

Sexual dysfunction in dialytic patients. A prospective cross-sectional observational study in two hemodialysis centers

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Summary

Objectives: Incidence and prevalence of patients in dialytic therapy increased considerably in recent years. The onset of new issues, once overshadowed, linked to a lower quality of life like sexual dysfunction became increasingly common. The first study in this area, dating back to the 1970s, shows the high prevalence of sexual dysfunction among patients in dialytic therapy of both sexes. Later studies proved an association of sexual dysfunction with psyche disorders, anxiety, depression and lack of self-confidence. The aim of this study is to describe the incidence of male and female sexual main dysfunctions, the latter not least in literature, in patients in hemodialytic therapy. With this aim two dialytic centers have been compared, one located in northern Italy and one in southern Italy, and the different prevalence has been compared to the general population.

Methods: We conducted a prospective cross-sectional observational study in patients undergoing dialytic therapy in two hemodialysis centers, one located in Palermo and one in Lecco. Male sexual dysfunction was investigated by the International Index of Erectile Function-15 (IIEF15) questionnaire and the Premature Ejaculation Diagnostic Tool (PEDT) questionnaire, and the female dysfunction by Female Sexual Function Index (FSFI) questionnaire. Criteria for inclusion in our study were: age < 75 years and dialytic age > 3 months; exclusion criteria were: advanced cancer diseases, life expectancy < 6 months, previous urological manipulation, anti-androgenic therapy, sexual dysfunction unrelated to kidney disease, psychiatric disorders. Data were compared with mean-standard deviation (SD) and with the variance analysis (ANOVA). A value of $p < 0.05$ is considered significant. Discrete data were analyzed with contingency analysis. A $\chi^2 < 0.05$ was considered significant.

Results: Data of 78 patients have been collected. Mean age and dialytic time were 54 ± 12 years and 42 ± 35 month; 33 patients were from Palermo and 24 from Lecco; 21 patients were excluded. Age and dialytic age of the two subgroups did not demonstrate statistically significant differences. Between the two centers there was a statistically significant difference ($p < 0.005$) in the distribution of basic nephropathy: an higher incidence of diabetic and obstructive nephropathy has been observed in the southern center compared to northern center, while glomerulonephritis and polycystic kidney disease had an higher incidence in the northern center compared to southern one. The main sexual dysfunctions in both sexes, erectile dysfunction (ED) and premature ejaculation (PE) in men and orgasm disorder and pelvic pain in women, have been investigated. ED was present in 70%

of hemodialyzed patients, which is an higher incidence compared to the general population. The severity of ED between patients of the two groups was significantly different ($\chi^2 < 0.001$) with higher incidence of moderate/severe forms in northern Italy. The score, in addition to discrete data (severe, moderate, mild, absence), of ED was significantly different ($p < 0.001$) between patients of the two centers (22 ± 7 Palermo vs. 9 ± 8 , Lecco). The PE was absent in 20 patients (54%), present in 12 patients (32%) and probable in 5 patients (14%) (scores of 7.6 ± 4.0 and 8.9 ± 6.8 , respectively in Palermo and Lecco patients). For women, orgasmic dysfunction was severe in 10 patients (50%), mild in 4 patients (20%), very mild in 5 patients (25%), while it was normal in 1 patient (5%), with a statistically significant difference ($p < 0.05$) between Palermo and Lecco patients (3.0 ± 1.4 vs 1.2 ± 2.0). Sexual pain in women was severe in 11 patients (55%), moderate in 4 patients (20%) and mild in 5 patients (25%). Sexual pain was present in all patients ($p < 0.05$).

Conclusions: Regardless of sex, sexual dysfunction is one of the most common side effect in patients with end stage renal disease in dialytic therapy. Our study confirms literature data. The growing number of the dialytic population with sexual disorders needs specialist support to improve quality of life of these patients.

KEY WORDS: Dialysis; End-Stage Renal Disease; Sexual male dysfunction; Erectile disorder; Premature ejaculation; Female sexual dysfunctions; International Index of Erectile Function; Premature Ejaculation Diagnostic Tool.

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INTRODUCTION

End-Stage Renal Disease (ESRD) is a disabling disease that forces patients to a radical change of their lifestyle and habits, causing physical and important psychological disorders. Sexual male dysfunction is an extremely common condition that manifests itself with *erectile disorder* (ED) and *premature ejaculation* (EP) (1), often present at the same time. In everyday clinical practice, both pathologies require a multidisciplinary approach in the diagnostic phase and in the therapeutic management (2, 3) due to their multifactorial genesis, such as psychological factors and endothelial dysfunction. Female sexual dysfunctions

are understudied, despite the incidence being alarmingly high: in a 30 years ago study, 76% of women were living with some symptoms of sexual dysfunction (4), while more recent literature suggest that prevalence is around 43% (5). Most common symptoms in women are dyspareunia, vaginismus, and noncoital sexual pain disorder (6). Since population undergoing hemodialysis (HD) treatment for ESRD significantly increased in the last few years, attention is focused on its sexual disease (7). The greater longevity of these patients and the association with dialytic therapy has led to new problems that in the past were not highlighted in an incisive way and that today have been noticed to have a significant influence on the quality of life among ESRD patients. First studies on sexual dysfunction in dialysis patients, date back to the 1970s, highlighted the high prevalence of sexual dysfunction among patients of both sexes (8). Following studies confirmed that sexual dysfunction is very common in men and women with ESRD, associated with anxiety and depression, affecting the quality of life with impact on self-confidence, self-esteem and self-image (9, 10). The aim of this study is to describe the incidence of male and female main sexual dysfunctions, in patients undergoing hemodialytic therapy, considering modern dialytic techniques. Two dialytic centers have been compared, one in Northern Italy and another one in Southern Italy. Different prevalence has been compared to the general population.

METHODS

A prospective cross-sectional observational study amongst two hemodialysis centers has been conducted. The presence of sexual dysfunctions has been assessed by questionnaires administered to patients on chronic haemodialysis treatment in both examined haemodialysis centers, one in Southern Italy (Palermo) and one in Northern Italy (Lecco). Questionnaires were administered and returned anonymously. Andrological or gynecological evaluation was offered when requested by patients. Inclusion criteria are age < 75 years and dialytic age > 3 months. Exclusion criteria are advanced neoplastic diseases, life expectancy < 6 months, radical prostatectomy, anti-androgenic therapy, sexual dysfunctions unrelated to kidney disease, any previous surgical manipulation of the urogenital system, use of drugs to improve sexual performance, psychiatric disorders, and people who refused to participate to the study.

Dialytic patients were recruited for the study regardless of the cause that led to end-stage renal failure. Data were collected from January 2018 to December 2018. Questionnaires administered to male patients are *International Index of Erectile Function 15* (IIEF) 15 (11) and *Premature Ejaculation Diagnostic Tool* (PEDT) (12). The *Female Sexual Function Index* test (FSFI) (13) was administered to Female patients.

Data are compared with mean *standard deviation* (SD) and with the variance analysis (ANOVA). A value of $p < 0.05$ is considered significant. Discrete data are analysed with contingency analysis. A $\chi^2 < 0.05$ value is considered significant. In our study, the sample size was not calculated and this represents a limitation for results.

RESULTS

78 patients were recruited into the study: 5 of them were excluded for psychiatric issues, 6 refused to answer and 10 did not complete the questionnaire. Therefore, our study was carried out on 57 patients. Patients underwent chronic hemodialysis treatment, aged 54 ± 12 years, 37 males and 20 females, with dialysis age 42 ± 35 months, of which 33 patients were hemodialyzed in a dialysis center in Southern Italy (Palermo) and 24 patients in a dialysis center in Northern Italy (Lecco).

In the dialysis center of Palermo, 23 male patients were recruited. Patient ages range from a minimum of 25 to a maximum of 72 years, with an average of 54 ± 14 years. We also analyzed the dialysis ages of patients from a minimum of 4 to a maximum of 84 months, with an average of 37 ± 24 months. In the dialysis center of Lecco, 14 male patients were recruited. Patient ages range from a minimum of 36 to a maximum of 70 years, with an average of 55 ± 10 years. We also collected informations about the dialysis ages of patients ranging from a minimum of 5 to a maximum of 106 months, with an average of 45 ± 33 months. Furthermore, we paid attention to the anamnesis and chronic pathologies that led patients to need dialysis treatment in the respective center (Table 1). The average age of male patients on hemodialysis treatment in Palermo is not significant different from those in Lecco (54 ± 14 years vs 55 ± 10 years, respectively) and there is not significant difference in dialysis age, either (37 ± 24 months vs 45 ± 33 months, respectively). On the other hand, there is a difference in the most common underlying disease between the two centers: diabetic nephropathy (39%) in Palermo and polycystic kidney (29%) in Lecco.

In the dialysis center of Palermo, 10 female patients were recruited. The ages of the patients range from a minimum of 39 to a maximum of 71 years, with an average of 54 ± 11 years. 60% (n. 6) of these patients were in menopause. We also collected informations about the dialysis ages of the patients ranging from a minimum of 10 to a maximum of 72 months, with an average of 35 ± 20 months. In the center of Lecco, 10 female patients were recruited. The ages of the patients range from a minimum of 34 to a maximum of 63 years, with an average of 53 ± 10 years. 80% (n. 8) of these patients were in menopause. We also collected the dialysis ages of the patients ranging from a minimum of 9 to a maximum of 209 months, with an average of 57 ± 62 months.

Table 1.
Cause of ESRD.

Cause of ESRD	Male Palermo	Male Lecco	Female Palermo	Female Lecco
Hypertensive nephropathy	3 (13%)	0	1 (10%)	0
Diabetic nephropathy	9 (39%)	3 (21%)	4 (40%)	2 (20%)
Obstructive nephropathy	3 (13%)	1 (7%)	1 (10%)	0
Glomerulonephritis	4 (17%)	2 (14%)	1 (10%)	3 (30%)
Polycystic kidney	1 (4%)	4 (29%)	1 (10%)	4 (40%)
Recurrent urinary tract infections	3 (13%)	1 (7%)	2 (20%)	0
Nephroangiosclerosis	0	3 (21%)	0	1 (10%)
Tot	23	14	10	10

We also paid attention to the anamnesis and chronic pathologies that led patients to need dialysis treatment in the respective center (Table 1). The average age of female patients on hemodialysis treatment in Palermo is not significantly different from those in Lecco (54 ± 11 years vs 53 ± 10 years, respectively) while there is a significant difference in dialysis age, either (35 ± 20 months vs 57 ± 62 months, respectively). As in the case of male patients, there is a difference in the most common underlying disease between the two centers: diabetic nephropathy (40%) in *Palermo* and polycystic kidney (40%) in *Lecco*. ESRD influence on sexual function is analyzed using questionnaires. For male patients following parameters are taken into account: erectile dysfunction, orgasmic dysfunction, libido reduction, dissatisfaction of sexual relations and premature ejaculation (Table 2).

Erectile dysfunction is present in 70% of patients with different severity level distributed with a significant difference ($\text{Chi}^2 < 0.001$). Data show prevalence of severe dysfunction among patients on hemodialysis treatment at the center of *Lecco*, while at the hemodialysis center of *Palermo* this dysfunction is absent in most patients.

We documented a different score ($p < 0.001$) among patients of the center of *Palermo* compared to those of

the center of *Lecco* (9 ± 2 vs 3 ± 4 , respectively). The reduction in sexual desire is absent in 2 patients (5%), very slight in 5 patients (14%), mild in 19 patients (51%), moderate in 8 patients (22%) and severe in 3 patients (8%). Libido reduction is statistically different ($\text{Chi}^2 < 0.05$) between the male patients of the two hemodialysis centers, with a clear prevalence of severe and moderate dysfunction among the patients on hemodialysis treatment at the center of *Lecco*, whereas it is mild in most patients in treatment at the hemodialysis center in *Palermo*. We documented a significantly different score ($p < 0.05$).

The general sexual well-being is also statistically different ($\text{Chi}^2 < 0.05$) with a clear prevalence of severe and moderate impairment among the patients on hemodialysis treatment at the center of *Lecco*, while this impairment is mild or very mild in most patients in treatment at the hemodialysis center in *Palermo*. We documented significantly different score ($p < 0.05$) among patients of the center of *Palermo*, compared to those of the center of *Lecco* (7 ± 0 vs 5 ± 1 , respectively).

There is a statistically significant difference ($\text{Chi}^2 = 0.03$) regarding premature ejaculation: this alteration of sexuality is more frequent in male patients on dialysis at the center

of *Lecco*, compared to male patients of the hemodialysis center in *Palermo*.

However, when considering the total score of responses on premature ejaculation, instead of considering the discrete variables (present, absent and probable), this difference is no longer significant; in particular, the total score is 7.6 ± 4.0 and 8.9 ± 6.8 in patients being treated at the hemodialysis center in *Palermo* and *Lecco*, respectively (Figure 1) (Table 2).

Figure 1.
Male's main sexual dysfunctions.

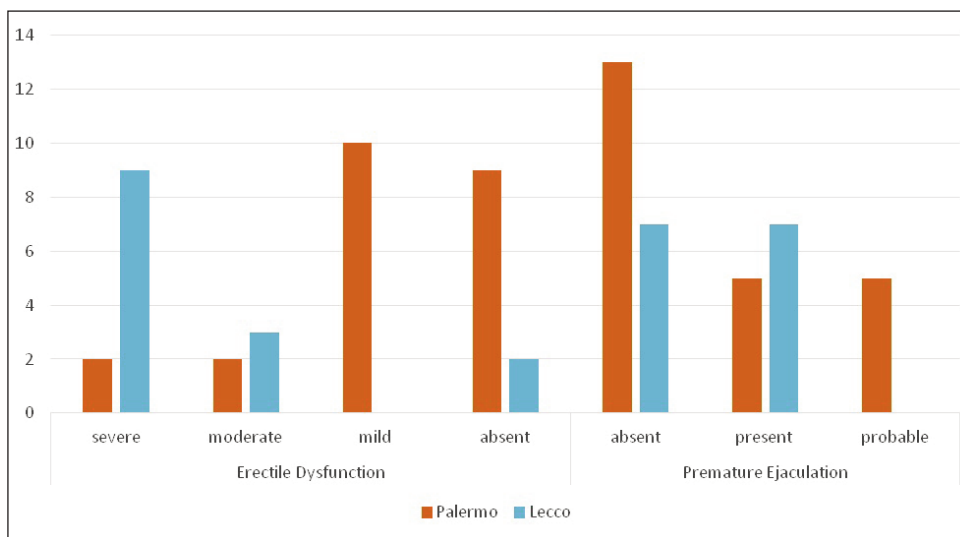


Table 2.
Males' sexual dysfunctions.

Patients features	Patients (n.) 57 Males: 37 - Females: 20 Age (years) 54 ± 12 (Palermo 54 ± 14 ; Lecco 55 ± 10) Dialysis age (month) 42 ± 35 (Palermo 37 ± 24 ; Lecco 45 ± 33)												P value
	Palermo						Lecco						
Males sexual dysfunctions	Severe	Moderate	Mild	Light	Very light	Absent	Severe	Moderate	Mild	Light	Very light	Absent	
Erectile dysfunction (%)	2 (8.7%)	2 (8.7%)	10 (43.5%)			9 (39.1%)	9 (64.3%)	3 (21.5%)	0			2 (14.2%)	
Orgasmic dysfunction (%)	1 (4.3%)		1 (4.3%)		2 (8.7%)	19 (82.7%)	9 (64.3%)		0		3 (21.5%)	2 (14.2%)	
Libido reduction (%)	0		3 (13%)	15 (65.3%)	3 (13%)	2 (8.7%)	3 (21.5%)		5 (35.8%)	4 (28.5%)	2 (14.2%)	0	
Dissatisfaction of sexual relations (%)	2 (8.7%)		0	12 (52.1%)	9 (39.2%)		10 (71.4%)		2 (14.2%)	1 (7.1%)	1 (7.1%)		
	Present		Probable			Absent	Present		Probable			Absent	
Premature ejaculation (%)	5 (21.7%)		5 (21.7%)			13 (56.6%)	7 (50%)		0			7 (50%)	

Here below female patients' data were then analyzed. Through the scores we investigated parameters such as reduction of sexual desire, reduction of sexual arousal, lubrication, orgasmic dysfunction, sexual dissatisfaction and sexual pain (Table 3). The reduction in sexual desire is statistically significant ($\text{Chi}^2 < 0.05$) in female patients in hemodialysis treatment in the two hemodialysis centers, with it being severe or moderate in patients in hemodialysis treatment in *Lecco*, while in patients in hemodialysis treatment in *Palermo* it presented in a milder form. However, the analysis of the score, i.e. the continuous variable, do not show a statistically significant difference between patients of *Palermo* and those of *Lecco* (2.2 ± 0.9 vs 2.8 ± 0.9).

The reduction in sexual arousal is not statistically significant in female patients in hemodialysis treatment at the two hemodialysis centers, although the reduction in sexual arousal is more severe in hemodialysis patients in *Lecco* than in hemodialysis patients in *Palermo*. The score shows a statistically significant difference ($p < 0.005$) between patients of *Palermo* and those of *Lecco* (3.2 ± 1.1 vs 1.3 ± 1.7) with a greater dysfunction of sexual arousal in the latter. The reduction in lubrication is statistically significant ($\text{Chi}^2 < 0.01$) in female patients in hemodialysis treatment at the two hemodialysis centers, being severe or moderately severe among patients in hemodialysis treatment in *Lecco*, while in patients in hemodialysis treatment in *Palermo* it manifested itself in a milder form.

Figure 2.
Female's main sexual dysfunctions.

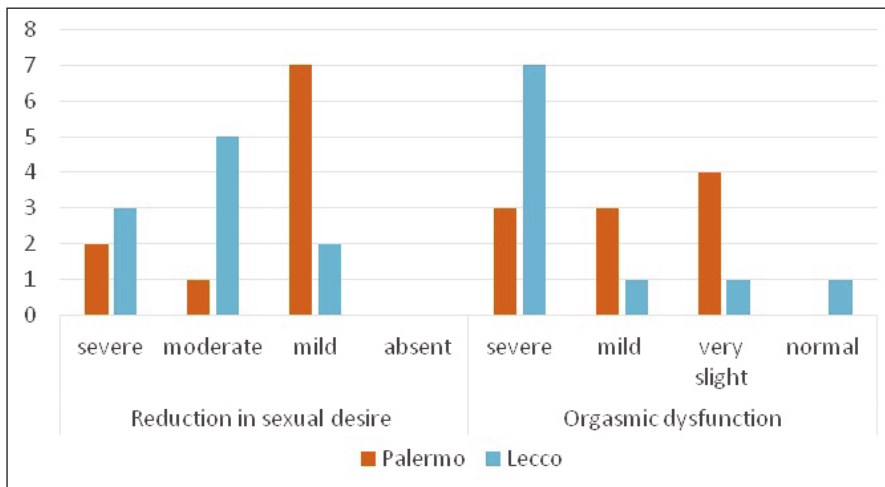


Table 3.
Females' sexual dysfunctions.

Females sexual dysfunctions	Palermo					Lecco					P value
	Severe	Moderate	Mild	Very mild	Absent	Severe	Moderate	Mild	Very mild	Absent	
Reduction of sexual desire (%)	2 (20%)	1 (10%)	7 (70%)			3 (30%)	5 (50%)	2 (20%)			
Reduction in sexual arousal (%)	1 (10%)	2 (20%)	5 (50%)	2 (20%)	0	6 (60%)	1 (10%)	2 (20%)	1 (10%)	0	< 0.005
Female lubrication reduction (%)	1 (10%)	2 (20%)	2 (20%)	5 (50%)	0	7 (70%)	0	0	1 (10%)	2 (20%)	
Orgasmic dysfunction (%)	3 (30%)		3 (30%)	4 (40%)	0	7 (70%)		1 (10%)	1 (10%)	1 (10%)	< 0.05
Sexual dissatisfaction (%)	1 (10%)	0	3 (30%)	6 (60%)		7 (70%)	2 (20%)	1 (10%)	0		< 0.001
Sexual pain (%)	3 (30%)	4 (40%)	3 (30%)		0	8 (80%)	0	2 (20%)		0	< 0.05

The analysis of the score, i.e. the continuous variable, do not show a statistically significant difference between the patients of *Palermo* and those of *Lecco* (3.2 ± 1.2 vs 1.5 ± 2.5 , respectively).

Orgasmic dysfunction is not statistically significant in female patients in hemodialysis treatment at the two hemodialysis centers, although there is a greater tendency for severe dysfunction in patients in hemodialysis treatment at the center of *Lecco* than in patients in hemodialysis treatment in *Palermo*. The score shows a statistically significant difference ($p < 0.05$) between the patients of *Palermo* and those of *Lecco* (3.0 ± 1.4 vs 1.2 ± 2.0 , respectively). Sexual dissatisfaction is statistically significant ($\text{Chi}^2 < 0.001$) in female patients in hemodialysis treatment at the two hemodialysis centers, with a greater tendency for severe sexual dissatisfaction in patients in hemodialysis treatment at the center of *Lecco*, compared to patients in treatment hemodialysis in *Palermo*.

The analysis of the score, i.e. of the continuous variable, also shows a statistically significant difference ($p < 0.001$) between the patients of *Palermo* and those of *Lecco* (3.8 ± 0.4 vs 0.7 ± 0.4 , respectively).

Finally, sexual pain presents a statistically significant difference ($\text{Chi}^2 < 0.05$) in female patients in hemodialysis treatment at the two hemodialysis centers, with a greater tendency to severe sexual pain in patients in hemodialysis treatment at the center of *Lecco*, compared to patients in hemodialysis treatment in *Palermo*.

The analysis of the score, i.e. the continuous variable, also shows a statistically significant difference ($p < 0.05$) between the patients of *Palermo* and those of *Lecco* (2.2 ± 0.7 vs 0.8 ± 1.8 , respectively) (Figure 2, Table 3).

DISCUSSION

Analyzing available data, the two main male and female typical sexual dysfunctions of the chronic hemodialytic patient were compared with those present in the general population, also making a comparison with data obtained throughout this study.

By evaluating *erectile dysfunction* (ED) we can show how this dysfunction has increased in the chronic hemodialytic population, compared to the general one, as we expected. According to general data, erectile dysfunction in Italy is present in about 3-5 million men, with a prevalence percentage ranging from 10% to 17%. According to an Italian study by Parazzini *et al.* (14), the prevalence of ED assessed by questionnaire in the general population was 12.8%, with 70% partial ED, while 30% is complete. These epidemiological data increase in the chronic hemodialytic population, as reported in the literature. In fact, according to a study by Savadi *et al.* (15), the prevalence of ED in patients with chronic renal failure was reported in the range of 22-88% and more specifically it is 87.5% in patients on hemodialysis. Analyzing our data, ED prevalence of 70% is observed, considering also the mild form, and it is more frequent in the population of Northern *Italy* than in that of Southern *Italy*. Evaluating premature ejaculation, it has been observed that in the Italian general population it is present in about 4-5 million men with a prevalence ranging from about 15 to 20%; while according to the literature, and more precisely according to Aslan, the prevalence of premature ejaculation is determined in 31.6% of patients (16). Analyzing our data, it was observed that the prevalence of premature ejaculation in our population is 46%.

Assessing the alterations of the female sexual sphere, although data from female hemodialytic patients are very limited, it has been observed that according to one of the largest study carried out worldwide, the prevalence of these disorders is around 84%, confronted with a general population prevalence of about 45% (more precisely, in the general population there is, for example, a dyspareunia ranging from 12% in women of childbearing age up to 31% in those in menopause; or vaginismus that is about 0.5-15%) (9). Data reported by our study, however, show that sexual dysfunctions in women receiving hemodialysis are around in 100% of patients, in almost all assessed items.

Furthermore, comparing data of these sexual dysfunctions between the population of Northern *Italy* and that of Southern *Italy*, in the two hemodialysis centers, it is evident that they are different, with a greater prevalence in the Northern population compared to the Southern one. This could be due to different reasons. These differences allow us only to be able to formulate diagnostic hypotheses underlying the different results obtained by our study. A definitely important aspect to explain these differences is basic nephropathy: our data show a significant difference between basic nephropathy in the population assessed in the North and in the South; it cannot be excluded that the underlying pathology may contribute to these differences in sexual dysfunction between the two Italian populations. Even the dialysis age, slightly higher in *Lecco* patients than in *Palermo* patients, could explain this difference between the two populations. The cultural differences between the two regions of the country could also have influenced the test results by changing the approach to the questions and altering the answers.

In addition, by assessing the prevalence of male and female sexual dysfunctions, it is evident that these are more frequent in the male than in the female sex. This dif-

ference could be due to different pathogenetic factors in the male sex compared to the female one. Finally, psychological factors in these differences cannot be excluded.

CONCLUSIONS

Our study confirms literature data, according to which chronic renal failure is a disabling disease, also from a sexual functionality point of view, of both male and female patients, and confirms the need for specialist andrological or gynecological advice, in addition to dialysis.

The growing number of dialytic populations with sexual disorders needs specialist support to improve their quality of life.

CONFLICT OF INTEREST STATEMENT

Authors declare that they have no competing interests. The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

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