

Comparison of Sexual Function Changes between Two Groups of Male Kidney Recipients from Living Donor and Cadaveric Donor

Keywords: Kidney transplant; Sexual dysfunction; IIEF-5 questionnaire

Abstract

Due to high incidence of kidney failure and ESRD cases, the need for better and more effective treatments increases to increase life span of patients and their quality of life. One of the useful treatment methods in patients with severe renal failure is kidney transplantation, which is performed in two ways: transplantation from a living donor and transplantation from a cadaveric donor. Considering that almost most patients with kidney failure who are candidates for kidney transplant surgery are young or middle-aged, one of the most important factors affecting their satisfaction with the course of treatment and quality of life is sexual ability and performance. All the patients who underwent kidney transplant from living donor or cadaveric donor from 5/22/2015 to 5/22/2015 in Sina Hospital constituted the statistical population of this study. Sampling in this study is simple sampling and the method used to collect the required data and information is questionnaire. Independent variables investigated in this study, which are related to kidney transplant as well as various parameters of sexual performance of the patients, were collected and recorded separately according to the approved model of IIEF-15 questionnaire in Iran for male patients. The data was statistically analyzed by SPSS software, version 16. Frequency and frequency percentage are used to describe the qualitative data, and mean and standard deviation are used to describe the quantitative data collected. Qualitative variables were analyzed using chi-square test and quantitative variables were analyzed using t-test. Based on the results obtained, sexual function of patients improved after transplantation from a living donor in both groups. Although in the comparison between the two groups, cadaveric donor patients show better conditions than living donor patients at all times in factors related to sexual performance, the difference between the two groups is not statistically significant in terms of variables related to sexual performance, except for desire.

Introduction

Considering the significant progress of human knowledge in the field of identifying efficient treatment methods in treatment of kidney failure, the number of people suffering from this disease who continue their lives with the help of kidney transplant is increasing. Currently, a transplanted organ is received in two ways: receiving an organ from a living donor or receiving an organ from a cadaveric donor. Despite the increasing number of organ transplants, especially kidney transplants, there have not been enough studies to compare or confirm the superiority of one of these two methods. Problems related to sexual dysfunction are common problems of patients with kidney failure, which are usually not given enough attention. A variety of sexual disorders and fertility problems are seen in men and women with kidney failure, including erectile dysfunction in men, decreased libido, lack of ovulation, menstrual disorders and infertility in women [1,2,3]. Pathogenesis of sexual dysfunction in uremic patients is attributed to hormonal imbalance, vascular and neurological disorders, drugs and psychological problems [4,5].



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Some studies have claimed that more than 50% of men with kidney failure experience erectile dysfunction during their illness [6]. There are also evidences of improvement in erectile function of patients with kidney failure who were undergoing haemodialysis after kidney transplant, and this improvement rate was higher in patients who were transplanted at a younger age [7]. ROSAS et al (2001) estimated the prevalence of erectile dysfunction in haemodialysis patients at 82% [8]. As noted, sexual dysfunction in CRF patients is not exclusive to men and can also be seen in affected women. Menstrual disorders, amenorrhea and subsequent fertility disorders are among the problems that these patients experience [9]. Toorian et al (1997) and Kettas et al (2008) in similar studies reported the prevalence of sexual dysfunction as 90% before dialysis and 60-70% after dialysis [10,11]. In a study conducted by Rebecca J Muehrer et al. (2009) at the University of Wisconsin, improvement of sexual function after kidney transplant and its impact on quality of life of patients were investigated and significant changes were reported. In addition, this study emphasized that an underlying disease leading to kidney failure can also be the cause of sexual dysfunction in these patients, and sometimes, due to inability to resolve the underlying cause, a significant improvement in sexual function may not be seen in a number of patients [12]. Among the common diseases that can lead to kidney failure, we can mention diabetes and hypertension, which can cause sexual dysfunction with the mechanism of vascular disorder and neuropathy. Controlling blood glucose and blood pressure in these patients will help improve sexual performance. Although the damage caused by these diseases will remain permanent in some cases [13].

Among the other theories proposed for erectile dysfunction in men with CRF, we can mention penile venous insufficiency. Anastomosis of transplanted renal artery is usually done as end to end internal iliac artery or end to side external iliac artery. The risk of venous insufficiency leading to sexual dysfunction in men with kidney failure transplanted in end-to-end internal iliac artery anastomosis is 10%; in case of a second transplant and internal iliac artery anastomosis on the opposite side, this risk is reported as 25-65% [7,13]. Unlike the studies reviewed so far, other studies have also

been conducted, the results of which indicate that kidney transplant cannot always have a positive effect on improving sexual performance of patients [2,16]. Considering that most cases of kidney transplant are performed in middle-aged patients and taking into account the age of sexual activity of patients, sexual dysfunction is one of the important issues in the lives of these people, which may not have been addressed well and necessary measures for treatment have not been taken due to cultural issues [3]. On the other hand, as we know little about sexual disorders of women with transplanted kidney failure or undergoing dialysis, it seems necessary to compare the changes in sexual function of kidney transplant recipients between two groups of kidney recipients from living donors and cadaveric donors. Therefore, this study, while evaluating sexual ability and performance of kidney transplant patients, tends to compare the changes in sexual performance of patients who received a kidney from a living donor with those who received a kidney from a cadaveric donor.

Material & Methods

This project is a cohort study that was done prospectively and without blinding.

Population, Sample Size and Calculation

All the patients who underwent kidney transplant from living donor or cadaveric donor from 5/22/2015 to 5/22/2015 in Sina Hospital constituted the statistical population of this study. Reference articles and similar texts were used to determine the sample size. In this way, if the first type error is equal to 1% and the study power is 81%, in the null hypothesis where the mean of both groups is equal to 0.27 and in the alternative hypothesis with estimated standard deviation equal to 6 in both groups and considering the significance level (α) equal to 0.05 using two-sided/two-sample t-test, we need 37 people in each group. The formula used to calculate sample size is:

$$N = 2 \times K \times \left(\frac{\sigma}{\mu_1 - \mu_2} \right)^2$$

where, $K = 7.9$, $\mu_1 = 27$, $\mu_2 = 23$, and $S = 6.1$

Inclusion and Exclusion Criteria

All patients who received a kidney transplant from both living and cadaveric donors at Sina Hospital from 5/22/2015 to 5/22/2015 were examined in this project. Patients with the following conditions were included in the study. It should be noted that exclusion criterion is not defined for patients due to retrospective nature of the study and simple sampling.

- Patients with appropriate age for sexual activity
- Patients with a history of at least 6 months of dialysis before kidney transplant
- Patients with creatinine levels less than 2 after kidney transplant

Sampling in this study was simple sampling. Due to the prospective nature of the study, patients who met the inclusion criteria were included in the study. According to the type of transplanted kidney donor, the participants were divided into two groups: kidney recipients from a living donor and kidney recipients from a cadaveric donor. Blinding has no place in implementation process of this study.

Data Collection Method

The method used in this study to collect the required data and information is to complete the questionnaire. An information form or questionnaire was considered for each patient, which contains complete personal information of kidney transplant patients. The independent variables investigated in this study, which are related to kidney transplant, as well as various parameters of sexual performance of the patients, were collected and recorded separately according to the approved model of IIEF-15 questionnaire in Iran for male patients.

Data Analysis Method

After finishing the sampling and computerizing the data, the data was statistically analyzed by SPSS software, version 16. Frequency and frequency percentage are used to describe the qualitative data of the study, and mean and standard deviation are used to describe the quantitative data collected. According to the value of margin of effect, non-inferiority comparison is made between two groups. Qualitative variables are analyzed using chi-square test and quantitative variables are analyzed by t-test ($P < 0.05$). The significance level of all tests is considered to be 95%.

Results

Due to the difference in the investigation method and the reported results, a comparison was made between men of two groups, and for ease of understanding and access; the results of the statistical analysis are reported separately by group (Table 1).

Total number of male patients in two groups was 87; 37 patients in group 1 (1 patient rejected and 1 patient died) with a mean age of 41.3 ± 11.38 (in the age range of 22-70 years) and 50 patients in group 2 (1 patient rejected and 6 patients died) with a mean age of 44.14 ± 14.21 (in the age range of 18-72 years). In group 1, the mean duration of dialysis was 16.3 ± 11.28 months, the minimum duration of dialysis was 6 months and the maximum was 48 months. In group 2, the mean duration of dialysis was 22.98 ± 19.15 months with a minimum range of 6 months and a maximum of 108 months. In group 1, the mean BMI of patients was 24.98 ± 3.77 kg/m², the minimum of which was 16.50 kg/m² and the maximum was 32.91 kg/m². In group 2, the mean of this index was 24.13 ± 4.22 kg/m² with a minimum range of 15.90 kg/m² and a maximum range of 35.46 kg/m².

Thirty patients in the living donor group and 40 patients in the cadaveric donor group had a history of hypertension. Statistical analysis of hypertension history in the examined patients and frequency chart of the two groups can be seen below (Table 2) (Figure 1).

Ten patients in the living donor group and 9 patients in the cadaveric donor group had a history of hyperlipidemia. Statistical analysis of hyperlipidemia history in the examined patients and the frequency chart of the two groups can be seen below (Table 3) (Figure 2).

Table 1: Frequency distribution in two groups with type of transplant.

		Type of transplant		Total
		Living donor	Cadaveric donor	
male	Count	37	50	87
	% within sex	42.5%	57.5%	100.0%

Seventeen patients in the living donor group and 29 patients in the cadaveric donor group had a history of diabetes mellitus. Statistical analysis of diabetes mellitus history in the examined patients and the frequency chart of the two groups can be seen below (Table 4) (Figure 3).

Laboratory findings, including creatinine, BUN, hemoglobin, fasting blood glucose, triglyceride, cholesterol, LDL and HDL, were examined in all patients. The results of examination of these variables, separated by the two studied groups, can be seen in Table 5. It should be noted that in group 1, there were two hepatitis B patients and no hepatitis C patients were observed. In group 2, one hepatitis B patient and one hepatitis C patient were observed (Table 5).

During this study, according to the approved questionnaire for evaluation of sexual performance of men in Iran, various factors were examined and reported. The results of descriptive analysis of the factors related to sexual dysfunction of men, which were evaluated three times before transplantation, 3 months after transplantation and 9 months after that and recorded by the patient in the questionnaire, as well as severity score of sexual dysfunction is listed in the following tables (Table 6,7) (Figure 4,5).

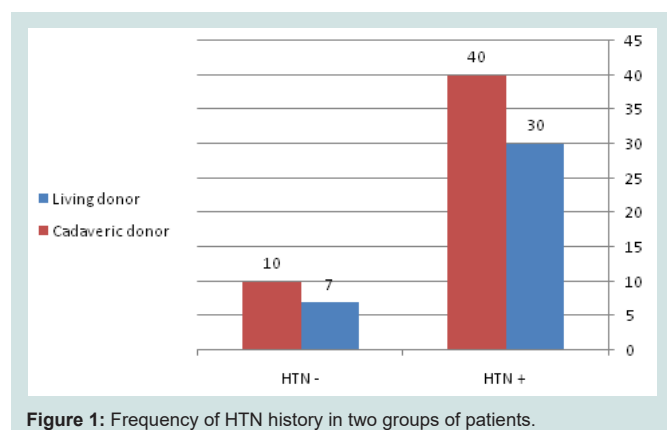


Figure 1: Frequency of HTN history in two groups of patients.

Table 2: Frequency of hypertension history in men of both groups.

			Type of transplant		Total
			Living D.	Cadaveric D.	
HTN	yes	Count	30	40	70
		% within HTN	42.9%	57.1%	100.0%
	no	Count	7	10	17
		% within HTN	41.2%	58.8%	100.0%
Total		Count	37	50	87
		% within HTN	42.5%	57.5%	100.0%

Table 3: Frequency distribution of hyperlipidemia in men of both groups.

			Type of transplant		Total
			Living D.	Cadaveric D.	
Hyperlipidemia	yes	Count	10	9	19
		% within Hyperlipidemia	52.6%	47.4%	100.0%
	no	Count	27	41	68
		% within Hyperlipidemia	39.7%	60.3%	100.0%
Total		Count	37	50	87
		% within Hyperlipidemia	42.5%	57.5%	100.0%

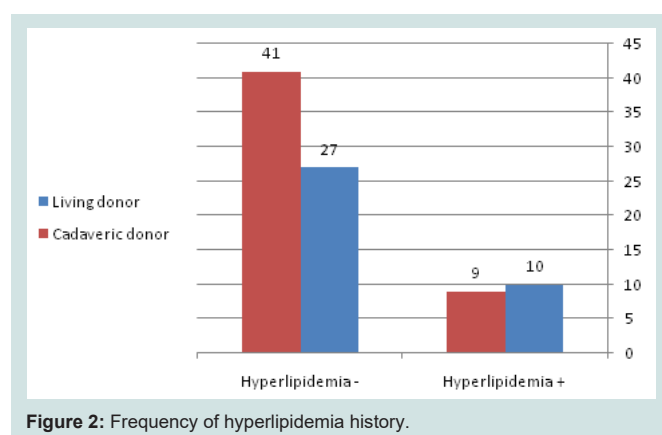


Figure 2: Frequency of hyperlipidemia history.

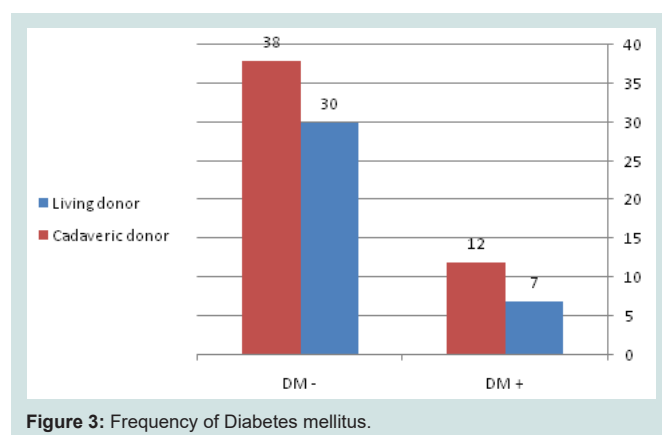


Figure 3: Frequency of Diabetes mellitus.

Table 4: frequency distribution of diabetes mellitus in men of both groups.

			Type of transplant		Total
			living donor	Cadaveric donor	
DM	yes	Count	7	12	19
		% within DM	36.8%	63.2%	100.0%
	no	Count	30	38	68
		% within DM	44.1%	55.9%	100.0%
Total		Count	37	50	87
		% within DM	42.5%	57.5%	100.0%

In the statistical analysis of the variables in two groups, first the mean age of the two groups was examined. According to Tables 8 and 9, there is no significant difference in mean age of male patients in the two studied groups ($P=0.319$) and therefore the male patients in the two groups have the same age distribution.

By performing multiple regression analysis, the relationship and Pearson correlation coefficient between some laboratory indicators and male sexual dysfunction before and after transplantation were determined and reported.

According to the obtained P-values and correlation coefficients, there is an inverse relationship between the age of male patients and sexual performance before transplantation, 3 months later and 9 months later. There is a direct relationship between BUN and triglyceride levels and sexual function before transplantation. Sexual performance 3 months after transplantation has a direct relationship with the level of triglycerides and hemoglobin. Nine months after

Table 5: Laboratory data of two groups.

	Variable		Living donor		Cadaveric donor	
			Before	After	Before	After
1	Cr	Mean±SD	7.77±2.5	1.83±2.36	1.48±5.72	1.77±0.67
		Range (min-max)	3.3-16.8	3.9-13.44	1-5.4	0.7-4.5
2	BUN	Mean±SD	95.08±36.43	116.17±41.68	62±26.5	88.28±42.41
		Range (min-max)	42-183	61-213	5-150	32-216
3	Hb	Mean±SD	11.36±2.1	11.9±2.49	10.62±1.8	10.02±1.75
		Range (min-max)	7.3-15	7.2-18.6	7.9-14.6	6.6-13.9
4	FBS	Mean±SD	11.36±2.1	113.24±63.46	93.33±26.5	106.22±57.16
		Range (min-max)	70-202	70-488	60-171	56-380
5	TG	Mean±SD	156.06±103.26	146.3±115.89	131.72±74.55	117.8±54.4
		Range (min-max)	57-641	48-674	60-480	60-400
6	Chol.	Mean±SD	151.42±52.24	139.14±38.51	129.47±40.46	125.08±31.67
		Range (min-max)	97-308	67-249	80-250	80-200
7	LDL	Mean±SD	120.12±22.7	95.82±16.9	118.08±32.1	95.24±16.4
		Range (min-max)	87-161	70-140	55-188	80-173
8	HDL	Mean±SD	90.28±39.8	82.82±30.63	85.58±28.20	87.88±42.20
		Range (min-max)	39-236	39-169	39-150	20-60
9	Systolic BP	Mean±SD	152.61±20.48	156.96±17.5	132.64±11.16	135.76±15.57
		Range (min-max)	100-210	120-210	110-155	80-160
10	Diastolic BP	Mean±SD	90.33±14.51	88.68±13.71	81.25±8.05	83.16±8.57
		Range (min-max)	60-130	70-126	60-100	60-110

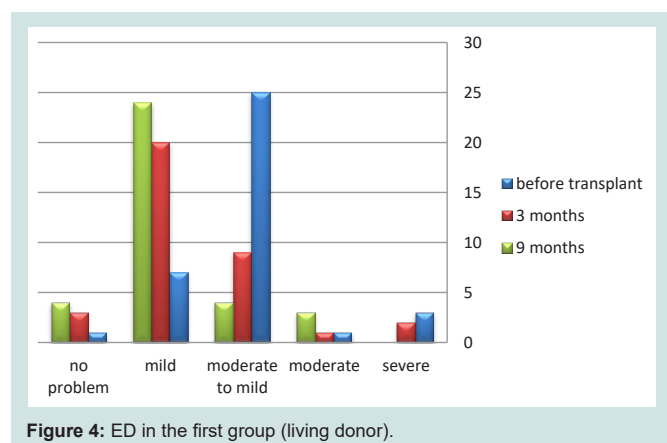


Figure 4: ED in the first group (living donor).

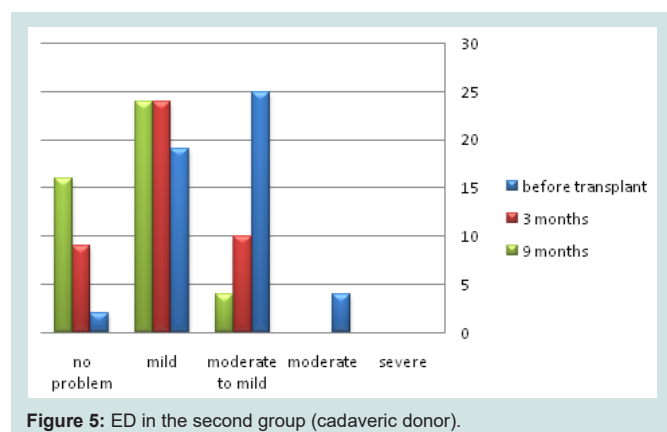


Figure 5: ED in the second group (cadaveric donor).

transplantation, a direct relationship is seen between hemoglobin and sexual dysfunction. In other cases, there was no significant relationship (Table 10).

As the main objective of the study, sexual dysfunction of men in two groups was compared on three occasions, before transplantation, 3 months after transplantation and 9 months later. In the pre-transplant period (P-value=0.028), there is a significant difference in ED sexual performance between the two groups, and according to the mean, men in the second group performed better. According to P-value=0.006, there was a significant difference between the men of the two groups in ED index at 3 months after transplantation, and performance of group 2 was better. According to P-value=0.002, there is a significant difference between ED sexual performance in men of the two groups at 9 months after transplantation, and according to the mean, the men of the second group performed better. Finally, it is shown that the second group (cadaveric donor) compared to the first group, performed better in all 3 occasions (Tables 11,12).

In addition to intergroup comparison, sexual performance was analyzed separately in each group, among male patients in the same group, using the Paired Sample T-test, and was compared in three occasions (Table 13).

According to Table 14, P-value shows that there is a significant difference in all cases of ED sexual dysfunction comparison in the group of living donor patients. Considering the increase of the mean with the increase of time after transplantation, post-transplant improvement of sexual function is evident.

According to Table 15, P-values show that there is a significant difference in all cases of ED sexual dysfunction comparison in the

Table 6: sexual dysfunction of men in both groups in three occasions.

Sexual performance area	Living Donor		Cadaveric Donor	
	Mean±SD	Range (min-max)	Mean±SD	Range (min-max)
Pre-transplant ED	14.4±4.2	2-23	16.65±3.5	9-25
ED 3 months before transplant	17.23±4.02	7-23	19.06±3.32	14-25
ED 9 months before transplant	18.48±3.91	7-25	21.07±3.19	15-25

Table 7: Severity of sexual dysfunction based on questionnaire scores.

ED sexual performance class	Frequency table of patient classes based on ED score					
	Living Donor			Cadaveric Donor		
	Before	3 months	9 months	Before	3 months	9 months
Severe	3	2	0	0	0	0
Moderate	1	1	3	4	0	0
Moderate to mild	25	9	4	25	10	4
Mild	7	20	24	19	24	24
No problem	1	3	4	2	9	16
Sum	37	35	35	50	43	43

Table 8: Mean age of men in two groups.

Group Statistics					
	Type of transplant	N	Mean	Std. Deviation	Std. Error Mean
age	living donor	37	41.2973	11.38436	1.87158
	Cadaveric donor	50	44.1400	14.21412	2.01018

Table 9: Comparison of two groups by mean age.

Independent Samples Test				
Comparison of age of two groups		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
age	Equal variances assumed	-1.001	85	.319
	Equal variances not assumed	-1.035	84.424	.304

Table 10: Coefficients of correlation of laboratory data and male sexual dysfunction.

Sexual function indicator	ED before		ED 3M		ED 9M	
Statistic variable	cc	P	cc	P	Cc'	P''
Age	-.588	.000	-.613	.000	-.659	.000
BMI	-.046	.337	-.092	.212	-.077	.250
Cr	.154	.078	.041	.362	.027	.409
BUN	.202	.031	.168	.071	.149	.097
FBS	.047	.333	.061	.298	.026	.412
TG	.215	.023	.228	.022	.161	.079
Chol.	.099	.180	.127	.134	.049	.336
LDL	-.013	.454	.031	.394	-.016	.445
HDL	-.084	.219	-.092	.211	-.039	.366
Hb	.177	.051	.198	.041	.206	.035
Systolic blood pressure	.060	.289	.026	.412	.058	.308
Diastolic blood pressure	.116	.143	-.023	.420	.000	.499

Table 11: Comparison of sexual dysfunction of men in two groups before transplant.

Independent Samples Test				
		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
EDbefore	Equal variances assumed	-2.307	85	.023
	Equal variances not assumed	-2.249	69.624	.028

group of cadaveric donor patients. Considering the increase of the mean with the increase of time after transplantation, post-transplant improvement of sexual function is evident. Finally, the obtained results show that ED sexual function improved after transplantation in both groups. However, in the comparison between the two groups, cadaveric donor patients show better conditions than living donor patients at all times.

Discussion & Conclusion

Problems related to sexual dysfunction are common problems of patients with kidney failure, which are usually not given enough attention. Some studies have claimed that more than 50% of men with

Table 12: Comparison of sexual dysfunction of men in two groups three months after transplant.

Independent Samples Test				
		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
ED3M	Equal variances assumed	-2.857	76	.006
	Equal variances not assumed	-2.801	65.843	.007

Table 13: Comparison of sexual dysfunction of men in two groups nine months after transplant.

Independent Samples Test				
		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
ED9M	Equal variances assumed	-3.215	76	.002
	Equal variances not assumed	-3.148	65.236	.002

Table 14: Sexual dysfunction of men in group 1 in three occasions.

Paired Samples Test				
Comparison of ED function in group 1		t	df	Sig. (2-tailed)
Pair 1	Before and 3 months	-9.616	34	.000
Pair 2	Before and 9 months	-11.330	34	.000
Pair 3	3 months and 9 months after	-4.554	34	.000

Table 15: sexual dysfunction of men in the second group in three occasions.

Paired Samples Test				
Comparison of ED function of group 2		t	df	Sig. (2-tailed)
Pair 1	Before and 3 months	-9.518	42	.000
Pair 2	Before and 9 months	-11.056	42	.000
Pair 3	3 months and 9 months after	-5.106	42	.000

kidney failure experience erectile dysfunction during their illness [6]. Considering the significant progress of human knowledge in the field of identifying efficient treatment methods in treatment of kidney failure, the number of people suffering from this disease who continue their lives with the help of kidney transplant is increasing. As most cases of kidney transplant are performed in middle-aged patients and taking into account the age of sexual activity of patients, sexual dysfunction is one of the important issues in the lives of these people, which may not have been addressed well and necessary measures are not taken due to cultural issues [3]. This study was designed and implemented to compare the changes in sexual function between patients who received a kidney from a living donor and those who received a kidney from a cadaveric donor. By using

standardized questionnaires approved in Iran, the variables related to sexual performance in male patients were investigated in two groups.

The mean duration of dialysis in men of this group was 16.3 ± 11.28 months. This variable for the second group was equal to 22.98 ± 19.15 months for men. According to the inclusion criteria, the minimum duration of dialysis was 6 months and the maximum duration was 108 months. In the study by Dr. Mehraei et al., the minimum dialysis time was 6 months and the maximum was 120 months [7], which is not significantly different from the present study. In another study in 2013, the studied patients underwent haemodialysis for a minimum of 7 months and a maximum of 89 months [6]. The existing difference shows that probably the patients in this study underwent intervention and kidney transplant operation faster.

In men of the first group, the mean BMI index was 24.98 ± 3.77 kg/m² with a minimum of 16.50 kg/m² and a maximum of 32.91 kg/m². In men of the second group, the mean of this index was 24.13 ± 4.22 kg/m² with a minimum range of 15.90 kg/m² and a maximum range of 35.46 kg/m². The mean of serum creatinine level is one of the variables measured and recorded in patients of both groups, before and after transplantation. In male patients, the mean baseline level of creatinine was different in two groups (7.77 ± 2.5 in the first group and 5.48 ± 1.72 in the second group). The average decrease in creatinine in the cadaveric donor group was slightly higher than the living donor group (83.36 ± 1.2 in the living donor and 1.77 ± 0.67 in the cadaveric donor), although again this difference was not statistically significant ($P > 0.05$).

In a study conducted in 2013 to compare sexual performance of haemodialysis and kidney transplant patients [20], creatinine of patients after kidney transplant was reported as 0.9, which was equal to the control group. The lower mean level of creatinine in the aforementioned study compared to the previous study can be related to factors such as the difference in the baseline creatinine level and physical and gender conditions of population of the two studies. Because different factors affect the level of creatinine and its clearance in the body. Therefore, without demographic uniformity, this variable cannot be compared in various studies. The relationship and correlation between the investigated variables and sexual function of male patients were examined separately in both groups.

According to P-values and correlation coefficients obtained in male patients of both groups, there is an inverse relationship between the age of patients and sexual performance before transplantation, 3 months later and 9 months later. There is a direct relationship between BUN and triglyceride levels and sexual function before transplantation. Sexual performance 3 months after transplantation has a direct relationship with the level of triglycerides and haemoglobin. At the time of 9 months after transplantation, a direct relationship is seen between haemoglobin and sexual dysfunction. Other variables examined at certain times have no significant relationship with sexual performance in male patients of both groups. According to the reports of Dr. Momeni et al.'s [21], age has an inverse relationship with all gender variables in male patients. This report is consistent with the present study; considering the decrease in sexual desire naturally with age, it seems reasonable and has no relationship with the type of kidney transplant. In the above study, the blood pressure of patients has a direct relationship with their sexual performance,

while the present study reported an inverse relationship between blood pressure and sexual performance of patients, considering that the prevalence of sexual dysfunction in the hypertensive population is more than normal population, the inverse relationship between these factors is not far from expected and seems logical.

As the main objective of the study, sexual dysfunction of men in two groups was compared on three occasions, before transplantation, 3 months after transplantation and 9 months later. At the time before transplantation (P -value = 0.028), there is a significant difference in ED sexual performance between the two groups, and according to the mean, men in the first group performed better. According to P -value=0.006, there was a significant difference between men of the two groups in ED index 3 months after transplantation, and the first group performed better. According to P -value=0.002, there is a significant difference in ED sexual performance between men of the two groups at 9 months after transplantation; according to the mean, the men of the first group performed better. Finally, it is shown that the first group (living donor) compared to the second group, had a better sexual performance in all 3 occasions, although this difference is only statistically significant for desire.

According to Brancoet al., although the living donor group is better than the cadaveric donor group in terms of improving sexual dysfunction, relationship satisfaction, and orgasm, this difference is only statistically significant regarding the satisfaction. These results are roughly consistent with the current study and show that, in general, sexual function of patients after kidney transplantation from a living donor is somewhat better than that of patients receiving from a cadaveric donor. As Barroso et al reported, due to the prevalence of sexual dysfunction in patients with ESRD following uremia and other factors, sexual function of patients improves after kidney transplantation compared to hemodialysis [17], and it was reported that the difference in desire of kidney transplant candidates is significantly higher. This review is consistent with the upcoming study and shows the effect of kidney transplant on desire.

Again, an intra-group investigation was conducted in order to investigate the process of changing sexual performance in men of both groups. According to Table 4-36, P -value shows that there is a significant difference in all cases of ED sexual dysfunction comparison in the group of living donor patients; considering the increase of the mean with the increase of time after transplantation, improved sexual function of patients after transplantation is evident. According to Table 4-37, P -values show that there is a significant difference in all cases of ED sexual dysfunction comparison in the group of cadaveric donor patients; considering the increase of the mean with the increase of time after transplantation, improved sexual function of patients after transplantation is evident. Finally, sexual function of the living donor patients improved after transplantation. Although in the comparison between the two groups, cadaveric donor patients show better conditions than living donor patients at all times in factors related to sexual performance, the difference between the two groups is not statistically significant in terms of variables related to sexual performance, except in desire.

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