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Do sexual dysfunctions get better during dialysis? Results of a six-month prospective follow-up study from Turkey

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Dialysis improves most symptoms of end-stage renal disease (ESRD), yet many patients continue to experience sexual dysfunction (SD) during the dialysis treatment. The aim of this preliminary study was to evaluate the frequency and the course of SD during a 6-month dialysis treatment. Additionally, relationships between the level of depression, cognitive impairment and biochemical parameters of SD were also assessed. The subjects were 43 ESRD (25 male and 18 female) on dialysis treatment for at least 12 months. SD was assessed using the Arizona Sexual Experiences Scale (ASEX); the level of depression and cognitive impairment were assessed using the Hamilton Depression Rating Scale (HDRS) and Mini Mental Status Exam (MMSE). Several biochemical parameters were also assessed. All assessments were carried out at baseline and repeated at 6-month follow-up. Of 43 patients, 20 (47%) and 18 (42%) complained of SD at baseline and at 6-month assessments, respectively. Of 25 males, nine (36%) and seven (28%) patients described SD at baseline and 6-month assessments, respectively; erectile dysfunction was the most frequent complaint. Of 18 females, 11 (61%) and 11 (61%) patients reported SD at baseline and 6-month assessments, respectively; difficulties with arousal and reaching orgasm were the most frequent complaints. Both total and item-by-item comparisons of baseline and 6 months ASEX scores did not reveal any significant changes during 6-month period, indicating that patient's sexual functions do not improve with dialysis treatment. For female patients, HDRS scores were significantly higher in patients with SD at baseline ($t = 2.15$, $P = 0.05$) and at 6-month follow-up ($t = 2.44$, $P = 0.03$) assessments; after excluding the effects of age and duration of dialysis for females using regression analysis, HDRS still significantly ($t = 4.02$, $P = 0.003$) associated with the SD. This preliminary prospective study suggests that SD is frequent in dialysis patients, does not remit with dialysis treatment, associated with depression in female patients, and much clinical attention is indicated.
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Introduction

Although it is a major factor affecting quality of life in end stage renal disease (ESRD), sexual dysfunction (SD) receives very limited attention in follow up of dialysis patients.[1] Successful dialysis improves most symptoms of ESRD, yet many patients continue to experience many forms of SD during the dialysis treatment.[2] Sexuality was the fifth most important life stressor cited by 135 dialysis patients in a study of quality-of-life issues.[3] More than half of patients suffering from ESRD and receiving dialysis treatment describe SD, most commonly a loss of interest in sexual activity.[1,4] Despite the importance of these issues, only 25% of patients discuss sexual function with their physicians.[3] Moreover, it has been noted that lack of knowledge about sexuality, conservative attitudes toward sexuality and anxiety when discussing sexual concerns are widespread among health care providers.[5]

SD addresses alterations related to drive, subjective arousal, penile erection/vaginal lubrication, ability to reach orgasm and satisfaction with orgasm;[6] all are affected by ESRD. A questionnaire given to dialysis patients revealed that 65% were

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dissatisfied with sex since starting dialysis, 40% have stopped having sex, 27% have no desire for sex and 23% reported they could not achieve orgasm.[2] There is no known single cause for these changes, but there are several physical and psychological factors that are thought to contribute to SD. Stress, depression and anxiety due to kidney disease and treatment may affect patients' sexual desire and ability to enjoy sex.[4] Other factors that may influence a patient's interest in sex include medications, diet, anemia, lack of sleep, inadequate dialysis, uremia and changes in hormone balance.[1,3,7]

Complaints of reduction in libido, impotence and marked reduction in the frequency of sexual relations have been reported in more than 50% of male ESRD patients.[7] Proposed factors that may cause SD in male dialysis patients are uremia, decreased penile blood supply, hormonal disturbances, low hematocrit level, drugs such as beta blockers, fatigue, psychological problems such as depression and anxiety and difficulties with partner.[1,2,8]

In comparison to males, SD is more common in healthy females as well as females on dialysis.[1] A study comparing sexual function before and after renal insufficiency found that the percentage of females who completely abstained from sexual intercourse increased from 9 to 40%. Among the females on dialysis who continued to have sexual activities, the anorgasmic percentage increased from 9% to 31%.[8,9] In another study, 100% of the women on hemodialysis, 67% of those on peritoneal dialysis and 31% of those with kidney transplants reported a lack of desire for sexual activity and lack of sexual fantasy.[10] Numerous hypotheses have been put forward as to the origin of the SD in female dialysis patients, including: uremia, hyperprolactinaemia, gonadal dysfunction, depression, changes in appearance, hyperparathyroidism and zinc-deficiency.[7–10]

Our clinical impression with ESRD patients is that most patients' observed SD does not improve during the dialysis treatment. There are few empirical prospective studies addressing the limited efficacy of dialysis in reversing SD. The primary objective of this preliminary study was to evaluate the course of SD during 6-months of dialysis treatment. Additionally, relationships between the level of depression, cognitive impairment and biochemical parameters of SD were also examined.

Subjects and methods

Subjects

The subjects were ESRD patients on dialysis treatment in the year 2002, at the dialysis center of Ibni-Sina Hospital of Ankara University, School of Medicine, Ankara, Turkey. The present study is a part of larger project dealing with various kinds of psycho-social problems encountered in hemodialysis (HD) patients and focuses on the patients sexual functioning.

Of all patients receiving maintenance hemodialysis in the year 2002, eligible patients were informed about the study protocol and 43 patients (25 male 18 female) agreed to participate. Eligibility criteria included: age between 18 and 65 y, dialysis for at least 12 months, medically stable, without hospitalization or acute illness in the preceding 3 months, ability to complete self-rating scales (thus, blindness and low educational level were exclusionary criteria) and no psychiatric treatment in the last 6 months. Consents and permission to access medical records were obtained for all the participants.

Procedure

Four categories of variables examined prospectively in this study were socio-demographic features, sexual functioning, level of depression and cognitive impairment and biochemical parameters. These variables were assessed at baseline and reassessed at 6-month follow-up for all patients. The interval of 6 months between observation points was chosen on the psychometric basis that a short time lapse between observations could artificially inflate the correlation. The main sociodemographic variables examined were age, sex, marital status and the duration of dialysis treatment.

Sexual functioning was assessed using the validated Turkish version[11] of Arizona Sexual Experiences Scale (ASEX).[6] The ASEX is a brief five-item scale designed to assess the core elements of sexual functioning: drive, arousal, penile erection/vaginal lubrication, ability to reach orgasm and satisfaction with orgasm. The female and male versions of ASEX differ on the gender-specific question addressing erection/lubrication. Each item is rated with a six-point Likert system, with lower scores reflecting enhanced sexual function and higher scores reflecting impaired sexual function. A total ASEX score of 19 or greater, any one item with an individual score of either 5 (very difficult) or 6 (never), or three or more items with individual scores of 4 have all been found to be highly correlated with clinician-diagnosed SD. The same criteria applied for the assessment of SD in this study.

Each patient's level of depression was assessed with The Hamilton Depression Rating Scale (HDRS), which consists of 17 items each representative of a category of depressive symptoms.[12] The Mini Mental Status Exam (MMSE) for the assessment of cognitive impairment was also administered to all patients.[13] Validity and reliability studies of the Turkish versions of the HDRS and the MMSE have already been established.

Several biochemical parameters that might interfere with sexual function were also assessed at baseline and 6-month follow-up. These parameters included: hematocrit, hemoglobin, parathormone, prealbumin, CRP, Ca, *P* levels and pre- and post-dialysis levels of urea, creatinine, Na and K.

Statistical analyses

All analyses were performed with SPSS software (version 11). The frequency of SD was reported with bar graphics for both sexes. The *t*-test for independent-samples was used to compare the means between grouping variables. The paired *t*-test procedure was used to compare the means of two variables for a single group. The Pearson correlation test was used for the analysis of correlations. The patient's age and duration of dialysis were widely distributed in our sample. To control for the effects of sex, age and duration of dialysis on the associations between SD and HDRS, MMSE and biochemical parameters, a hierarchical regression analysis was employed. Confidence intervals were 95% (two-sided) for all analyses.

Results

The 43 patients included in the study had received hemodialysis for a mean of 66. 95 ± 46.39 months, with a range of treatment duration 12–192 months. The mean age of patients was 41.53 ± 11.48 y (range 22–65); 25 (58.8%) were male, 38 (88.4%) were married, 33 (76.7%) had children. The mean age and duration of dialysis were not significantly different between male and female patients ($F = 1.04$, $P = NS$).

Of 43 patients, 20 (47%) complained of one or more dysfunctional sexual items at baseline assessment. At 6-month follow-up 18 (42%) complained of SD. Of 25 males, 9 (36%) and 7 (28%) patients described SD at baseline and 6-month follow-up respectively; difficulties with erection was the most frequent complaint that we encountered in our sample (Figure 1). Of 18 females, 11 (61%) and 11 (61%) patients described SD at baseline and 6-month follow-up respectively; difficulties with arousal and reaching orgasm were the most frequent complaints that we encountered (Figure 2). Sexual problems were proportionately more common in females and the gender difference was significant at baseline (t-value = 2.53, $P = 0.01$) and at 6-month follow-up (t-value = 3.39, $P = 0.002$). Overall, SD was significantly correlated with age at baseline ($r = 0.28$, $P = 0.06$, significant at trend level) and at 6-month follow-up ($r = 0.33$, $P = 0.03$). Duration of dialysis and marital status were not correlated with SD.

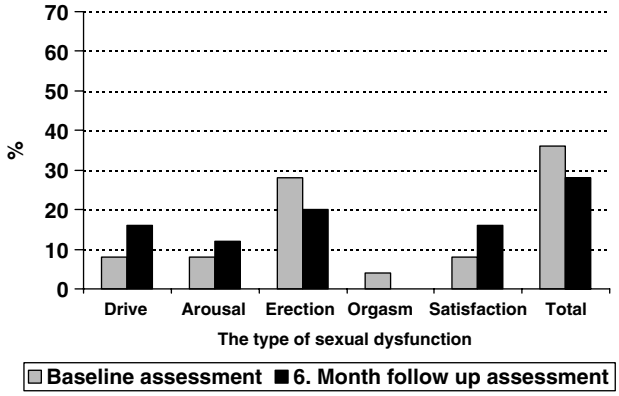

Figure 1 Sexual dysfunction in male dialysis patients ($n = 25$).

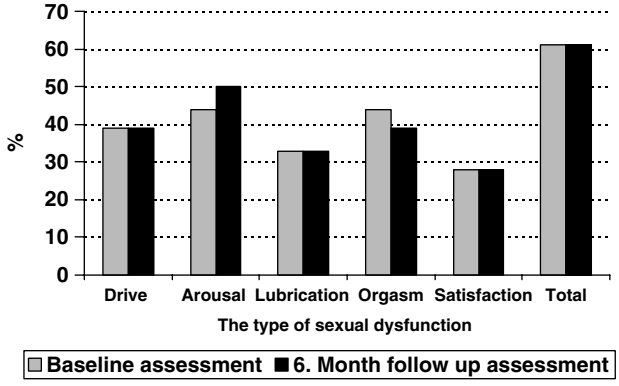

Figure 2 Sexual dysfunction in female dialysis patients ($n = 18$).

Paired *t*-test analyses indicate that the SD found in males and females did not significantly change at 6-month dialysis treatment in comparison to baseline assessment. Item-by-item comparisons of the ASEX items (drive, arousal, penile erection/vaginal lubrication, ability to reach orgasm and satisfaction with orgasm) also did not reveal any significant changes during 6-month follow-up (Figures 1 and 2).

The level of depressive symptoms was analyzed with total HDRS scores. Comparisons of the baseline and 6-month follow-up HDRS scores did not reveal any significant differences during the follow-up. For male patients, HDRS scores were not significantly different in patients with or without SD at baseline and at 6-month follow-up assessments. However, for female patients, HDRS scores were significantly higher in patients with SD at baseline ($t = 2.15$, $P = 0.05$) and at 6-month follow-up ($t = 2.44$, $P = 0.03$) assessments.

For all patients, in comparison to baseline assessments, MMSE scores improved significantly at 6-month follow-up ($t = -2.74$, $P = 0.01$). For male patients, MMSE scores were not significantly different in patients with or without SD at baseline and at 6-month follow up. However, for female patients, MMSE scores were significantly lower in patients

with SD at baseline ($t=3.97$, $P=0.002$) but not at 6-month follow-up assessments.

As patients' age and the duration of dialysis treatment were contributing to the total variance explaining SD, a hierarchical regression analysis was performed to control the effects of these variables on significant findings obtained with HDRS and MMSE for females. At the first step, age and duration of dialysis treatment was entered into the equation; these control variables explained 44% of variance and significantly predicted the SD at a trend level ($F_{(2,16)}=3.9$, $P=0.056$). At the second step, HDRS and MMSE scores were entered into the equation using stepwise method. After excluding the effects of age and duration of dialysis for females, the HDRS ($t=4.02$, $P=0.003$) significantly predicted the SD and explained an additional 36% of the total variance. However, after the effects of age and duration of dialysis were excluded from the variance, the MMSE did not make any significant contribution in predicting the SD.

Among the laboratory parameters (hematocrit, hemoglobulin, parathormone, prealbumine, CRP, Ca, *P* levels and pre- and postdialysis levels of urea, creatinine, Na and K), only predialysis K level increased significantly ($t=2.17$, $P=0.04$) at the end of the 6-month follow-up. Pearson correlation analyses among biochemical parameters revealed that only predialysis creatinine levels at baseline ($r=-0.31$, $P=0.04$) and at 6-month follow-up ($r=-0.35$, $P=0.02$) were significantly correlated with SD for both sexes.

At baseline laboratory assessments, postdialysis Na levels were significantly different for males ($t=-1.99$, $P=0.06$, significant at trend level), females ($t=-2.17$, $P=0.04$) and the total group of ($t=-2.50$, $P=0.01$) patients with SD; additionally, predialysis creatinine levels were significantly different for male ($t=2.20$, $P=0.04$) and for the total group of patients ($t=2.30$, $P=0.03$) with SD. At 6-month follow-up, none of the biochemical parameters was significantly different for males, females or the total group of patients. As patients' age, sex and the duration of dialysis treatment were contributing to the total variance explaining SD, a regression analysis was performed to control for the effects of these variables on biochemical parameters at baseline. At the first step, sex, age and duration of dialysis treatment were entered into the equation; these control variables explained 27% of variance and significantly predicted the SD ($F_{(3,40)}=4.55$, $P=0.008$). At the second step all biochemical parameters (hematocrit, hemoglobin, parathormone, prealbumin, CRP, Ca, P levels, and pre- and postdialysis levels of urea, creatinine, Na and K) were entered into the equation using stepwise method. After excluding the effects of sex, age and duration of dialysis, none of the above variables including postdialysis Na level could significantly predict the SD.

Discussion

In this preliminary study, we found that SD is common in both men and women with ESRD on dialysis treatment. SD was more common in females in our sample and this is consistent with other reports of up to 100% frequency. Our study found 61% at baseline and this did not change at 6-month follow-up. Similarly, the frequency of SD for males ranged from 17 to 63% in other studies and in our study was 36% at baseline and 27% at 6-month assessment. Common disturbances in our study include erectile dysfunction in men and decreased arousal and orgasm in females. These findings are consistent with many other studies from different cultures.[1–10]

Moreover, SD observed in both sexes was not significantly improved at 6-month assessment in our sample. In a study on the capacity of hemodialysis to reverse the SD in 27 men with ESRD, it was found that, despite 2 y of stable hemodialysis, there was only minor improvement in sexual activity.[14] Similarly, in another study with male hemodialysis patients, sexual performance that was assessed by nocturnal penile tumescence remained remarkably stable over 18-month follow-up.[15] To our knowledge, the persistence of SD over time in various domains of sexual functioning in female patients has not been reported previously.

The level of depressive symptoms as measured by the HDRS was significantly higher for the females but not males at baseline and follow-up; the significance of HDRS scored in predicting sexual function for female patients persisted even after controlling for the effects of age and duration of dialysis. Additionally, a large amount of the variance contributing to SD can be explained by the HDRS score. In spite of the limited size of this study, we may conclude that these results clearly indicate that depression is an important factor associated with the SD seen in female patients on dialysis. This study also indicates that the role of depression on SD in males is more limited. Although both depression and anxiety levels were correlated with SD for both sexes in many studies,[2,4,7–10] the contribution of depression to gender specific SD warrants further empirical investigation.[16]

The set of control variables (age, sex and duration of dialysis) contributed significantly to the variance explaining the SD in this study and others.[1] Although some biochemical parameters and MMSE scores appeared to be significantly different in male and/or female patients with SD in this study, after controlling for the effects of sex, age and duration of dialysis, their significance disappeared. This suggests that, although MMSE and postdialysis Na, and predialysis creatinine levels could be different for patients with or without SD, their contribution to SD was not independent from other contributing

factors. In our study, as in others, SD was not associated with biochemical variables.[17]

It has been reported that anemia is associated with SD in long-term hemodialysis patients.[1,8–10,18] In most of these reports, both hemoglobin and hematocrit levels were much lower than in the patients in our sample and only increased to the levels that are seen in our sample after erythropoietin treatment. This difference might explain our negative findings. Similarly, urea level was shown to be an important factor for developing SD in both males and females.[1,7,16] In our study, although the patients were uremic and a high frequency of SD was found, blood urea levels were not correlated with SD. However, predialysis creatinine levels at baseline and follow-up were higher in our sample.

There were many limitations to this study that limit the generalizability of our findings. First, our sample size was relatively small, which limit the possibility of detecting some interactions that might be detected by a sample size with adequate statistical power and patients were recruited from one dialysis center only. Second, we have not studied the impact of many factors including medical treatments, endocrine and vascular abnormalities and the family interactions that could contribute to the overall variance that might explain the SD. Additionally, age and duration of dialysis varied widely in our sample. Although we have attempted to control for the effects of sex, age and duration of dialysis by means of statistical methods, the small sample size may limit the generalizability of our results.

In summary, we may conclude that SD is frequent in dialysis patients, probably do not remit with dialysis treatment, closely related with depression for females and needs special attention.

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References

1 Diemont WL *et al.* SD after renal replacement therapy. *Am J Kidney Dis* 2000; **35**: 845–851.
2 Calaluce M. Better education and care of sexual health of ESRD patients may positively affect quality of life. *PD Today* 1998; **4**: 17.
3 Milde FK, Hart LK, Fearing MO. Sexuality and fertility concerns of dialysis patients. *ANNA J* 1996; **23**: 307–315.
4 Camsari T *et al.* Psychosexual function in CAPD and hemodialysis patients. *Perit Dial Int* 1999; **19**: 585–588.
5 Ulrich BT. Sexual knowledge of nephrology personnel. *ANNA J* 1987; **14**: 179–183.
6 McGahuey CA, Delgado LP, Geleberg AJ. Assessment of SD using the Arizona Sexual Experience Scale (ASEX) and implications for the treatment of depression. *Psychiatric Ann* 1999; **29**: 39–45.
7 Palmer BF. SD in uremia. *J Am Soc Nephrol* 1999; **10**: 1381–1388.
8 Binik YM, Mah K. Sexuality and end- stage renal disease: research and clinical recommendations. *Adv Ren Replace Ther* 1994; **1**: 198–209.
9 Rozemann D *et al.* Sexual function in women on dialysis. *Dial Transplant* 1990; **19**: 640–644.
10 Toorians AW, Giltay EJ, Donker AJM, Gooren LJG. Sexual functioning in chronic renal failure. *Semin Dial* 1997; **10**: 176–181.
11 Soykan A. The reliability and validity of Arizona Sexual Experiences Scale in Turkish ESRD patients undergoing hemodialysis. *Int J Impotence Res* 2004; **16**: 531–534.
12 Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960; **23**: 56–62.
13 Folstein MF, Folstein SE, McHugh PR. 'Mini-Mental State', a practical method for grading the cognitive state of patients for clinician. *J Psychiatr Res* 1975; **1**: 189–198.
14 Holdsworth SR, de Kretser DM, Atkins RC. A comparison of hemodialysis and transplantation in reversing the uremic disturbance of male reproductive function. *Clin Nephrol* 1978; **10**: 146–150.
15 Procci WR, Martin DJ. Effect of maintenance hemodialysis on male sexual performance. *J Nerv Ment Dis* 1985; **173**: 366–372.
16 Mastrogiacomo I *et al.* Hyperprolactinemia and sexual disturbances among uremic women on hemodialysis. *Nephron* 1984; **37**: 195–199.
17 Toorians AW *et al.* Chronic renal failure and sexual functioning: clinical status versus objectively assessed sexual response. *Nephrol Dial Transplant* 1997; **12**: 2654–2663.
18 Schaefer RM *et al.* Improved sexual function in hemodialysis patients on recombinant erythropoietin: a possible role for prolactin. *Clin Nephrol* 1989; **31**: 1–5.