Sexual Dysfunction in Female Hemodialysis Patients: A Cross Sectional Study in Iran

Seyed Mansour Gatmiri[1], Marjan Bordbar[2], Firoozeh Raisi[3], Anahid Nourian[4]

[1] *Nephrology Research Center, Center of Excellence in Nephrology, Tehran University of Medical Sciences, Tehran, Iran*

[2] *Department of Internal Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

[3] *Roozbeh Psychiatric Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[4] *Department of Clinical Pharmacy, School of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*

Received: 08 Aug. 2018; Accepted: 28 Dec. 2018

Abstract- There has been little attention to sexual dysfunction (SD) in women undergoing hemodialysis (HD), therefore few studies are found in this field. The aim of this study was to determine the incidence of SD, assess its association with biochemical factors, employment and educational status, economic situation, depression, anxiety, and medication. End stage renal disease (ESRD) married women aged 18 to 60 years presenting to Tehran University of Medical Sciences (TUMS) hospitals' (Imam Khomeini, Sina, and Baharloo) from April to September 2017 were included in the study. Female Sexual Function Index (FSFI) questionnaire was used to evaluate SD. Patients were divided into two groups with SD (scores≤28) and without SD (scores>28). Hospital Anxiety and Depression Scale (HADS) questionnaire was used to investigate anxiety and depression; patients with scores equal to or more than 11 were implied as depressed or anxious. Demographic data, duration of dialysis, ESRD causes and biochemical tests were also collected. Thirty patients (81.1%) out of 37 showed SD who were older, had lower educational and economic status, had higher hemoglobin levels and used erythropoietin products and Venofer® (iron sucrose injection) less; most of these patients were housewives. The incidence of SD among patients was high. Erythropoietin and Venofer use was less frequent in patients with SD compared to the other group. This suggests that these two products have a role in treatment of SD rather than the treatment of anemia.

Acta Med Iran 2019;57(4):244-252.

Keywords: ESRD; HD; SD; Erythropoietin; Venofer; Sexual dysfunction

Introduction

In end stage renal disease (ESRD), glomerular filtration rate (GFR) irreversibly falls to less than 15 ml/min/1.73 m^3. ESRD can lead to death unless renal replacement therapy (RRT) is performed; of which hemodialysis (HD) is one of the most prevalent ways (1). The incidence of sexual dysfunction (SD) in HD women is 25%-64% in the world (2,3). Studies conducted in Iran have shown 27.3% incidence of SD among female HD patients (4). Different factors can cause SD including hormonal disorders, neurologic and vascular diseases, psychosocial factors and medication (5,6). Epidemiological studies show that one third of HD women have decreased libido and near one forth do not experience orgasm (7). Sexual function among male HD patients has been fully investigated (8) but studies on sexual complications in women are limited. There are 21 meta-analyses assessing SD in men and only 2 in women; seemingly there is more SD in female patients based on the fewer conducted studies (9). The aim of this study was to investigate the factors affecting sexual function in female HD patients and try to control them.

Materials and Methods

All female HD patients presenting to Imam Khomeini, Sina and Baharloo hospitals aged 18 to 60 years who had been married for at least 6 months and had lived with their husbands most of the time were included in the study. Patients whose husbands had sexual problems were excluded. All these criteria were

Corresponding Author: S.M. Gatmiri*, M. Bordbar**
* Nephrology Research Center, Center of Excellence in Nephrology, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 21 61192679, Fax: +98 21 66581568, E-mail address: gatmiri@tums.ac.ir
** Department of Internal Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 2161192679 Fax: +98 2166581568 E-mail address: bordbar.marjan63@gmail.com

assessed by the internal medicine resident. All the patients were receiving HD for at least three months. Patients were followed for 6 months from April to September 2017 and their data were collected during this time. None of the patients had any signs of psychiatric diseases, infections or complications of acute uremia. Biochemical and hematologic parameters, dialysis adequacy (Kt/V), underlying causes of renal failure, duration of HD and demographic information including age, number of children, educational and employment status, economic situation and medications including erythropoietin and Venofer were recorded. Informed consent form were filled out by all the patients.

Hospital Anxiety and Depression Scale (HADS) and Female Sexual Function Index (FSFI) questionnaires were used to evaluate depression and anxiety and sexual function, respectively. FSFI questionnaire consisted of 19 questions in 6 domains: desire, arousal, lubrication, orgasm, global satisfaction, and pain (10). The maximum score for each domain was 6; scores equal to or less than 28 were indicative of SD.

HADS questionnaire consisted of 7 questions in each field (anxiety and depression) with 0-3 scores for each question (4). Minimum and maximum scores were 0 and 21 in each field, respectively. Patients were divided into three groups: normal (scores 0-7), borderline (scores 8-10) and ill (depressed or anxious) (scores 11-21).

Each patient independently filled out the forms and explanations were given to the patients in case of any obscurities about the questions.

Statistical analysis

Data were analyzed using SPSS software version 18. Chi-Square Test and Paired Sample T-Test were used to analyze qualitative and quantitative parameters, respectively. Fisher's Exact Test was also used if necessary. These tests were performed to evaluate the factors affecting sexual function. $P<0.05$ was considered statistically significant. All HD patients in this study were females who were divided into two groups based on presence or absence of SD. The following parameters were analyzed: age, HD duration, diabetes mellitus (DM), hypertension (HTN), ESRD causes, calcium (Ca), phosphorus (P), albumin, hemoglobin (Hgb), C- reactive protein (CRP), serum creatinine (sCr), uric acid, ferritin, thyroid stimulating hormone (TSH) and intact parathyroid hormone (iPTH) levels, frequency and doses of erythropoietin and Venofer injections, FSFI and HADS scores, demographic information.

Results

Forty two patients presenting to Imam Khomeini, Sina and Baharloo hospitals were eligible to enter the study. Five patients were excluded due to husband's sexual problems (4 patients) and unwillingness for participation (1 patient). Thirty seven HD women entered the study after filling out the informed consent form. Patients were aged 25 to 60 years with the average of 49-year-old. Of these patients, 34 were housewives and 3 were employed. Six patients had educated for 12 years, 20 had educated less than 12 years and 4 had academic educations. Six patients had family incomes below 10 million, 30 had 10 to 30 million and 1 had more than 30 million rials per month. Based on HADS scores 13, 6 and 18 patients were in the normal, borderline and ill (depressed or anxious) group, respectively. Demographic data including age, number of children, educational, employment and economic status and history of psychiatric illnesses were evaluated. Patients were divided into two groups (scores ≤28 and >28 indicating presence and absence of SD, respectively) based on FSFI criteria.

Incidence of sexual dysfunction

Thirty out of 37 patients (81.1%) had SD (Figure 1).

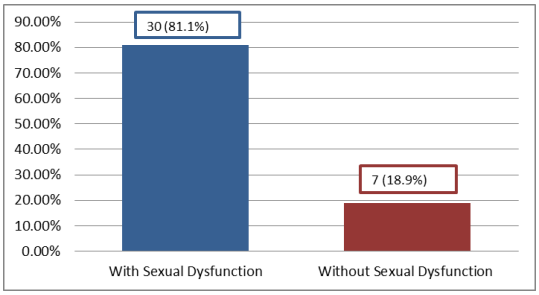

Figure 1. Distribution of sexual dysfunction

Age distribution in sexual dysfunction

Age of patients with SD and without SD was 51.57±9.59 and 42.86±12, respectively ($P=0.04$). There was a statistically significant difference in age between the two groups; sexual performance declined with age.

Employment status and sexual dysfunction

Patients with SD were mostly (96.7%) housewives and only 3.3% were employed; 71.4% of patients without SD were also housewives (Figure 2). There was a meaningful correlation between employment status and sexual function in patients ($P=0.05$); SD was significantly higher in housewives.

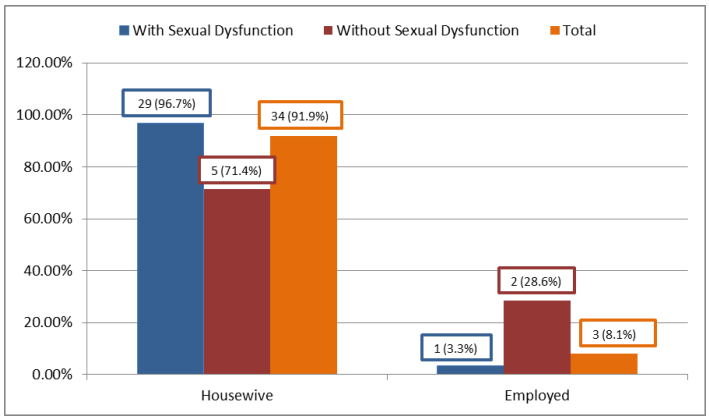

Figure 2. Employment distribution in sexual dysfunction

Educational status and sexual dysfunction

Eighty three percent of patients with SD had educated less than 12 years, 13.3% had educated for 12 years and 3.3% had academic educations; 28.6% of patients in the other group had educated less than 12 years, 28.6% had educated for 12 years and 42.9% had academic educations, respectively (Figure 3). There was a statistically significant difference in educational status between the two groups (*P*=0.005); patients without SD had educated more than those with SD.

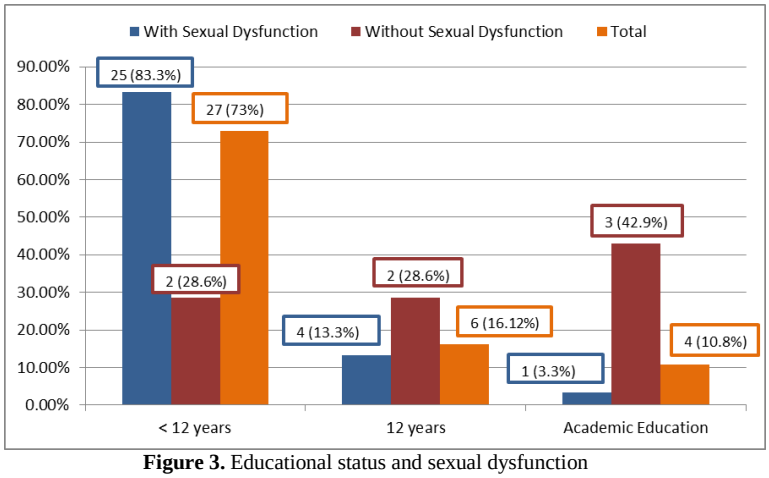

Figure 3. Educational status and sexual dysfunction

Economic status and sexual dysfunction

Family income in patients with SD was mostly (80%) 10 to 30 million rials and 20% had incomes below 10 million. None of them had incomes more than 30 million rials. In the other group no family had incomes below 10 million; 85.7% and 14.3% had incomes 10 to 30 million and more than 30, respectively (Figure 4). A statistically significant difference in economic status between the two groups showed higher sexual dysfunction with lower incomes (*P*=0.05).

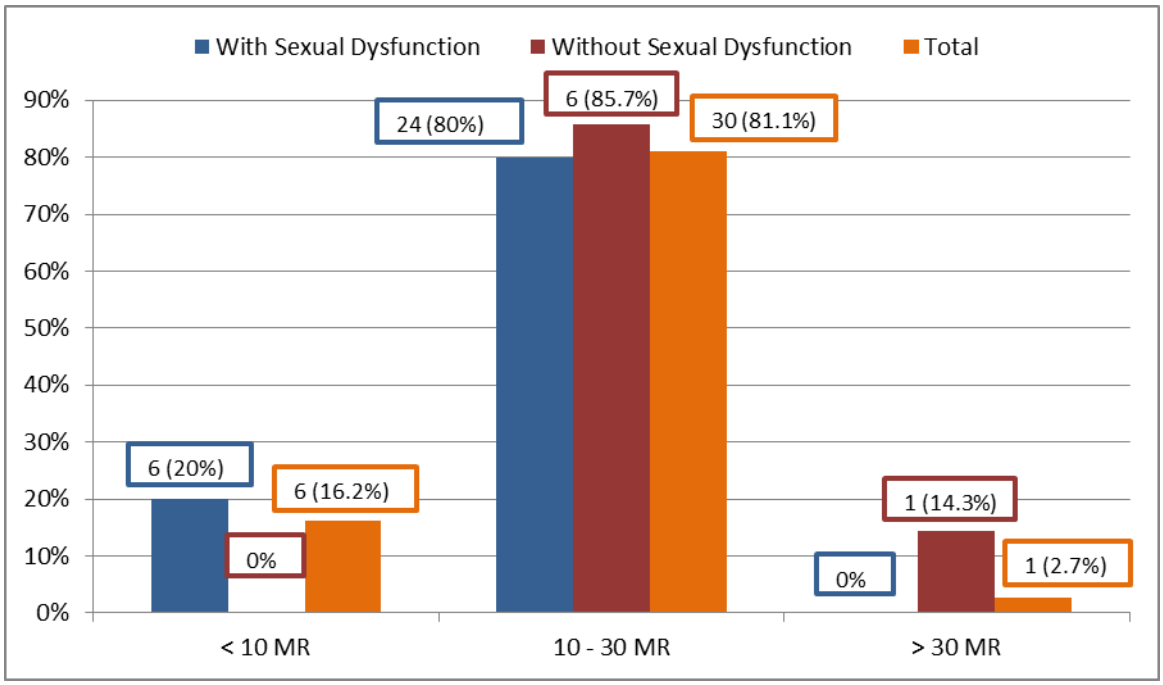

Figure 4. Economic status distribution and sexual dysfunction; MR, million rials

Hemoglobin levels and sexual dysfunction

Hgb levels in patients with and without SD were 11.11±1.84 gr/dl and 9.43±2.29 gr/dl, respectively. There was a significant correlation between Hgb levels and SD (P=0.04); patients with SD had higher Hgb levels than the other group.

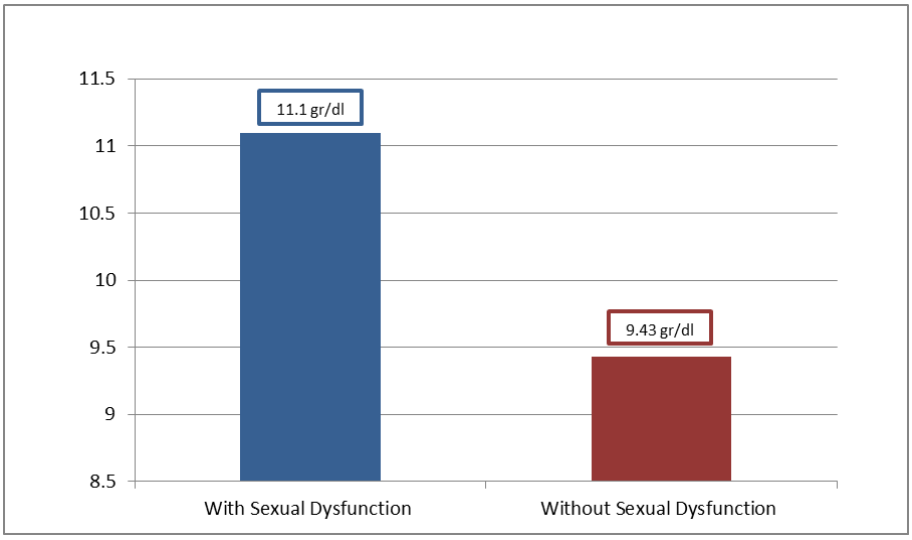

Figure 5. Hgb level distribution in sexual dysfunction

Erythropoietin use and sexual dysfunction

Eighty percent of patients with SD used erythropoietin (16.7% weekly, 46.7% twice weekly and 16.7% three times a week). In the other group 14.3% and 85.7% injected erythropoietin products twice weekly and three times a week, respectively (Figure 6, Table 1). We observed a statistically significant difference in erythropoietin use between the groups with and without SD (P=0.005).

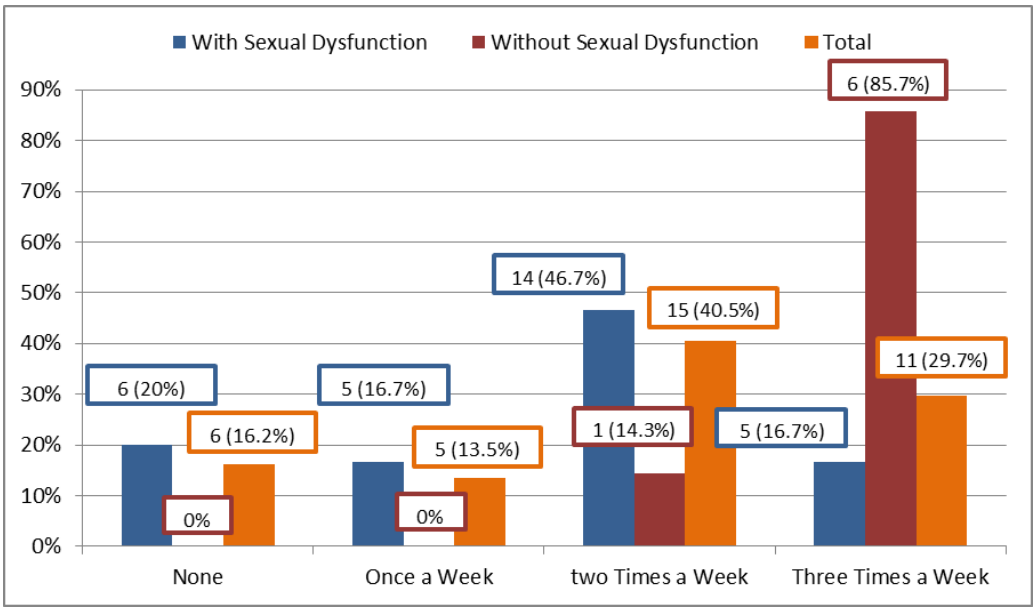

Figure 6. Erythropoietin use distribution in sexual dysfunction

Venofer Use and Sexual Dysfunction

Thirty percent of patients with SD did not use Venofer; 50% and 20% had every other week and weekly Venofer injections, respectively. All patients without SD used Venofer once a week (Figure 7, Table 1). Venofer use significantly declined the rate of SD (P=0.001).

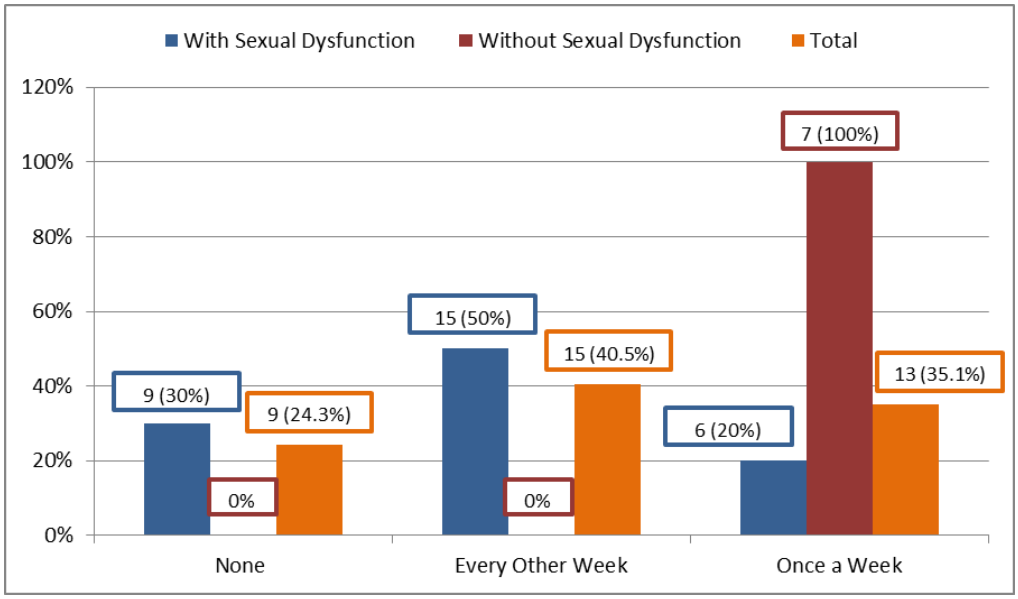

Figure 7. Venofer use distribution in sexual dysfunction

Depression and anxiety and sexual dysfunction

Based on HADS scores 33.3%, 13.3% and 53.3% of patients with SD and 42.9%, 28.6% and 28.6% without SD were in normal, borderline and ill categories, respectively (Table 1). No meaningful correlation was found between anxiety and depression and SD (P=0.4). It seems that a relation can be found between these factors but larger population size is needed.

Table 1. Erythropoietin and Venofer use and depression and anxiety in sexual function

	Erythropoietin (*P*=0.005)				Venofer (*P*=0.001)			HADS (*P*=0.4)		
	None	Once a Week	Twice a Week	Three Times a Week	None	Every Other Week	Once a Week	Normal	Borderline	Depressed or Anxious
With SD (≤28)	6	5	14	5	9	15	6	10	4	16
	20%	16.7%	46.7%	16.7%	30%	50%	20%	3.33%	13.3%	53.3%
Without SD (>28)	0	0	1	6	0	0	7	3	2	2
	0	0	14.3%	85.7%	0	0	100%	42.9%	28.6%	28.6%
Total	6	5	15	11	9	15	13	13	6	18
	16.2%	13.5%	40.5%	29.7%	24.3%	40.5%	35.1%	35.1%	16.2%	48.6%

SD, sexual dysfunction; HADS, hospital anxiety and depression scale

Duration of hemodialysis and sexual dysfunction

Duration of HD in patients with and without SD was 4.9±4.7 and 4.5±6.4 years, respectively (Table 2). There was no statistically significant difference in duration of HD between the two groups (*P*=0.8).

Table 2. Laboratory Parameters and underlying diseases in sexual function

	With SD	Without SD	Total
Duration of HD (*P*=0.8)	4.9/4.7	4.5/6.4	-
Uric Acid (*P*=0.5)	6.62/1.46	6.96/1.22	-
Ferritin (*P*=0.4)	499/360	381/448	-
TSH (*P*=0.6)	2.17/1.26	2.39/0.54	-
Kt/V (*P*=0.3)	1.41/0.23	1.31/0.36	-
iPTH (*P*=0.7)	468/523	396/137	-
CRP (*P*=0.4)	9/7.89	6.86/3.24	-
P (*P*=0.2)	5.89/1.37	6.6/1.5	-
Ca (*P*=0.9)	8.83/0.77	8.73/0.38	-
sCr (*P*=0.1)	3.84/0.9	3.24/0.63	-
Hgb (*P*=0.04)	11.11/1.84	9.43/2.29	-
PCKD (*P*=0.2)	1	1	2
	3.3%	14.3%	5.4%
Proteinuria (*P*=0.03)	0	2	2
	0	28.6%	5.4%
Idiopathic (*P*=0.3)	4	0	4
	13.3%	0	10.8%
HTN (*P*=0.4)	13	2	15
	43.3%	28.6%	40.5%
DM (*P*=0.5)	12	2	14
	40%	28.6%	37.8%

SD, sexual dysfunction; HD, hemodialysis; TSH, thyroid stimulating hormone; iPTH, intact parathyroid hormone; CRP, C-reactive protein; P, phosphorus; Ca, calcium; sCr, serum creatinine; Hgb, hemoglobin; PKD, polycystic kidney disease; HTN, hypertension; DM, diabetes mellitus.

Diabetes mellitus and sexual dysfunction

Among 37 patients in the study, 37.8% in the SD group and 40% in the other group had diabetes (Table 2). There was no statistically significant difference in diabetes between the two groups (*P*=0.5).

Hypertension and sexual dysfunction

HTN was seen in 40.5% and 43.3% of patients with and without SD, respectively (Table 2). There was no statistically significant difference in HTN between the two groups (*P*=0.4).

End-stage renal disease and sexual dysfunction

Out of 37 patients, 4 with idiopathic ESRD and one with polycystic kidney disease had SD. None of the patients with proteinuria had SD.

Laboratory parameters and sexual dysfunction

There was no significant correlation between parameters like sCr, Ca, P, uric acid, ferritin, TSH, CRP,

iPTH and Kt/V and SD (Table 2).

Discussion

The incidence of sexual dysfunction (SD) among hemodialysis (HD) women was high in our study (81.1%). Our findings were close to Seethala *et al*., (11) who studied 66 female HD patients of whom 80% had SD. A systematic review by Navaneethan *et al*., (9) estimated the prevalence of SD among HD women to be 30%-80%. Kettas *et al*., (12) observed that age was the most important risk factor for SD. Lacovedes *et al*.; (13) and Peng *et al*., (14) also found a significant correlation between age and SD in HD women which was similar to our study (*P*=0.04). Age of patients in our study was 51.57±9.59 and 42.86±12 in patients with and without SD, respectively.

Five patients (17.4%) with SD and 29 (96.7%) without SD were housewives in our study; 2 patients (28.6%) with SD and 1 (3.3%) without SD were employed; SD was significantly lower in employed women (*P*=0.05). According to Giovanni (15) 34 (56.7%) patients out of 60 who were employed had SD and 26 (43.3%) did not show SD. Among 131 unemployed patients, 95 (72.5%) had SD. He found a relation between employment and SD.

Twenty five (83.3%), 4 (13.3%), and 1 (3.3%) patients with SD had educated less than 12 years, had educated for 12 years and had academic educations, respectively; 2 (28.6%), 2 (28.6%) and 3 (42.9%) patients without SD had educated less than 12 years, had educated for 12 years and had academic educations, respectively. We found a correlation between educational status and SD in HD patients (*P*=0.005). Giovanni (15) also found the same results; from 304 patients educated less than 5 years, 273 (89.8%) had SD. Of the 233 patients educated 5 to 8 years 193 (82.2%) had SD. Sixty-three patients (70%) out of 90 with more than 8 years education had SD. He found that with lower educational status, patients had more SD. According to Lessan-Pezashki *et al*., (16) educated patients had better sexual function compared to non-educated ones (*P*=0.01, *P*=0.03).

In our study family income of 6 patients (20%), 24 (80%) and none with SD was less than 10 million, 10 to 30 million and more than 30 million rials, respectively. In the group of patients without SD, family income of 6 patients (85.7%) and 1 (14.3%) was 10 to 30 million and more than 30 million rials, respectively and no family had income less than 10 million in this group. We observed that SD had a correlation with family income and it would be less with higher incomes (*P*=0.05). In contrast, Santos (17) concluded that no correlation existed between economic status and SD. He divided the patients into 4 economic groups; B, C, D, E. One out of 3 patients in group B and 20 out of 24 patients in group C had SD. In group D and E 21 out of 26 patients and 4 out of 5 patients reported SD, respectively. No statistically significant difference was found in economic status between the 4 groups.

We couldn't find any correlation between HTN and DM and SD unlike Altunoglu (18). Giovanni (15) also didn't observe a correlation between these factors and SD.

Hgb levels in patients with and without SD were 11.11±1.84 and 9.43±2.23 respectively in our study. A meaningful correlation was found between Hgb levels and SD (*P*=0.04). The higher level of Hgb was associated with higher rate of SD in our study. In contrast, Asadifard (19) showed that SD was higher with lower Hgb levels; low Hgb levels were a risk factor for SD. Santos (17) reported that Hgb level was not a risk factor for SD in patients with Hgb levels of 9.4±2 and 9.7±1.7 in groups with and without SD, respectively (*P*=0.65).

In our study, sCr levels were 3.84±0.9 and 3.24±0.63 in patients with and without SD, respectively. No correlation was found between sCr levels and SD (*P*=0.1). According to Altunoglu (20) there was a significant difference in sCr levels between the control (sCr=0.9 mg/dl), peritoneal dialysis (9.525), HD (9.3) and kidney transplant (1.3) groups. Patients with higher sCr values had more SD (*P*=0.05). In contrast, Santos (17) couldn't find any correlation between sCr and SD. According to Azevedo *et al*., (20) sCr levels were 8.6 mg/dl and 9.9 mg/dl in HD women with and without SD, respectively. There was no statistically significant difference in sCr levels between the groups (*P*=0.09).

There was no correlation between Ca and TSH levels and SD in our patients. Altunoglu (18) also didn't find Ca**P* and TSH levels in a significant correlation with SD. Azevedo (20), unlike us, showed a correlation between P levels and SD.

CRP, iPTH and ferritin levels were comparable between the two groups in our study. Conversely, Altunoglu (18) showed a significant correlation between these factors and SD.

Kt/V values were not significantly different between the groups in our study. A Study by Neto *et al*., (21) in male HD patients showed that erectile dysfunction was higher with Kt/V≥1.34. In this study, patients with 1.29±0.2, 1.3±0.3 and 1.51±0.6 Kt/V values had mild,

moderate and complete erectile dysfunction, respectively. Peng *et al*., (14) divided female HD patients into two groups: Kt/V values ≥1.2 and <1.2. There was no statistically significant difference in FSFI scores between the groups. Santos (17) also couldn't find a correlation between Kt/V values and SD (1.9±0.03 and 1.9±0.4 in patients with and without SD, respectively).

Duration of HD was comparable between the two groups in our study, similar to a study by Santos (17). Six patients with SD (20%) didn't use erythropoietin in our study. Five (16.7%), 14 (46.7%) and 5 (16.7%) patients with SD used erythropoietin weekly, two and three times a week, respectively. In the group of patients without SD, 6 (85.7%) and 1 (14.3%) patients used erythropoietin three and two times a week, respectively. SD was reversely correlated to erythropoietin use in patients (P=0.005). Similarly in a study by Sezgin *et al*., (22) erythropoietin use had a positive effect on sexual performance in chronic kidney disease (CKD) patients. Resics *et al*., (23) also conclude that increase in Hgb levels due to erythropoietin use led to better sexual function in female HD patients; but he didn't find a correlation between erythropoietin use and sex hormones.

Patients using Venofer had significantly lower SD in our study (P=0.001). Among patients with SD, 9 (30%) patients didn't use Venofer; 50 (50%) and 6 (20%) patients used Venofer every other week and weekly, respectively. All patients without SD used Venofer once a week.

In our study, SD was not related to HADS score. Ten (33.3%), 4 (13.3%) and 16 (53.3%) patients with SD and 3 (42.9%), 2 (28.6%) and 2 (28.6%) patients without SD were normal, borderline and ill based on HADS scores, respectively. Seethala (11) results were similar to ours. In contrast, Peng *et al*., (14,24) and Lew-Starowicz *et al*., (25) showed a correlation between depression and SD. One study has also shown that depression and anxiety have negative effects on mental and physical health in HD patients that can lead to SD (26).

Regarding the high incidence of SD among female HD patients and its consequences including depression and anxiety, loss of self-confidence, reduction in quality of life, marital problems and divorce, it is pivotal to pay attention to this aspect of patient's life especially females and to identify the problems in each visit. Our results also show the role of erythropoietin and Venofer use in improving sexual function other than their effect in correcting anemia.

There were differences in some laboratory parameters like iPTH, CRP, sCr and ferritin between the two groups of patients; but no significant correlation was found between these parameters and SD. Larger population size is needed to assess the relation between laboratory parameters and SD.

Acknowledgments

This study was supported by Tehran University of Medical Sciences as a thesis and a research project with the code of 9311160003.

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