 ml/min per 1.73 m2) and persistent albuminuria; the second stage is GFR between 60 to 89 ml/min per 1.73 m2 and persistent albuminuria. Third stage is GFR between 30 and 59 ml/min per 1.73 m2 [Vecchio, M. *et al*., 2010- Vlachopoulos, C.V. *et al*., 2013]. Fourth stage presents GFR between 15 and 29 ml/min per 1.73 m2. Fifth stage of is disease is a GFR of less than 15 ml/min per 1.73 m2 or ESRD. In addition, causes of end-stage renal disease represent 1) Diabetes mellitus 20-40%, 2) Hypertension 5-20%. 3) Glomerular diseases 10-20%: e.g., IgA nephropathy. 4) Interstitial diseases 20-30%. 5) Systemic inflammatory diseases 5-10%: e.g., systemic lupus erythematosus, vasculitis. 6) Renal artery stenosis 5%. 7) Congenital and inherited 5%: e.g., polycystic kidney disease, Alport's syndrome. 8) Unknown 5-20%. In general, ED is present in up to 30 million men in the United States and approximately 100 million men worldwide.14 Patients of chronic kidney disease have a prevalence of ED ranging from approximately 50 to over 90%. ED is defined as the consistent or recurrent inability to acquire or sustain an erection of sufficient rigidity and duration for sexual intercourse [Vlachopoulos, C.V. *et al*., 2013- Araujo, A.B. *et al*., 2009]. This paper aims to Identify the prevalence of erectile dysfunction in uremic patients undergoing haemodialysis in Al-Kadhimiya and Al-Kindey hospitals and to find the relationship between erectile dysfunction and the age, HB, DM, albumin, urea, creatinine, SBP, HCV infection, HBV infection, smoking and the duration of dialysis.

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PATIENTS AND METHODS

A descriptive cross-sectional study was conducted from the 1st of November 2021 to the 27th of January 2022 in the Haemodialysis unit of Al-Kadhimiya and Al-Kindey teaching hospital in Baghdad City. Fifty-three male patients who were on regular maintenance haemodialysis were included in the study. Only those patients who had alive spouses were included. All patients were informed, and consent about the study was taken. Each subject completed a self-administered 5-item validated questionnaire, the IIEF-5, adapted in Urdu, which is an abridged version of the 15-item International Index of Erectile Function. Based on IIEF-5, categorisation of ED was done into those with ED (with a score of 21 and less) and without ED for those with a score of 22 and more. Data was analysed by dividing the patients into ED and Non-ED groups. Demographic data was collected on forma containing age, duration of dialysis, history of smoking, and of diabetes mellitus. At the same time, blood pressure was checked, and the blood sample of these patients was drawn to measure haematological (haemoglobin) and biochemical parameters (urea, creatinine, blood sugar, albumin, HBs Ag, Anti HCV). Data was entered and analysed using SPSS 16.0. Mean ±SD is given for normally distributed quantitative variables. Frequencies and percentages are given for qualitative variables. Pearson Chi-square test was applied to observe correlations in qualitative variables. A $p<0.05$ was considered statistically significant. This paper includes inclusion criteria which males with CKD on maintenance haemodialysis who have alive spouses; the marital sex is considered as an appropriate expression of sexuality, while exclusion criteria that have patients of acute renal failure and those with cognitive/communication deficit which that determined with type of machines: Fresenius, Gambro and B. Braun machine.

RESULTS

Table 1: Demographic data of the patients included in the study

Factor	Mean	Category	No.
Age (years)	38.79 ± 9.03	< 35 35-44 >=45	17 24 12
Urea level (mg/dl)	173.0 ± 35.69	<150 150-189 >=190	14 21 18
Albumin level g/dl	2.95 ± 0.64	<2.5 2.5-3.4 >=3.5	14 26 13
Systolic BP mmHg	168.8 ± 25.1	<140 140-179 >=180	4 23 26
Creatinine mg/ dl	6.65 ±1,53	<4 4-7.9 >=8	2 38 13
Duration of dialysis (months)	19,91±7,32	<17 17-22 >=23	24 17 12
Hb g/dl	9.28±1.77	<7 7-10 >10	4 39 10
Diabetes mellitus	---	Diabetic Non- -diabetic	34 19
HBsAg state	---	Negative Positive	47 6
HCVab state	---	Negative Positive	38 15
Smoking	---	Nonsmoker ex-smoker smoker	23 22 8
IIEF-5 score	---	<22 >=22	45 8

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Table 2: Quantitative variables of patients found with and without ED

Factor	With ED Mean ± SD	Without ED Mean ± SD	*P*-value
Age (years)	38.93 ± 8.48	30.63 ± 4.17	<0.05
Urea level (mg/dL)	179.09 ± 32.03	138.9 ± 38	< 0.05
Albumin level g/dl	2.91 ± 0.62	3.61 ± 0.51	> 0.05
Systolic BP mmHg	170.2 ± 25.5	161.2 ± 22.9	> 0.05
Creatinine mg/ dl	6.47 ± 1.47	7.71 ± 1.53	> 0.05
Duration of dialysis (months)	19.73 ± 7.55	20.88 ± 6.20	> 0.05
Hb g/dl	9.16 ± 1.79	9.92 ± 1.65	> 0.05

Table 3: Qualitative variables of patients found with and without ED.

Factor	With ED No. = 45	Without ED No.=8	P value
Diabetic	33	1	< 0.05
NON-DIABETIC	12	7	
Current smokers	7	1	> 0.05
HBsag positive	5	1	> 0.05
Anti-HCV positive	13	2	> 0.05

Table 4: Show the relationship between the (urea, albumin, SBP, creatinine, duration of the dialysis, age, Hb) and the ED

parameters		With ED		Without ED		Total		P value
		No.	%	No.	%	No.	%	
Urea level mg/dl	>150	8	17.8	6	75	14	26.4	<0.05
	150-189	20	44.4	1	12.5	21	39.6	
	>=190	17	37.8	1	12.5	18	34	
	total	45	100	8	100	53	100	
Albumin level g/dl	<2.5	12	26.7	2	25	14	26.4	<0.05
	2.5-3.4	23	51.1	3	37.5	26	49.1	
	>=3.5	10	22.2	3	37.5	13	24.5	
	total	45	100	8	100	53	100	
Systolic blood pressure (mmHg)	<140	3	6.7	1	12.5	4	7.5	<0.05
	140-179	19	42.2	4	50	23	43.4	
	>=180	23	51.1	3	37.5	26	49.1	
	total	45	100	8	100	53	100	
Creatinine level mg/dl	<4	2	4.4	0	0	2	3.8	<0.05
	4-7.9	34	75.6	4	50	38	71.7	
	>=8	9	20	4	50	13	24.5	
	total	45	100	8	100	53	100	
Duration of haemodialysis by months	<17	21	46.7	3	37.5	24	45.3	>0.05
	17-22	14	31.3	3	37.5	17	32.1	
	>=23	10	22.2	2	25	12	22.6	
	total	45	100	8	100	53	100	
Age by years	< 35	11	24.4	6	75	17	32.1	<0.05
	35-44	23	51.1	1	12.5	24	45.3	
	>=45	11	24.4	1	12.5	12	22.6	
	total	45	100	8	100	53	100	
Hb level g/dl	< 7	4	8.9	0	0	4	7.5	>0.05
	7-10	33	73.3	6	75	39	73.6	
	>10	8	17.8	2	25	10	18.9	
	total	45	100	8	100	53	100	

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Table 5: Show the relationship between the (HBs ag, HCVab, diabetes mellitus, smoking) and the ED

Parameters		With ED		Without ED		Total		p-value
		No.	%	No.	%	No.	%	
HBsag state	negative	40	88.9	7	87.5	47	88.7	>0.05
	positive	5	11.1	1	12.5	6	11.3	
	total	45	100	8	100	53	100	
HCVab state	negative	32	71.1	6	75	38	71.7	>0.05
	positive	13	28.9	2	25	15	28.3	
	total	45	100	8	100	53	100	
Diabetes mellitus	Nondiabetic	12	26.7	7	87.5	19	35.8	<0.05
	Diabetic	33	73.3	1	12.5	34	64.2	
	total	45	100	8	100	53	100	
Smoking	Nonsmoker	19	42.2	4	50	23	43.4	>0.05
	Ex-smoker	19	42.2	3	37.5	22	41.5	
	Smoker	7	15.6	1	12.5	8	15.1	
	total	45	100	8	100	53	100	

DISCUSSION

Erectile dysfunction (ED) is a major health issue in modern life and is often underdiagnosed and underestimated due to patient embarrassment and the physician's unawareness about its high prevalence and impact on quality of life. In this study, there is a very high prevalence (84.9%) of ED in haemodialysis patients. The similar prevalence of ED was observed in Iran (87.5%), Turkey (82.9%), Egypt (82.5%), and Brazil (86.4 %). Factors responsible for such a high rate of ED in dialysis patients in the current study is related with multiple factors, including diabetes mellitus, increasing age (more than thirty-five years), and very high pre-dialysis urea level. [Banks, E. *et al*., 2013; Costa, M.R. *et al*., 2018]

Current study shows that ED was more prevalent in diabetic than non-diabetic patients, and it reveals a significant association of DM with ED. Of the 45 patients with ED, there were 33 patients with diabetes and 12 nondiabetics. Similar result is observed by Miyata, Y. *et al*., Diabetes affects ED in many ways. Large vessel atheromatous disease is 40 times more prevalent amongst men with diabetes compared to non-diabetics. Diabetes mellitus causes ultrastructural changes in cavernosal tissues; these changes include reduction in smooth muscle content, increased collagen deposition, thickening of the basal lamina, and loss of endothelial cells. Endothelial and neurogenic relaxant responses mediated by nitric oxide (NO) are impaired in diabetes. [Al Khallaf, H.H, 2010]

Age is an important risk factor for ED. In the current study, increasing age significantly correlated with the prevalence of ED, which agrees with other studies like the Massachusetts Male Aging (MMA) study, Rodger, *et al*., Chun–Fu Lia, *et al*., and Rosas SE, *et al*., In Rodger, *et al*., and Chun–Fu Lia, *et al*., found a strong association between age and the prevalence of ED,

The average age of the patient with ED was 50 years, and the average age of those without ED was 38 years ($p<0.001$). While in our study, the mean of age of patients with ED was 38.9 years, and 30.6 years for patients without ED. This difference may be related to other factors like dialysis techniques, concomitant diseases, medications that we used, and psychological state. [Sumii, K. *et al*., 2016]

Age causes gradual changes in sexual organs; these changes do not occur suddenly like in women but occurs gradually during a process called andropause or late-onset hypogonadism. An abrupt increase in hypogonadism prevalence occurred in men aged 45 to 50 years, beyond which a plateau of prevalence was maintained until older than 80 years of age.

Urea is usually used in measuring the quantification of dialysis. Very high urea indicates inadequate haemodialysis dialysis. In the present study, the mean blood urea level in a patient with ED was 179±32mg/dl, while it was 139±38mg/dl in those without ED, which were statistically significant (p-value <0.05); a similar result was observed by Asim Mumtaz, *et al*., in a study done Lahore (Pakistan) on a fifty Patients, in which patients with ED has high blood urea of 175 ± 56.8mg/dl while in those without ED, it was 152±33.4mg/dl. Increased urea level leads to decreased synthesis of NO and supersaturation of the Oxygen free radicals; These Oxygen free radicals lead to increased consumption of NO,

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which is a relaxing factor for penile smooth muscles. [Nishida, H. *et al*., 2016; El-Assmy, A, 2012]

In the current study, the SBP and serum albumin levels show no significant statistical association with ED ($p > 0.05$); this result is comparable to Asim, *et al*., study. In the current study, the mean duration of the dialysis was 19.73 months in patients with ED and 20.88 months in patients without ED; there was no significant association with ED ($p > 0.05$). Similar result was seen with Steel, *et al*., In the current study, the serum creatinine level has no significant association with the ED ($p > 0.05$); this corresponds to the result of the Messina, *et al*., study. In the current study, the Hb level shows no significant association with ED ($p > 0.05$) similar finding was observed in Leila, *et al*., In the current study, the HBs ag state has a statistically insignificant association with the ED ($p >0.05$). Similar result was observed by Asim, *et al*., study. In the current study, the smoking habit has a statistically insignificant association with ED ($p >0.05$). Similar result was observed by Asim, *et al*., study. [Edey, M.M, 2017]

CONCLUSION

This paper found most of the patients suffering from ESRD on maintenance haemodialysis are having ED. Besides to that, Haemodialysis does not improve sexual dysfunction. Furthermore, major factors responsible for ED are diabetes mellitus, age of more than 35 years, and high pre-dialysis urea. Similarly, The ED adversely affects the quality of life of patients with ESRD to some extent. While important advances to improve survival on haemodialysis therapy have been achieved, improvements in quality of life should also be sought, and therefore evaluations for ED should be included in a routine assessment of haemodialysis patients. Our results may provide basic data for future research in this field, especially in other centres.

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