The Relationship between Sexual Dysfunction and Health-related Quality of Life in Chronic Renal Failure Patients

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ABSTRACT This paper aimed to evaluate the frequency of sexual dysfunction (SD) and its relationship with health-related quality of life (HRQoL) among dialysis patients. Two hundred and forty-six married patients were recruited, with one partner undergoing dialysis for at least one-year, in three Kayseri dialysis-centers. Data was collected using the Arizona Sexual Experiences Scale (ASEX$_S$), Short Form-36 (SF-36), Fatigue Severity Scale (FSS), and the Beck Depression Inventory (BDI). Erectile dysfunction and orgasmic disorder were the major problems for males and females. Physical HRQoL was markedly lower in patients with SD in both treatment groups (p=001). Female ASEX$_S$ scores were inversely correlated with PCS (p=0.001). Older age (OR=1.056), impaired physical HRQoL (OR=0.944), HD modality (OR=2.486) were the main predictors for SD. SD was highly prevalent and closely associated with deteriorated HRQoL in both groups. Strengthening sexual function with supporting psychology, hormones, and pharmacologics, may cure impaired HRQoL.

INTRODUCTION

Sexual dysfunction is defined as difficulties experienced during any stage of sexual activity including desire, arousal, or orgasm (Finkelstein et al. 2007). It is common in patients with end-stage renal failure, which usually begins much earlier than chronic kidney disease stage five (Strippoli et al. 2012). Its prevalence is estimated to run from nine percent before starting dialysis to sixty-seventy percent in dialyzing male and female patients (Weisbord et al. 2007; Rathi and Ramachandran 2012). Recent studies reported that the most common sexual problem in males is erectile dysfunction, which has widely ranged from forty to ninety-one percent (Vecchio et al. 2012; Arslan et al. 2002; Esen et al. 2015). For women, the prevalence of SD was found to be between thirty to one hundred percent (Strippoli et al. 2012; Mor et al. 2013; Kettas et al. 2010; Seethala et al. 2010).

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However, SD is a complex process and not yet completely understood. Many researchers have reported that it was correlated with depression, anxiety, fatigue, diabetes, hormonal challenges, treatment of modality, and quality of life (QoL) in dialysis patients (Weisbord 2013; Basok et al. 2009). Furthermore, depression, QoL, and SD are more strongly interconnected with each other with these patients. Inadequate sexual performance may lead to anxiety, lack of sexual desire, and even depression (Sungur 1999). Depression was defined as the most common psychological problem, ranging from thirteen to thirty percent among dialysis patients and it has also been associated with poor HRQoL (Finkelstein and Finkelstein 2000; Elder et al. 2008). Dialysis modality may have an impact on development of SD. While some of the studies looking at this correlation (McGahuey et al. 2000), report no meaningful correlation between treatment type and SD. Some studies (Kettas et al. 2010; Seethala et al. 2010; Basok et al. 2009; Toorians et al. 1997; Turkmen et al. 2012) report that HD receiving patients experience frequent SD, moreover, they expressed that HD is the basic factor causing SD. According to previous studies (Gilhooly et al. 2001; Blazquez et al. 2009), fatigue

has a direct effect on SD which particularly causes hypoactive sexual desire syndrome.

SD is correlated with decreased HRQoL (Basok et al. 2009) especially, ED, which was reported in around seventy percent of men with chronic kidney disease. This has been associated with lower QoL, decreased social function and role limitations physical and role limitations emotional (Palmer 1999).

Although sexuality was the fifth most important life stressor cited by dialysis patients and SD is a major factor affecting quality of life in end stage renal disease, it receives very limited attention in the follow up of dialysis patients. The aims of this paper were to examine the prevalence of SD using self-reported questionnaires and to evaluate its correlation with HRQoL among HD and PD patients in both sexes. This paper is one of the few reports that provides data for future analytical studies supporting the need of literature in this area.

METHODOLOGY

This cross-sectional study was conducted in three dialysis centers – Erciyes University Department of Nephrology, Kayseri Education and Research Hospital, and Private Almet Dialysis Center. A total of 246 married patients (116 HD and 118 PD) were enrolled in this study. The $ASEX_S$, SF-36 Scale, FSS, and BDI were used to evaluate for sexual functions, HRQoL, fatigue and depressive symptoms. Of the 246 patients, 207 patients (89 HD; 39 female, 50 male and 118 PD; 59 female, 59 male) responded to the $ASEX_S$ scale. Of these 207 respondents, 161 (77.8%) reported SD (75; 46.6% HD and 86; 53.4% PD). The study was approved by the Ethics Committee of Erciyes University Medical School.

Instruments

Arizona Sexual Experiences Scale (ASEX$_S$)

This instrument assesses SD by evaluating five domains of sexual functioning in one week before completion of the questionnaire: (1) drive, (2) arousal, (3) penile erection/vaginal lubrication, (4) ability to reach orgasm, (5) satisfaction, and (6) pain. The female and male versions of $ASEX_S$ differ in the gender-specific question 3 addressing erection/lubrication. Each item is rated with a six-point Likert system, with higher scores reflecting more impaired sexual function. A cut-off point of ≤ 11 was accepted for screening SD for patients undergoing HD. Total $ASEX_S$ score was 5-30 points. SD in this paper was defined as a score on the $ASEX_S$ of ≥ 12 (McGahuey et al. 2000).

Short Form-36 (SF-36)

Quality of life was measured using the Short Form-36 which included 36 items covering eight domains and two primary dimensions. Physical functioning (PF), role limitations-physical (RP) and bodily pain (BP) domains are the physical summary components (PCS); whereas social functioning (SF), role limitations-emotional (RE) and mental health (MH) are the mental summary components (MCS). General health (GH) and vitality (VT) domains are considered components of both dimensions. Each of the eight domains has a scale of 100, with higher scores indicating better functioning (Ware 2000).

Fatigue Severity Scale (FSS)

The FSS is a valid and reliable instrument used to determine physical fatigue (Krupp et al. 1988) that contains 9 statements, each scored from 0 to 7. The FSS summated score can range from a possible 9-63, where the higher the score, the greater the fatigue. The scoring algorithm defines scores of >4.0 points to indicate "fatigue", 4.1–4.9 to indicate "medium fatigue", and 5.0-7.0 "severe fatigue".

Beck Depression Inventory (BDI)

The presence and degree of depressive symptoms were assessed with the BDI (Beck and Steer 1984). The BDI consists of 21 descriptive items. Responses are scored on a scale of 0-3, with 3 indicating high symptom frequency. The total score can range between from 0 to 63. The cut-offs; 0–9 indicates that a person is not depressed, 10-16 indicates mild to moderate depression, 17-29 moderate to severe depression, and 30-63 signifies severe depression.

Statistical Analysis

Baseline demographic, socio-economic, and clinical characteristics are described as means± SD for continuous variables, and as frequency

distribution for categorical variables. Statistical significance of the differences between SD category groups was tested using student t-test for continuous variables and χ^2 test for categorical variables. Spearman correlation analysis was performed to evaluate correlations between SF-36 subscales/dimensions and ASEXs scores. Multivariate logistic regression analysis was used to identify factors that were associated with SD in both sexes. In the regression model, the ASEXs scores for male and female were considered to be dependent variables whereas age, modality of dialysis and duration, FSS score, BDI score, SF-36, physical and mental component scores, total cholesterol, Kt/V urea, and body mass

index were considered independent. After multiple regression, only the variables listed in the table were significantly associated with ASEXs scores. Two-tailed p-values of <0.05 were considered to be significant.

RESULTS

Two hundred and forty-six (246) married patients were enrolled in this paper. The ASEX$_s$ scale was responded to by 207 participants, 89 (43%) of which have HD and 118 (57%) of which have PD. The mean age was 49.3±15.8 and 47.0±14.3 yrs for PD and HD patients, respectively (Table 1). Forty-nine percent of HD pa-

Table 1: Characteristics of the patients with and without sexual dysfunction in both dialysis modalities

Various characteristics	*Type of renal replacement treatment*					
	*HD (n:89)**		*PD (n:118)** *		*Total (N:207)*	
	No SD (≤11 p) n (%)	*With SD (12-30 p) n (%)*	*No SD (≤11 p) n (%)*	*With SD (12-30 p) n (%)*	*No SD (≤11 p) n (%)*	*With SD (12-30 p) n (%)*
Gender						
Female	4 (10.3)	35 (89.7)	17 (28.8)	42 (71.2)	21 (21.4)	77 (78.6)
Male	10 (20.0)	40 (80.0)	15 (25.4)	44 (74.6)	25 (22.9)	84 (77.1)
P	.033		.502		.051	
Body Mass Index (BMI)						
Underweight	2 (15.4)	11 (84.6)	5 (33.3)	10 (66.7)	7 (25.0)	21 (75.0)
Normal	5 (13.2)	33 (86.8)	16 (31.4)	35 (68.6)	21 (23.6)	68 (76.4)
Overweight/obese	7 (18.4)	31 (81.6)	11 (21.2)	41 (78.8)	18 (20.0)	72 (80.0)
P	.819		.428		.787	
Level of Education						
Illiterate/Primary School	7 (10.4)	60 (89.6)	21 (26.3)	59 (73.8)	28 (19.0)	119 (81.0
High school /University	7 (31.8)	14 (68.2)	11 (28.9)	27 (71.1)	18 (30.0)	41 (70.0)
P	.017		.758		.085	
Age/mean ±SD	49.31±15.79	47.07±14.3	548.16±15.09			
18-44	9 (30.0)	21 (70.0)	17 (41.5)	24 (58.5)	26 (36.6)	45 (63.4)
45-64	4 (8.9)	41 (91.1)	14 (20.0)	56 (80.0)	18 (15.7)	97 (84.3)
65 and over	1 (7.1)	13 (92.9)	1 (14.3)	6 (85.7)	2 (9.5)	19 (90.5)
P	.031		.036		.001	
Underlying Kidney Disease						
Diabetes Mellitus	1 (4.2)	23 (95.8)	5 (14.3)	30 (85.7)	6 (10.2)	53 (89.8)
P	.069		.042		.008	
Hypertension	7 (14.3)	42 (85.7)	23 (27.1)	62 (72.9)	30 (22.4)	104 (77.6)
P	.603		.981		.981	
Depression	3 (9.1)	30 (90.9)	10 (19.6)	41 (80.4)	13 (15.5)	71 (84.5)
P	.187	.109	.054			
Fatigue	5 (7.7)	60 (92.3)	18 (22.8)	61 (77.2)	23 (16.0)	121 (84.0)
P	.001		.132		.001	
Duration of Dialysis	3.78±2.54	5.22±4.29	3.40±3.16	3.71±2.77	3.52±2.96	4.41±3.63
P	.098		.628		.089	
Hemoglobin (gr/dL)	12.27±5.43	11.36±1.95	11.66±1.72	11.38±1.62	11.85±3.26	11.37±1.77
P	.544	.437	.349			
KtV/Urea (weekly)	2.40±1.09	2.43±1.39	2.37±0.58	2.28±0.49	2.38±0.76	2.35±1.01
P	.931		.481		.853	

*HD: Hemodialysis, **PD: Peritoneal Dialysis

tients were men; fifty-five percent of PD patients were women. The mean duration receiving of HD was 4.8±4.0 yrs that is significant higher than the mean of time PD (3.5±2.8 yrs) (p=0.003). The other demographic and clinical characteristics for the patients with and without SD are shown in Table 1.

The overall prevalence of SD was seventy-eight percent, seventy-nine percent for females and seventy-seven for males. Eighty-four percent of the HD patients and seventy-three percent of the PD patients reported SD, but had no significance (p=0.051). Indeed, the prevalence of SD was significantly higher in the female HD group than PD group (89.5% vs 71.2%, p=0.033), but did not show significant difference in men according to treatment modality (80% vs 74.6%, p=0.502) (Table 1). Overall ASEXs score was 22.0±6.2 in female and 17.9±5.2 in male, which was significantly higher in females compared to males (p<0.001). There was no significant difference in $ASEX_S$ scores in terms of treatment modality in either gender.

For the males, the most prevalent areas of difficulty were penile erection (49.5%), followed by satisfaction (37.6%), and then arousal (34.9%). The least prevalent areas of difficulty in these

patients were desire (23.9%), followed by premature ejaculation (26.6%) (Table 2a).

The $ASEX_S$ subscale scores were similar in both HD and PD male patients. The most prevalent area of severe difficulty for men in both groups was penile erection (3.90±1.47 vs 4.20±1.30, respectively) followed by arousal for HD (3.58±1.39), and satisfaction for PD (3.48±1.70) patients. Other points for HD and PD groups were shown in Table 2a. Total ASEXs score was significantly higher in women with HD compared to counterparts with PD. For women in the HD group, the most prevalent areas were severe difficulty with orgasm (4.58±1.37) and desire (4.58±1.49), followed in PD group by arousal (4.73±1.37) and desire (4.40±1.32). The $ASEX_S$ domain scores have not shown a significant relation according to dialysis modality (Table 2b).

In this paper prevalence of depression and fatigue was forty-one percent and sixty-seven percent, respectively. The rate of SD was higher in depressed patients than those who had a healthy mental status, which was not significant in both groups (84.5% vs 73.2%, p=0.054). However, prevalence of SD was significantly higher in tired patients than those who had no

Table 2a: Comparison of dialysis male patients according to received scores from Arizona sexual experiences scale

ASEX domains	Overall prevalence of SD		HD Patients with SD (n:40)	PD Patients with SD (n:44)	P
	N	%	Mean±SD	Mean ±SD	
Total	84	77.1	17.57±5.25	18.20±5.34	>.05
Desire	26	23.9	3.34±1.37	3.31±1.37	>.05
Arousal	38	34.9	3.58±1.39	3.54±1.57	>.05
Penile erection	54	49.5	3.90±1.47	4.20±1.30	>.05
Premature ejaculation	29	26.6	3.07±1.58	3.15±1.41	>.05
Satisfaction	41	37.6	3.48±1.70	3.84±1.47	>.05

Table 2b: Comparison of dialysis female patients according to received scores from Arizona sexual experiences scale

ASEX domains	Overall prevalence of SD		HD Patients with SD (n:40)	PD Patients with SD (n:44)	P
	N	%	Mean±SD	Mean ±SD	
Total	76	78.4	22.82±6.38	21.47±6.21	.35
Desire	49	50.5	4.58±1.49	4.40±1.32	>.05
Arousal	53	54.6	4.73±1.37	4.40±1.39	>.05
Vaginal lubrication	48	49.5	4.41±1.55	4.14±1.42	>.05
Orgasm	56	57.7	4.58±1.37	4.30±1.50	>.05
Satisfaction	47	48.5	4.50±1.58	4.21±1.60	>.05

fatigue (84% vs 63.5%, p=0.001) (Table 2b). Exclusively, in HD group, the rate of SD in females expressing tiredness was significantly higher (100% vs 60%, p<0.001).

There were no significant differences on HRQoL between the two dialysis modalities, solely Role emotional was significantly lower in PD patients than the HD ones (p=0.03). The HRQoL score of patients with and without SD are shown in Table 3. Physical component summary (PCS) scores were slightly lower in patients with SD compared to subjects who had healthy sexual function in both groups (p=0.001, p<0.001, respectively). Patients with SD scored poorer in most aspects representing physical health and QoL in both groups. In the HD group PF (p=0.005), GH (p<0.001) and VT (p=0.019); in PD group PF (p=0.032), RP (p<0.001), BP (p=0.003) scores were significantly lower in patients with

SD. Mental component summary (MCS) scores were not associated with SD in both treatment groups (p>0.05), except for RE. A significant difference was found in most domains representing mental HRQoL in the PD group. SF (p=0.025), MH (p=0.003), VT (p<0.001) and aspect in general health perceptions (p=0.015).

Linear correlation outcomes regarding ASEXs and HRQoL scores in end stage renal disease patients were shown in Tables 4a and 4b.

Erectile dysfunction was inversely correlated with PF, RE, and MH scores in male patients. The severity of ED, arousal and lack of desire increased as the score of SF-36 physical function decreased. The summary component mental showed a significantly negative association with ED than the physical component summary (p<0.05).

Table 3: Comparison of SF-36 scale scores in patients with and without sexual dysfunction in both dialysis modalities (n: 207)

SF-36 Subscales	HD			PD		
	With SD (n:75) Mean±SD	No SD (n:14) Mean±SD	P	With SD (n:86) Mean ±SD	No SD (n:32) Mean ±SD	P
RP	47.11± 44.40	55.35± 48.21	.560	41.86± 46.40	62.50± 44.90	.032
PF	50.00± 31.98	73.21± 24.38	.005	48.25± 28.88	68.70± 24.78	<.001
BP	60.77± 36.51	75.35± 29.40	.117	62.70± 36.43	80.68± 24.26	.003
GH	40.50± 19.67	62.71± 16.80	<.001	38.54± 24.78	50.59± 22.74	.015
VT	43.40± 21.82	62.85± 26.36	.019	44.53± 25.77	63.43± 20.25	<.001
SF	49.44± 43.67	52.38± 36.31	.791	59.30± 34.57	73.04± 26.58	.025
RE*	61.00± 31.23	71.42± 33.40	.294	58.09± 24.03	57.29± 46.55	.345
MH	54.88± 20.24	62.85± 19.30	.175	58.09± 24.03	69.87± 15.70	.003
PCS	38.42± 10.35	47.06± 6.85	.001	37.14± 11.13	45.23± 8.91	<.001
MCS	40.49± 9.71	44.25± 10.03	.269	42.20± 11.65	46.72± 10.81	.053

Table 4a: Spearman correlation coefficients to determine the relation between SF-36 and ASEXs scores in male

SF-36 subscale and dimension scores	ASEXs domain scores					
	Total	Desire	Arousal	Penile erection	Premature ejaculation	Satisfaction
RP	-.137	-.113	-.061	-.061	-.127	-.085
PF	-.295**	-.223*	-.228*	-.344**	-.158	-.148
BP	-.153	-.113	-.071	.019	.101	-.050
GH	-.088	-.075	.053	-.159	-.092	-.050
VT	-.171	-.157	-.087	-.279	-.056	-.076
SF	-.138	-.095	-.065	-.060	-.091	-.192
RE	-.217*	-.134	-.075	-.247**	-.074	-.196
MH	-.214*	-.147	-.141	-.296**	-.036	-.173
PCS	-.170	-.183	-.134	-.196	-.113	-.012
MCS	-.199	-.145	-.093	-.264*	-.033	-.175

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed),

Table 4b: Spearman correlation coefficients to determine the effect of the SF-36 scales on ASEX in female

SF-36 subscale and dimension scores	ASEXs domain scores					
	Total	Desire	Arousal	Penile erection	Premature ejaculation	Satisfaction
RP	-.194**	-.359**	-.300**	-.293**	-.145	-.165
PF	-.356**	-.415**	-.413**	-.347**	-.339**	-.276**
BP	-.205**	-.153	-.155	-.122	-.175	-.205**
GH	-.248**	-.239*	-.256*	-.246*	-.128	-.137
VT	-.250**	-.227*	-.199	-.186	-.145	-.135
SF	-.169*	-.326**	-.298**	-.208*	-.218*	-.168
RE	-.139*	-.174	-.195	-.104	-.043	-.045
MH	-.199**	-.166	-.147	-.148	-.119	-.099
PCS	-.339**	-.394**	-.363**	-.334**	-.271**	-.267**
MCS	-.152*	-.178	-.160	-.133	-.063	-.051

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed)

Desire, arousal, vaginal lubrication, orgasm, and satisfaction scores were inversely correlated with PF scores in female patients. Similarly SF-36 RP scores were related with impaired sexual function in desire, arousal, and vaginal lubrication scores.

Multivariate logistic regression analysis showed that factors such as old age (OR: 1.056 (1.022-1.090), p=0.001), lower scores of PCS (OR: 0.944 (0.903-0.986), p=0.009), and receiving hemodialysis (OR: 2.486 (1.129-5.476), p=0.024) were correlative with SD independent of the dialysis modality (Table 5).

DISCUSSION

Sexuality is one of the basic needs of humankind and is an important component of physical, psychological, and social life. In ESRD patients, sexual functions may deteriorate depending on chronic renal failure, the type of treatment and its complications. There is a reciprocal relationship between sexual life and health related quality of life. The disease itself, renal replacement treatment, and sexual dysfunction leads to an impaired quality of life in ESRD patients by creating a combined risk.

In this paper, high prevalence of SD was found among PD and HD patients, which was similar to that reported in previous studies (Strippoli et al. 2012; Mor et al. 2013; Seethala et al. 2010). Seethala et al. (2010) found eighty percent in overall prevalence, Strippoli et al. (2012) suggested that eighty-four percent of women with HD have SD. Mor et al. (2013) noted a low level of sexual activity among female patients, eighty-one percent of women reported that they were not sexually active. Recent literature (Navaneethan et al. 2010; Vecchio et al. 2012; Stauffer and Fan 2014; Edey 2017) has shown that SD is a complex problem and numerous factors such as depression, poor health, QoL, hormonal imbalance, obesity, diabetes, aging, and dialysis modality is associated with it. In this paper, when

Table 5: Predictors of sexual dysfunction at baseline by univariate and multiple binary logistic regressions in both sexes

Predictive variable	Gender					
	Female		Male		Total	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Age	1.117 (1.041-1.198)	0.002*	1.039 (1.000-1.079)	0.050*	1.056 (1.022-1.090)	0.001*
PCS	0.923 (0.870-0.981)	0.009*	0.922 (0.869-0.979)	0.007*	0.944 (0.903-0.986)	0.009*
MCS	0.945 (0.893-0.999)	0.047*	-	-	-	-
HD	-	-	-	-	2.486 (1.129-5.476)	0.024*

Note: OR: Odds ratio, CI: confidence interval
*p < 0.05; p > 0.05 are expressed as "–".
PCS: Physical component summary, MCS: Mental component summary, HD: receiving hemodialysis

modality of dialysis affect on SD was considered; despite no significant difference between HD and PD groups in terms of prevalent of SD (p=0.051), but logistic regression analysis revealed that receiving HD was the major predictor for SD and it increased 2.5 fold suffering to SD (p=0.024). The previous researchers (Kettas et al. 2010; Seethala et al. 2010; Basok et al. 2009; Turkmen et al. 2012) that examined the relationship between SD and modality of dialysis also reported patients receiving HD were considerably more (five to seven times, p=0.001, p=0.02) likely to have SD than patients on PD, in accordance with present paper findings. In this paper, sexual problems were significantly associated with less education (p=0.017), older age (≥65, p=0.001), diabetes mellitus (p=0.008), and fatigue (p=0.001) in both treatment groups and were similarly found in previous papers (Arslan et al. 2002; Grandjean et al. 2007; Kettas et al. 2010; Navaneethan et al. 2010; Seethala et al. 2010; Strippoli et al. 2012; Vecchio et al. 2012) findings. In accordance with these studies, in this paper, age was a predictive factor associated with SD and older age increased 1.0 fold sexual problems regardless of the type of dialysis (p=0.001). In this paper, patients with fatigue were more likely to suffer from SD than subjects who had no fatigue (p=0.001). This difference is significantly more prominent in women with HD (p<0.001). In addition, it is more pronounced in women. Total ASEXs scores were positively correlated with FSS in both genders (p=0.01 and p=0.04). Some studies indicated that fatigue has a direct effect on SD, particularly by creating hypoactive sexual desire. Consistent with present paper results, Gilhooly et al. (2001) showed that SD is more prevalent in women with chronic fatigue (p<0.02). Blazquez et al. (2009) found that eighty-eight percent of women with chronic fatigue syndrome presented with one or more sexual problems as compared to their counterparts without fatigue. Similarly, researchers have indeed found higher prevalence of depression in patients with SD in both treatment modalities, though it did not show statistical significance. However, total ASEXs scores were significantly associated with BDI scores (p=0.001 and p=0.01). In various studies (Kurdoglu et al. 2012; Vecchio et al. 2012; Azevedo et al. 2014) depression is a common clinical problem in those receiving dialysis and an significant risk factor for SD (Gilhooly et al. 2001; Kurdoglu et al. 2012) and these

dimensions have reciprocal relationships (Azevedo et al. 2014). Sexual concerns can cause anxiety in relationships and lack of self-confidence, depression, lack of commitment to the relationship with caregiver, and deteriorating relations (Noroozi et al. 2015).

In this paper, SD was also widespread in each gender, but it was seen as a more common problem in females on HD compared to peers of PD (p=0.033). Previous investigations (Toorians et al. 1997; Strippoli et al. 2012; Mor et al. 2013; Azevedo et al. 2014) have also reported higher prevalence of SD in women maintaining HD (from 81 to 100%) than PD (from 67 to 94%) similarly with this paper results. Notably, Kettas et al. (2008) reported that female patient HD were five times more likely to encounter problems with SD than the women patients on PD.

This paper demonstrated that the most common disturbances in men is erectile dysfunction (ED). This finding is consistent with many other studies (Arslan et al. 2002; Vecchio et al. 2012; Esen et al. 2015) which determined the prevalence of ED in men between forty-one and ninety-three percent from different cultures. The researchers found that the most common disturbances in women are decreased orgasm (57.7%) and arousal (54.6%). In earlier studies (Basok et al. 2009; Song et al. 2009; Seethala et al. 2010) in line with this paper results, difficulties with arousal and reaching orgasm were the most frequent cause of dysfunction in women which suggested that between sixty percent and one-hundred percent were chronic renal failure patients.

This paper found that there was no statistically significant difference between HD and PD patients in terms of HRQoL score; however SD is strongly associated with impaired QoL in each treatment modality. Patients with SD had lower scores in most domains of SF-36 especially in the aspect of physical health which is in consistence with other studies (Basok et al. 2009; Weisbord 2013; Theofilou 2011; Azevedo et al. 2014). These patients had worse physical function, more physical role limitation and more frequent bodily pain, and lacked vitality. In this paper, multivariate further analysis confirm that SD was closely associated with a lower physical health-related QoL, in both sexes. The $ASEX_S$ scores correlated negatively with the physical component summary (PCS) score (p=0.009) and positively with older age (p=0.001) regardless of dialysis modality.

In addition, when the PD group was compared to the HD one, a more compromised QoL (except for RE) in all domains of both physical and mental health were found. In the PD group, the researchers found that aspect of mental health seemed correlative with SD, which is expected. Also, mood disorder was a predictive factor in impaired sexual function, in line with one paper (Santos et al. 2013). Furthermore, this paper result is in concordance with previous papers (Turk et al. 2004; Basok et al. 2009) in terms of the domains of the SF-36 showing significant inverse correlations with all the ASEXs domain scores in women. Similarly, difficulty with penile erection, which was most commonly seen in men, was negatively correlated with physical function and mental health QoL scores (Turk et al. 2004; Basok et al. 2009).

CONCLUSION

In general, in this paper, sexual dysfunction is a common problem in both sexes. Erectile dysfunction and difficulty reaching orgasm were the most common self-reported dysfunctions by male and female. The physical health QoL remarkably deteriorated in patients with SD in two dialysis modalities. The results of the multivariate regression analysis indicated that older age, impaired physical health, QoL, and receiving HD were major predictors for SD in both sexes. Sexual dysfunction is a modifiable risk factor and strengthening sexual function with support, hormones, psychological assistance, and pharmacologicals, may cure impaired HRQoL. Healthy sexuality contributes to improving an individual's quality of life.

HEAD APPENDIX

HD: Hemodialysis
PD: Peritoneal Dialysis
SD: Sexual Dysfunction
ASEXs: Arizona Sexual Experiences Scale
FSS: Fatigue Severity Scale
BDI: Beck Depression Inventory
BMI: Body Mass Index
KtV/Urea: Weekly Urea
HRQol: Heath-related Quality of Life
SF-36: Short Form 36
RP: Role limitations-Physical
PF: Physical Function
BP: Bodily Pain

GH: General Health
VT: Vitality
SF: Social Function
RE: Role limitations-Emotional
MH: Mental Health
PCS: Physical Component Summary
MCS: Mental Component Summary
OR: Odds Ratio
CI: Confidence Interval

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