



Sexual Dysfunction Among Patients with End-Stage Renal Disease Undergoing Hemodialysis: Prevalence and Associated Factors

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Received 2019 November 10; Revised 2020 April 11; Accepted 2020 May 16.

Abstract

Background: Chronic renal disease is a worldwide concern. The number of patients on hemodialysis increases every year. These patients have several physiological and psychological problems like sexual dysfunction that can affect their mental health and treatment course.

Objectives: This study first aimed to assess the prevalence of sexual dysfunction in end-stage renal disease (ESRD) patients on hemodialysis compared to healthy people. Then, it evaluated factors associated with sexual dysfunction in both groups.

Methods: This cross-sectional study recruited a total of 142 participants in two groups selected by a convenience sampling method. Group one included 71 ESRD patients from two hemodialysis centers in Zahedan, Southeast of Iran, recruited between September 2018 and September 2019. Group two included 71 healthy individuals matched for age, weight, and educational status. The two groups were assessed based on psychiatric interviews, the International Index of Erectile Function (IIEF), and the index of female sexual function (IFSF). The SPSS 24 software was used for data analysis. The bivariate Pearson correlation test, Cramer V, and independent-t-test were used to analyze the data.

Results: All female patients and 90% of healthy females had various levels of sexual dysfunction, and there was no significant difference between them ($P = 0.21$). However, 84.6% of male patients and 33.3% of healthy males had various levels of sexual dysfunction and there was a significant difference between the two groups ($P < 0.001$). The duration of hemodialysis was not correlated with sexual dysfunction. Age, weight, educational status, and marriage duration showed the most correlations with sexual dysfunction, especially in females.

Conclusions: As the findings showed, sexual dysfunction had a high prevalence among hemodialysis patients. As many of these patients must be on hemodialysis for long periods, we need to pay attention to sexual dysfunction when assessing and planning for their treatment.

Keywords: Erectile Dysfunction, Kidney Failure, Renal Dialysis, Sexuality

1. Background

Worldwide there is a shortage of kidney available for transplant, and the number of patients with end-stage renal disease (ESRD) is rapidly increasing. End-stage renal disease is the last stage of chronic renal disease in which the kidneys fail to work properly and become fatal unless using hemodialysis or renal replacement. Hemodialysis is the most common form of renal replacement, and around a million ESRD patients are on maintenance dialysis (1, 2). Hemodialysis can make several physiological and psychological changes (3).

End-stage renal disease exceedingly influences sexual health, mainly because of endocrine abnormalities. How-

ever, sexual dysfunction (SD) may be formed by both physiological and psychological reasons, such as hormonal abnormalities, dysautonomia, vascular disease, drug-related adverse effects, and depression that are very prevalent in these patients (4-6). Furthermore, SD can lead to severe distress and interpersonal pressures (7). Besides, culture has shown to influence the presentation of SD. While sexual dysfunction is seen worldwide, the presenting symptoms may vary (8).

A large number of studies have focused on SD in men. Sexual dysfunction is highly prevalent in male ESRD patients undergoing hemodialysis. The most frequent issue studied has been erectile dysfunction (ED) (9). Several studies showed that phosphodiesterase-5 inhibitors

could improve erectile dysfunction in men with ESRD (10-12). In a comprehensive study of 302 communities of male hemodialysis patients, Rosas et al. found that 82% of patients had ED. Research by Turk et al. showed ED in 70% of patients with chronic hemodialysis (13, 14). Older age and diabetes were correlated with ED in both of the studies. Considering different definitions and methods used in previous studies, the prevalence of ED has broadly ranged from 41 to 93% (15-17).

Sexual dysfunction in female ESRD patients is correlated with problems in biopsychosocial domains that lead to difficulties with sexual desire, arousal, vaginal lubrication, orgasm, and pain during intercourse. Despite that women comprise almost half of the hemodialysis patients, a few studies have focused on female SD; therefore, the understanding of this disorder is limited (3, 18, 19). Yazici et al. (20) studied 117 women with ESRD and found that SD was present in 94% of the patients on peritoneal dialysis and 100% of those on hemodialysis. A report by Strippoli et al. (21) from 27 randomly selected dialysis units in Europe, and South America showed 84% of females with SD based on the FSFI scores. Individual domains with the highest level of dysfunction were arousal, whereas satisfaction appeared to be the least impaired domain. Adjusted analyses showed that lower education levels, symptoms of depression, menopausal status, diabetes, low serum albumin, and diuretic therapy were independently correlated with a higher risk of SD (21). Despite the high prevalence of SD in the general population (22, 23) and ESRD patients, there are limited studies that compare SD between hemodialysis patients and healthy individuals.

2. Objectives

The first aim of this study was to assess the prevalence of sexual dysfunction in ESRD patients on hemodialysis compared to healthy people. The second aim was to evaluate the factors associated with sexual dysfunction in both groups.

3. Methods

3.1. Procedure

The current study included 142 participants. A convenience sampling method was used to employ all ESRD patients between September 2018 and September 2019 in two hemodialysis centers in Zahedan, Southeast of Iran, based on the inclusion criteria. The control group included 71 healthy individuals matched for age, weight, and educational status. All research procedures were approved

by the Ethics Committee of Zahedan University of Medical Sciences (code: IR.ZAUMS.REC.1397.236). A complete history, including physical illnesses, psychiatric disorders, drug abuse, and sexual problems, was taken based on interviews, the International Index of Erectile Function (IIEF), and the index of female sexual function (IFSF). Informed consent was taken from all participants. The inclusion criteria included being a married person, age of 18 to 60 years, no physical or psychological condition that caused sexual dysfunction, no drug abuse, no recent infection, hemodialysis sessions at least twice a week for a minimum of three months (for the patient group), and no surgery that manipulated the genital system. The exclusion criteria included unwillingness to participate in the study and irregular attendance in hemodialysis sessions.

3.2. Measurements

The sociodemographic data included gender, age, weight, duration of hemodialysis, number of children, years of marriage, and educational status. The IFSF contained 19 items on a five-point Likert scale ranging from "0" to "5". The IFSF assesses six domains of sexual function, including desire, arousal, lubrication, orgasm, satisfaction, and pain. The scores for each domain range between 0 or 1 and 5 (19, 21). The reliability of the IFSF Persian version was 0.70 measured by Cronbach's alpha coefficient and its validity was 0.73 based on the principal component analysis using varimax rotation, followed by confirmatory factor analysis (24, 25).

The IIEF contained 15 items on a five-point Likert scale ranging between 1 (almost never) and 5 (almost always). The index assesses five domains, including erectile function, with a maximum score of 30. A higher score indicates a better sexual function (26). The test-retest reliability of the IIEF Persian version was 0.95 and its divergent validity evaluated by Spearman's rank correlation was 0.74, which was acceptable (27).

3.3. Statistical Analysis

The patients' characteristics are presented as mean (SD) and frequency. The independent-t test was used to evaluate differences between the groups and compare sociodemographic data. The correlations of FSFI, IIEF, and their domains with demographic data were evaluated by the Bivariate Pearson correlation test. Cramer V was used to compare the educational status. The statistical significance level was set at $\alpha = 0.05$.

4. Results

4.1. Demographic Data of Participants

Of 71 participants in both groups, 32 (45.1%) were female. Age ($t = 1.26$, $P = 0.20$), weight ($t = -1.86$, $P = 0.64$), and educational status (Cramer's $V = 0.23$, $P = 0.07$) were the same in the two groups. The sociodemographic data are summarized in [Table 1](#).

Table 1. Sociodemographic Data of Participants (N = 142)^a

Variables	On Dialysis (N = 71)	No History of Dialysis (N = 71)	P Value
Age, y	43.66 ± 9.17	41.53 ± 10.76	0.207
Weight, kg	64.84 ± 10.83	68.33 ± 11.46	0.64
Duration of hemodialysis, mo	25.88 ± 30.08	-	
Marriage years	23.22 ± 25	17.26 ± 19	0.003
Gender			
Female	32 (45.1)	32 (45.1)	
Male	39 (54.9)	39 (54.9)	
Number of Children			0.001
None	7 (9.9)	10 (14.1)	
1 - 3	23 (32.4)	46 (64.8)	
4 - 6	29 (40.8)	15 (21.1)	
> 7	12 (16.9)	0 (85.9)	
Education status			
Illiterate	16 (22.5)	9 (12.7)	0.07
Elementary	32 (45.1)	24 (33.8)	
Diploma	16 (22.5)	24 (33.8)	
Post-secondary school	7 (9.9)	14 (19.7)	

^aValues are expressed as No. (%) or mean ± SD.

4.2. Prevalence of Sexual Dysfunction

The results showed that 100% of women on dialysis and 90% of women with no history of dialysis had various levels of SD. While 84.6% of men on dialysis and 33.3% of men with no history of dialysis had various levels of ED ([Figure 1](#)). The mean and median scores of sexual function are summarized in [Table 2](#).

4.3. Differences Between the Groups

The results of the independent *t*-test on sexual function showed significant differences in the total score of IIEF and the scores of all five domains between the two groups. The results of the independent *t*-test on sexual function

showed no significant difference in the total score of IFSF and the scores of desire, arousal, satisfaction, and pain between the two groups ([Table 2](#)).

4.4. Correlation Between Sexual Dysfunction and Demographic Data

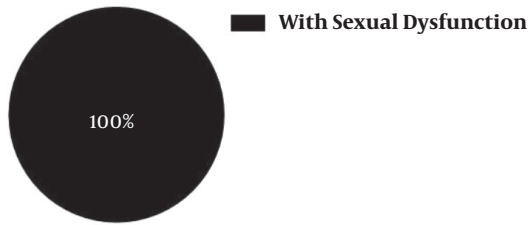
The results of the Bivariate Pearson correlation between demographic data and sexual dysfunction for both groups are summarized in [Table 3](#).

5. Discussion

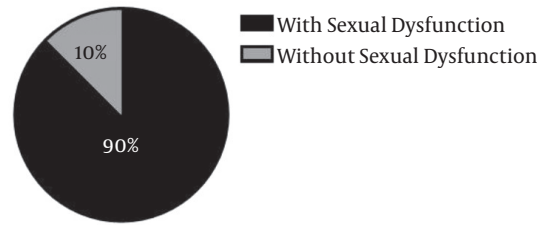
Sexuality is one of the most complex areas of human behavior. Sexual function can be affected by illnesses, psychological conditions, relationships, and many other factors. Chronic illness is usually related to SD because of malaise, fatigue, body image, hormone changes, and brain alternations. Previous studies showed that emotional issues could affect sexual function in the general population ([28](#)). Any mental or physical condition that could affect the quality of life also could affect sexual desire and function ([19](#)). However, in the current study, patients with psychiatric disorders or chronic disorders other than ESRD were excluded. Some authors advocate the use of physiological evaluations, but such results could not relate these measures to SD. Multidimensional self-report questionnaires like IIEF and FSFI are still the most widely used instruments in evaluating SD ([29](#)). In the current study, 142 subjects, including ESRD patients and healthy individuals, were assessed by self-report questionnaires. The results showed men on hemodialysis had significantly higher sexual dysfunction, but there was no difference in SD between women of the two groups, except in desire, arousal, satisfaction, and pain.

As the results showed, all ESRD women on hemodialysis and 90% of healthy women had various levels of SD symptoms. The patients showed more dysfunction in desire, arousal, and satisfaction among the six domains of FSFI. However, healthy women showed more dysfunction in lubrication, satisfaction, and pain. This finding is in line with the results of a multinational study by Strippoli et al. ([21](#)) that assessed SD in the range of 55 to 96% in 1,472 ESRD patients. Yazici et al. ([20](#)) used a similar questionnaire as used in the current study and showed that all of the female hemodialysis patients ($n = 117$) and 45.8% in the control group ($n = 48$) had SD, which showed a lower prevalence of SD in healthy individuals than that shown by the current study. Other studies also showed that SD is present in higher than 78% of female ESRD patients ([2, 30](#)). Menopause can be a cause of SD with increasing age in women. It is reported that postmenopausal women have higher complaints such as reduced desire, lubrication difficulties, difficulty in achieving orgasm, vaginal dryness,

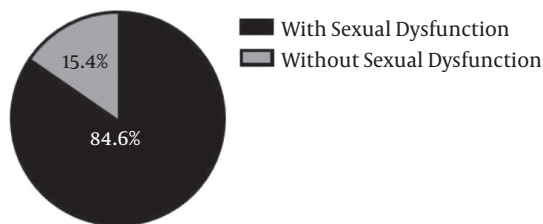
Female Patients with ESRD



Healthy Females



Male Patients with ESRD



Healthy Males

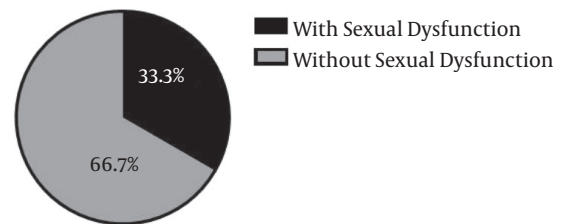


Figure 1. Prevalence of sexual dysfunction

Table 2. The Results of Independent-t-test Between Groups (N = 142)^a

Variables	Range	On Dialysis (N = 71)	No History of Dialysis (N = 71)	t	P Value
Males					
Sexual desire	1 - 10	4.92 ± 2.55	8.02 ± 1.76	-6.22	0.001
Erectile function	1 - 30	13.28 ± 8.55	23.97 ± 9.37	-5.26	0.001
Orgasm satisfaction	1 - 10	4.10 ± 2.98	7.71 ± 2.61	-5.69	0.001
Intercourse satisfaction	1 - 15	5.89 ± 4.54	11.46 ± 3.83	-5.84	0.001
Overall satisfaction	1 - 10	4.48 ± 2.79	8.33 ± 2.04	-6.93	0.001
Total score	5 - 75	32.69 ± 20.19	59.51 ± 16.61	-6.40	0.001
Females					
Desire	1 - 5	2.08 ± 1.05	3.22 ± 1.76	-3.15	0.003
Arousal	0 - 5	1.81 ± 1.4	2.99 ± 2.44	-2.35	0.02
Lubrication	0 - 5	2.32 ± 1.80	2.41 ± 2.15	-0.19	0.85
Orgasm	0 - 5	2.06 ± 1.61	2.93 ± 2.24	-1.78	0.07
Satisfaction	1 - 5	2.02 ± 1.52	2.93 ± 1.78	-2.20	0.03
Pain	0 - 5	2.61 ± 2.31	1.35 ± 2.11	2.28	0.02
Total score	2 - 36	12.91 ± 7.99	15.85 ± 10.47	-1.26	0.21

^aValues are expressed as mean ± SD.

and pain (31). The researchers determined that the multifactorial causes of SD in ESRD patients include age, physiological status, psychological status, medical health, the experience of a sad event, menstruation status, type of dialysis, presence of a fistula, medication use, number of live

childbirths, and the site of previous surgery (32). Based on the literature, the emotional state of women on dialysis can affect sexual function, as well (3).

The current study showed that 90% of healthy women had sexual dysfunction, and the rate of dysfunction in its

Table 3. The Results of Correlation Bivariate Between Sexual Function and Demographic Data (N = 142)

	On Dialysis						No History of Dialysis				
	Age	Weight	ES	DH	NC	DM	Age	Weight	ES	NC	DM
Males											
Sexual desire	-0.22	-0.03	0.33 ^a	-0.18	-0.30	-0.28	0.01	-0.06	-0.07	-0.09	-0.04
Erectile function	-0.24	-0.05	0.18	-0.04	-0.33 ^a	-0.19	-0.08	0.19	0.08	-0.05	-0.01
Orgasm satisfaction	-0.10	0.07	0.20	-0.11	-0.25	-0.15	-0.22	0.17	-0.17	-0.08	-0.12
Intercourse satisfaction	-0.20	-0.06	0.11	-0.07	-0.31	-0.16	-0.37 ^a	0.06	-0.40 ^a	-0.25	-0.31
Overall satisfaction	-0.14	-0.04	0.28	-0.19	-0.30	-0.21	-0.16	0.21	-0.15	-0.09	-0.06
Total score	-0.21	-0.03	0.21	-0.10	-0.33 ^a	-0.21	-0.18	0.17	-0.10	-0.12	-0.11
Females											
Desire	-0.02	-0.06	0.25	-0.18	-0.36 ^a	0.10	-0.31	0.26	0.51 ^b	-0.03	-0.34
Arousal	0.008	0.06	0.25	-0.24	-0.32	-0.09	-0.57 ^b	-0.33	0.48 ^b	-0.21	-0.67 ^b
Lubrication	-0.02	0.04	0.07	0.02	-0.33	-0.08	-0.41 ^b	-0.03	0.37 ^a	-0.07	-0.50 ^b
Orgasm	-0.12	0.04	0.27	-0.06	-0.39 ^a	-0.14	-0.43 ^a	-0.35 ^a	0.27	-0.10	-0.55 ^b
Satisfaction	-0.02	0.12	0.15	-0.33	-0.25	-0.05	-0.46 ^b	-0.71 ^b	0.19	-0.30	-0.56 ^b
Pain	-0.13	-0.12	0.11	0.16	-0.35 ^a	-0.07	-0.41 ^a	-0.87 ^b	0.12	-0.30	-0.49 ^b
Total score	-0.07	0.01	0.21	-0.09	-0.41 ^a	-0.06	-0.53 ^b	-0.41 ^a	0.39 ^a	-0.20	-0.63 ^b

Abbreviations: DH, duration of hemodialysis; DM, duration of marriage; ES, educational status; NC, number of children.

^a $p < 0.05$.^b $p < 0.01$.

six domains was more than 80%. In a global study of SD in the general population of women, the lack of desire and orgasm dysfunction were the most common sexual problems across the world, ranging from 26 to 43% and 18 to 41%, respectively, which is common in the lack of desire with the current study (22). However, a systematic review in Iran reported that the prevalence of total sexual disorders was 19.2 to 77%, sexual desire disorder was 15.4 to 65.8%, sexual arousal disorder was 9.8 to 88.3%, and lubrication disorder was 11.9 to 71.4%. In addition, the reported prevalence for pain disorder was 9 to 95.9%, the female orgasmic disorder was 10.5 to 76%, and sexual dissatisfaction was 2.4 to 78.5%. Therefore, SD in Iran has a higher rate than the global prevalence (23), and Zahedan has higher rates than other cities of Iran.

In male patients, 84.6% had erectile dysfunction that is similar to the results of Rosas et al. (33) study, which used similar tools but a higher sample size ($n = 302$) and showed 82% of male patients on hemodialysis had erectile dysfunction. Turk et al. (13) found that 70% of male patients had ED. The etiology of ED includes vascular disease, hormonal dysregulation, autonomic dysfunction, medication side effects, and psychiatric disorders such as depression. Normal male sexual function is performed through the integrative response of neurologic, endocrine, vascular, and psychologic systems. Men undergoing hemodialysis can exhibit dysfunction in any of these systems (5). The increased severity of ED with increasing age agrees with the literature (14). In healthy men, 33.3% showed various

levels of SD. In other cities of Iran, the prevalence of ED was reported between 18.8 and 27% from three studies (23), which show Zahedan has a higher prevalence of ED among the cities evaluated in Iran. However, it must be considered that different questionnaires were used in different studies.

5.1. Limitations

There are some limitations in this study that need to be considered for improvements in future work. First, our patient population was small because of comorbid psychiatric and medical illness. Second, despite that the study was done in one geographic area, and the rate of SD may be different in other regions, the generalization of the findings must be done with caution. Third, except for some demographic information, we did not assess the reasons for SD. Fourth, the study of sex was generally characterized by bias. Fifth, we only used self-report questionnaires for assessing sexual dysfunction without any physiologic evaluation such as photoplethysmography or duplex ultrasonography. Sixth, the current study used a cross-sectional design, and we had no idea if SD was persistent in our participants. Seventh, sexual inactivity results in lower scores on any domains of FSFI and IIEF that could cause overstimulated SD. Eighth, the role of the spouse and the quality of emotional relationship were not considered.

5.2. Conclusions

The findings of this study showed that the prevalence of SD was very high among men and women on hemodial-

ysis and even in healthy females. It is important to pay attention to sexual dysfunction in the assessment and treatment plan of ESRD patients to increase their satisfaction and quality of life. Furthermore, we need to arrange psychoeducational and medical programs in the community to decrease sexual dysfunction.

Acknowledgments

This study was supported by the Zahedan University of Medical Sciences, Zahedan, Iran. The researchers appreciate the cooperation of supporters and participants.

Footnotes

Authors' Contribution: Soorgi and Shahab Lotfinia analysed Data. Nour-Mohammad Bakhshani drafted the manuscript. Shahab Lotfinia and Zohre Soorgi revised critically the manuscript.

Conflict of Interests: The authors have no conflict of interest.

Ethical Approval: The ethical approval was IR.ZAUMS.REC.1397.236.

Funding/Support: No funding or support was received.

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