

# Sexual function of kidney transplant recipients

A função sexual da pessoa transplantada renal

La función sexual de la persona con trasplante renal

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## Abstract

**Background:** Sexual dysfunction in people with chronic kidney disease is progressive and worsens with the deterioration of kidney functions. Although most people recover their sexual function after kidney transplantation, many sexual problems may persist after transplantation.

**Objectives:** To characterize the sexual function of kidney transplant recipients and analyze their association with demographic and clinical variables.

**Methodology:** A descriptive-correlational study was conducted with a sample of 139 kidney transplant recipients. Data were collected using a questionnaire for sociodemographic and clinical characterization, the International Index of Erectile Function, the Female Sexual Function Index, and the Beck Depression Inventory.

**Results:** The prevalence rate of sexual dysfunction in kidney transplant recipients was high (> 90%), and sexual desire was the most affected domain. Sexual function was influenced by age, depressive states, and the presence of a menstrual cycle.

**Conclusion:** Considering the prevalence of sexual dysfunction, nurses should integrate the research findings and promote sexual health in their daily clinical practice.

**Keywords:** kidney transplantation; sexuality; nursing

## Resumo

**Enquadramento:** A disfunção sexual na pessoa com doença renal crónica é progressiva, verificando-se um agravamento com a deterioração da função renal. O transplante renal pode restaurar a função sexual na maioria destas pessoas, no entanto, muitos problemas sexuais podem persistir.

**Objetivos:** Caracterizar a função sexual da pessoa transplantada renal e analisar a sua relação com as variáveis demográficas e clínicas.

**Metodologia:** Trata-se de um estudo descritivo-correlacional, realizado a partir de uma amostra de conveniência de 139 pessoas transplantadas renais. Os dados foram colhidos com recurso a um questionário de caracterização sociodemográfica e clínica, e ao Índice de Avaliação do Funcionamento Sexual e ao Inventário Depressivo de Beck.

**Resultados:** A taxa de prevalência de disfunção sexual na pessoa transplantada renal é elevada (> 90%) sendo o desejo sexual a dimensão mais afetada. A função sexual é influenciada pela idade, estados depressivos e presença de ciclo menstrual.

**Conclusão:** Tendo em conta a prevalência da disfunção sexual é importante que na prática clínica os enfermeiros integrem os resultados da investigação e promovam a saúde sexual.

**Palavras-chave:** transplante de rim; sexualidade; enfermagem

## Resumen

**Marco contextual:** La disfunción sexual en la persona con enfermedad renal crónica es progresiva, y se verifica un agravamiento con el deterioro de la función renal. El trasplante renal puede restaurar la función sexual en la mayoría de estas personas, sin embargo, pueden persistir muchos problemas sexuales.

**Objetivos:** Caracterizar la función sexual de la persona con trasplante renal y analizar su relación con las variables demográficas y clínicas.

**Metodología:** Se trata de un estudio descriptivo-correlacional, realizado a partir de una muestra de conveniencia de 139 personas con trasplante renal. Los datos se recogieron mediante un cuestionario de caracterización sociodemográfica y clínica, así como mediante el Índice de Evaluación del Funcionamiento Sexual y el Inventario de Depresión de Beck.

**Resultados:** La tasa de prevalencia de la disfunción sexual en la persona con trasplante renal es elevada (> 90%), y el deseo sexual es la dimensión más afectada. La función sexual se ve influenciada por la edad, los estados depresivos y la presencia del ciclo menstrual.

**Conclusión:** Considerando la prevalencia de la disfunción sexual, es importante que en la práctica clínica los enfermeros integren los resultados de la investigación y promuevan la salud sexual.

**Palabras clave:** trasplante de riñón; sexualidad; enfermería

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## Introduction

Kidney transplantation is the treatment of choice for people with end-stage renal disease (ESRD) because, in general, these patients experience increased survival rates and better quality of life than those patients using other renal replacement therapies (Muehrer, 2009). ESRD also has a strong impact on the sexual functioning of both men and women, clearly affecting their quality of life (Raggi et al., 2012) and leading to sexual dysfunction, which is a very common, benign, underdiagnosed, and multifactorial condition. Its risk factors (both physiological and psychological) are similar for both men and women (Antonucci et al., 2015). Some studies show that kidney transplantation improves sexual functioning by correcting metabolic and endocrine imbalances and improving psychological problems (Filocamo et al., 2009). However, studies report a prevalence of sexual dysfunction after kidney transplantation varying between 36% and 60% (Küçük, Türkmen, & Küçük, 2013), which is a high percentage when compared to the general population. The most common sexual dysfunctions in kidney transplant recipients are decreased libido in both men and women, erectile dysfunction in men, and decreased vaginal lubrication and sexual satisfaction and inability to reach orgasm in women (Josephson & McKay, 2013; Özdemir, Eryılmaz, Yurtman, & Karaman, 2007).

Given the importance of sexuality in the quality of life of kidney transplant recipients, it has become important to understand their perception of sexual function after transplantation. Thus, this study aims to assess the sexual function and analyze the association between the demographic and clinical variables and sexual function in kidney transplant recipients.

## Background

Sexual health and well-being are essential for a responsible, safe, and satisfying sex life. However, these aspects are still undervalued by healthcare providers and research on sexuality is still underexplored. Today, sexuality is freer from taboos and prejudice and approached in a more open way.

It is difficult to define *normal* sexual function or frequency of sexual activities because of the strong connection to cultural and ethnic aspects (Filocamo et al., 2009; Küçük et al., 2013). According to Van Ek et al. (2017), sexual dysfunction is the inability to respond sexually or have sexual pleasure. Tomada and Tomada (2012) believe that it refers to a change occurring during any phase of the sexual response cycle that prevents the individual or couple from experiencing satisfaction from the sexual activity.

A number of studies have identified the etiology of sexual dysfunction as being multifactorial (Antonucci et al., 2015; Wespes et al., 2013). Cardiovascular diseases (sedentary lifestyle, obesity, smoking, high cholesterol, and metabolic syndrome), anxiety, and depression are among the most common risk factors. The same authors underline the effectiveness of lifestyle changes and pharmacotherapy in improving sexual function.

According to Küçük et al. (2013), ESRD is largely associated with diminished sexual activity due to malaise, fatigue, and changes in body image. Research has shown that ESRD has a strong impact on sexual functioning (Raggi et al., 2012), which may lead to sexual dysfunction as a result of the physical and hormonal changes affecting it. Many of these changes impact these patients' personal lives and, more specifically, their sexuality. Due to the multiple changes and adjustments, sexual activity and sexual desire are not a priority.

Having a kidney transplant does not end a person's desire to have sex or makes sexuality less important. However, these individuals have reported problems at this level which can affect their satisfaction and quality of life after the transplant (Muehrer, 2009). Branco et al. (2013) emphasize that most kidney transplantations are performed in adults, a time when sexual function is of great importance. The most common sexual dysfunctions are decreased libido in both men and women; erectile dysfunction in men; inability to reach orgasm and reduced vaginal lubrication and sexual satisfaction in women (Josephson & McKay, 2013; Özdemir et al., 2007). However, research shows that successful transplantation reduces the risk of sexual dysfunction (although it remains three to five times higher than in the general population) and

may restore normal sexual function, especially in young patients with well-functioning grafts (Branco et al., 2013).

Factors contributing to sexual dysfunction in kidney transplant recipients include age, hypertension, diabetes mellitus, malnutrition, smoking, endocrine disturbances, anemia, neuropathy, drug therapy, time of hemodialysis (HD), being a second-time transplant recipient, self-esteem problems (concerning body image, and interpersonal roles and relationships), fatigue and weakness, lack of intimacy and loss of sexual desire, depression, and fear (Antonucci et al., 2015; Branco et al., 2013; Mirone et al., 2009).

Research on sexual dysfunction in kidney transplant recipients has focused on men, mostly on erectile dysfunction, concluding that: there is a higher prevalence of erectile dysfunction in patients undergoing HD than in transplant recipients (Antonucci et al., 2015); the prevalence of erectile dysfunction is higher among transplant recipients under the age of 45 years (Mirone et al., 2009), a result which is contrary to the study by Antonucci et al. (2015) where being older than 50 years and having diabetes mellitus and hypotestosteronemia are associated with erectile dysfunction; the prevalence of erectile dysfunction is lower in living-donor transplant recipients than in cadaveric-donor transplant recipients due to minimized ischemic injury, lower immunosuppressive treatment dosages, and improved graft outcomes (Branco et al., 2013).

Studies with women have concluded that sexual dysfunction decreased after kidney transplantation; successful renal transplantation may improve depression (Kettas, Çayan, Efesoy, Akbay, & Çayan, 2010); sexual dysfunction is high (Küçük et al., 2013); renal transplantation has positive effects on sexual function and menstrual and hormonal status. Menstruation and fertility were often restored by the normalization of the endocrine profile (Filocamo et al., 2009).

## Research question

What are the characteristics of the sexual function of kidney transplant recipients and the associated demographic and clinical factors?

## Methodology

An analytical, level-2 quantitative, descriptive-correlational study was conducted with a convenience sample of kidney transplant recipients who had a follow-up consultation at a Transplantation Center in Portugal, between September and November 2015, and met the inclusion criteria: age  $\geq$  18 years; being married, cohabiting, or having a sex partner; having had a kidney transplant 6 months to 5 years before; knowing how to read and write; and agreeing to participate in the study after clarification of its objectives.

The data collection tool included sociodemographic and clinical questions, the International Index of Erectile Function (IIEF, translated and validated for the Portuguese population by Gomes & Nobre, 2012), the Female Sexual Function Index (FSFI, translated and validated for the Portuguese population by Pechorro et al., 2012), and the Beck Depression Inventory (BDI, translated and validated for the Portuguese population by Vaz Serra & Abreu, 1973). The IIEF is a 15-item tool (scored on a 6-point Likert-type scale) that examines five domains of male sexual function: Erectile function, Orgasmic function, Sexual desire, Intercourse satisfaction, and Overall satisfaction. The FSFI is a 19-item questionnaire (scored on a 6-point Likert-type scale) that assesses the following domains: Desire-Arousal, Lubrication, Orgasm, Satisfaction, and Pain. Both the IIEF and the FSFI have good psychometric properties. The BDI is a 21-item measure, scored using a Guttman scale, used to assess depressive symptoms (both the cognitive and the biological dimensions). All ethical and legal aspects required in scientific research were respected. The research protocol was analyzed and approved by the Ethics Committee of the health institution where data were collected (Opinion No. CES/097).

The data collection tool was handed out in the waiting room of the consultation office to the 153 people who signed the informed consent form. Of these, 14 did not return the data collection tool, which corresponds to a response rate of 90.85%. The final sample was composed of 139 kidney transplant recipients: 98 men (70.5%) and 41 women (29.5%).

Sexual function was assessed in a sample of 110

transplant recipients (79 men and 31 women) because, according to the guidelines in the IIEF and FSFI validation studies for the Portuguese population (Gomes & Nobre, 2012; Pechorro et al., 2012), the individuals who had no sexual activity in the past four weeks were excluded. Data were analyzed using IBM SPSS Statistics, version 22.0. Distribution normality was tested and, based on the values obtained ( $p < 0.05$ ) in the Kolmogorov-Smirnov test, non-parametric tests were used (Spearman's rank correlation coefficient and Mann-Whitney  $U$  test).

## Results

The sociodemographic and clinical characterization of the sample includes the most frequent results. In this sample, the mean age was 49 years (the youngest participant was 20 years old and the oldest one was 72 years old); most of them were married (85; 61.6%) and 27 were single (19.6%). As for their level of education, 34 of them had completed the 12<sup>th</sup> grade (28.6%) and 26 had completed the 4<sup>th</sup> grade (21.8%). With regard to profession, the majority of them were retired (65; 48.9%) and 44 individuals were employed (33.1%). With regard to health history, 92 subjects had high blood pressure (HBP; 66.2%); 23 smoked (16.5%); and 17 had dyslipidemia (12.2%). About half of kidney transplant recipients (70; 51.1%) were pre-obese or obese and the remaining 67 individuals had a normal Body

Mass Index (BMI; 48.9%). The majority of participants (94; 73.4%) had no depressive symptoms. No cases of severe depression were found and, of the 34 participants who had a depression diagnosis (26.6%), 24 had minimal or mild depression (18.8%).

On average, kidney transplant recipients had CKD for 13 years and the main etiology was HBP (45; 34.4%), followed by unknown cause (36; 27.5%) and polycystic kidney disease (20; 15.3%). Before the transplant, 105 individuals had used HD as renal replacement therapy (78.9%), 20 had used peritoneal dialysis (15%), and eight had used both techniques (6%). The mean duration of dialysis therapy was 4 years and 4 months. As to the time of transplantation, most participants had received a transplant 6 months to 1 year and 4 to 5 years before, 34 individuals (24.6%) in each group.

The majority of transplant recipients were physically active (112; 81.2%) and engaged in walking (100; 71.9%) and cycling (21; 15.1%) activities.

With regard to the characterization of sexual functioning, 29 participants (20.9%) reported no sexual activity in the past 4 weeks, reducing the sample to 110 kidney transplant recipients (79 men and 31 women).

In this sample, 94.9% of male subjects had sexual dysfunction. The most affected domains were Sexual desire and Intercourse satisfaction (75.9%); Overall satisfaction (62%); Erectile function (50.6%); and Orgasmic function (38%; Table 1).

Table 1

*Absolute and percentage distribution of male individuals with sexual dysfunction for each IIEF domain (n = 79)*

|                              | Domain            |                   |               |                          |                      |
|------------------------------|-------------------|-------------------|---------------|--------------------------|----------------------|
|                              | Erectile function | Orgasmic function | Sexual desire | Intercourse satisfaction | Overall satisfaction |
|                              | No. (%)           | No. (%)           | No. (%)       | No. (%)                  | No. (%)              |
| <b>Type of dysfunction</b>   |                   |                   |               |                          |                      |
| Severe dysfunction           | 2 (2.5)           | 1 (1.3)           | 1 (1.3)       | 7 (8.9)                  | 2 (2.5)              |
| Moderate dysfunction         | 8 (10.1)          | 3 (3.8)           | 4 (5.1)       | 5 (6.3)                  | 6 (7.6)              |
| Mild to moderate dysfunction | 18 (22.8)         | 12 (15.2)         | 15 (19.0)     | 13 (16.5)                | 7 (8.9)              |
| Mild dysfunction             | 12 (15.2)         | 14 (17.7)         | 40 (50.6)     | 35 (44.3)                | 34 (43.0)            |
| No dysfunction               | 39 (49.4)         | 49 (62.0)         | 19 (24.1)     | 19 (24.1)                | 30 (38.0)            |

In this sample, 96.8% of female participants had sexual dysfunction. In the FSFI, the lowest mean scores were found in the Desire/arousal and Orgasm domains. Satisfaction had the

highest mean score (Table 2). Still, 21 women reported having a menstrual cycle (55.3%) and 11 women reported that it was restored after kidney transplantation (35.5%).

Table 2  
Summary statistics of FSFI domains for female subjects ( $n = 31$ )

|                | Mean | Median | Standard deviation | Interquartile range |
|----------------|------|--------|--------------------|---------------------|
| <b>Domain</b>  |      |        |                    |                     |
| Desire/arousal | 2.81 | 3.00   | 1.63               | 1.39                |
| Lubrication    | 3.24 | 3.50   | 1.98               | 2.28                |
| Orgasm         | 3.08 | 3.67   | 2.08               | 2.34                |
| Satisfaction   | 3.74 | 3.67   | 1.84               | 1.34                |
| Pain           | 3.34 | 3.67   | 2.10               | 2.67                |

Table 3 shows the analysis of the correlations between IIEF and FSFI domains and age, BMI, duration of dialysis, and depression. In the association between age and male sexual functioning, significant correlations were only found in the domains of Sexual desire, Erectile function, and Overall satisfaction. These low negative correlations suggest that Sexual desire, Erectile function, and Overall satisfaction decrease as age advances. In women, the results show statistically significant correlations between age and all IIEF domains. These high negative correlations suggest that lubrication, desire/arousal, orgasm, and satisfaction decrease and pain worsens as women get older.

A statistically significant correlation was found between BMI and the domain of Intercourse satisfaction in men. This low positive correlation suggests that the higher the BMI, the higher the intercourse satisfaction. The correlation between female sexual functioning and BMI is

not statistically significant (Table 3).

Moreover, no statistically significant association was found between pretransplant dialysis duration and sexual functioning, in either men or women.

Statistically significant negative low correlations were found between BDI scores (depression) and male sexual functioning in the following domains: Sexual desire, Erectile function, and Overall satisfaction. It seems that the higher the BDI score (higher depression rates), the lower the sexual desire, erectile function, and overall satisfaction. A statistically significant negative correlation was also found in women between the BDI scores and the female sexual functioning in the following domains: Lubrication, Desire/arousal, and Satisfaction. These are negative correlations, but comparatively stronger than those observed in male subjects. These results show that lubrication, desire/arousal, and satisfaction decrease as BDI scores increase (Table 3).

Table 3

*Spearman's bivariate correlation analysis (one-tailed tests) between the IIEF (men; n = 79) and FSFI (women; n = 31) domains and age, BMI, dialysis duration, and BDI scores*

|               |                          | Age              | BMI              | Dialysis duration | BDI              |
|---------------|--------------------------|------------------|------------------|-------------------|------------------|
| Domains       |                          |                  |                  |                   |                  |
| IIEF (n = 79) | Sexual desire            | -0.207*          | -0.015 <i>ns</i> | -0.137 <i>ns</i>  | -0.267**         |
|               | Erectile function        | -0.265**         | -0.020 <i>ns</i> | -0.166 <i>ns</i>  | -0.294**         |
|               | Orgasmic function        | -0.174 <i>ns</i> | 0.065 <i>ns</i>  | -0.006 <i>ns</i>  | -0.109 <i>ns</i> |
|               | Intercourse satisfaction | -0.165 <i>ns</i> | 0.201*           | -0.178 <i>ns</i>  | -0.149 <i>ns</i> |
|               | Overall satisfaction     | -0.182*          | 0.113 <i>ns</i>  | -0.074 <i>ns</i>  | -0.309**         |
| FSFI (n = 31) | Lubrication              | -0.618***        | -0.130 <i>ns</i> | -0.252 <i>ns</i>  | -0.387**         |
|               | Desire/arousal           | -0.705***        | -0.215 <i>ns</i> | -0.109 <i>ns</i>  | -0.440**         |
|               | Orgasm                   | -0.511***        | -0.172 <i>ns</i> | -0.260 <i>ns</i>  | -0.161 <i>ns</i> |
|               | Satisfaction             | -0.503***        | -0.076 <i>ns</i> | -0.239 <i>ns</i>  | -0.417**         |
|               | Pain                     | -0.350*          | -0.055 <i>ns</i> | -0.290 <i>ns</i>  | -0.265 <i>ns</i> |

Note. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; *ns* = not significant.

Table 4 shows that the differences between male sexual functioning and physical activity were only statistically significant in the IIEF domain Overall satisfaction. Men ( $n = 11$ ) who did not practice any physical activity had a significantly higher overall satisfaction than those who did. No statistically significant differences were found between these variables in women.

As for the correlation between the presence of menstrual cycle and female sexual functioning, the differences were only statistically significant in the domains of Lubrication, Desire/arousal, and Orgasm. These negative differences suggest that women without a menstrual cycle ( $n = 14$ ) have comparatively worse lubrication, desire/arousal, and orgasm.

Table 4

Results of the Mann-Whitney U test applied to the IIEF (men; n = 79) and FSFI (women; n = 31) domains according to the practice of physical activity and the presence of menstrual cycle in women

| Domains       |                          | Physical activity | No. | Mean rank | U                     |
|---------------|--------------------------|-------------------|-----|-----------|-----------------------|
| IIEF (n= 79)  | Sexual desire            | Yes               | 68  | 38.31     | -1.165 <sub>ns</sub>  |
|               |                          | No                | 11  | 46.73     |                       |
|               | Erectile function        | Yes               | 68  | 38.36     | -1.102 <sub>ns</sub>  |
|               |                          | No                | 11  | 46.45     |                       |
|               | Orgasmic function        | Yes               | 68  | 38.52     | -0.1003 <sub>ns</sub> |
|               |                          | No                | 11  | 45.45     |                       |
|               | Intercourse satisfaction | Yes               | 68  | 38.84     | -0.643 <sub>ns</sub>  |
|               |                          | No                | 11  | 43.55     |                       |
|               | Overall satisfaction     | Yes               | 68  | 37.51     | -1.975*               |
|               |                          | No                | 11  | 51.59     |                       |
| Domains       |                          | Physical activity | No. | Mean rank | U                     |
| FSFI (n = 31) | Lubrication              | Yes               | 24  | 16.40     | -0.451 <sub>ns</sub>  |
|               |                          | No                | 7   | 14.64     |                       |
|               | Desire/arousal           | Yes               | 24  | 16.92     | -1.042 <sub>ns</sub>  |
|               |                          | No                | 7   | 12.86     |                       |
|               | Orgasm                   | Yes               | 24  | 16.13     | -0.143 <sub>ns</sub>  |
|               |                          | No                | 7   | 15.57     |                       |
|               | Satisfaction             | Yes               | 24  | 16.63     | -0.713 <sub>ns</sub>  |
|               |                          | No                | 7   | 13.86     |                       |
|               | Pain                     | Yes               | 24  | 15.52     | -0.557 <sub>ns</sub>  |
|               |                          | No                | 7   | 17.64     |                       |
| Domains       |                          | Menstrual cycle   | No. | Mean rank | U                     |
| FSFI (n = 31) | Lubrication              | Yes               | 17  | 18.00     | -2.115*               |
|               |                          | No                | 14  | 11.31     |                       |
|               | Desire/arousal           | Yes               | 17  | 18.19     | -2.242*               |
|               |                          | No                | 14  | 11.08     |                       |
|               | Orgasm                   | Yes               | 17  | 17.84     | -2.013*               |
|               |                          | No                | 14  | 11.50     |                       |
|               | Satisfaction             | Yes               | 17  | 17.31     | -1.634 <sub>ns</sub>  |
|               |                          | No                | 14  | 12.15     |                       |
|               | Pain                     | Yes               | 17  | 15.59     | -0.429 <sub>ns</sub>  |
|               |                          | No                | 14  | 14.27     |                       |

Note. \*p < 0.05; ns = not significant.

## Discussion

In this sample, 29 kidney transplant recipients reported no sexual activity in the previous 4 weeks (20.9%), which is consistent with other studies, although lower than the percentage (35%) found by Antonucci et al. (2015) in male individuals. It is thus important to identify the reason behind the lack of sexual activity for a long period of time. Sexual dysfunction is an important health problem among kidney transplant recipients because 94.9% of men and 96.8% of women reported symptoms of sexual dysfunction. Van Ek et al. (2017) identified a prevalence of 46% in both male and female kidney transplant recipients.

Although the prevalence of sexual dysfunction is very high in both male and female kidney transplant recipients, it is higher in women, which is in line with Özdemir et al. (2007) who found a prevalence of 93.9% in women and 56.9% in men. Kurtulus, Salman, Fazlioglu, and Fazlioglu (2017) found a prevalence of 73.9% in women. The most affected male sexual functions were sexual desire, intercourse satisfaction, overall satisfaction, and erectile function. These results are similar to those found by Özdemir et al. (2007) and Josephson and McKay (2013) who reported decreased libido in both men and women, erectile dysfunction in men, and decreased vaginal lubrication, sexual satisfaction, and inability to reach orgasm in women. Studies on erectile dysfunction found a prevalence varying between 40.6% and 75.5% (Branco et al., 2013; Yavuz et al., 2013), which is in line with this study, where 40 male participants (50.6%) mentioned this dysfunction. The lowest mean FSFI scores were found in the domains of Desire/arousal, followed by Orgasm, Lubrication, Pain, and Satisfaction. Kurtulus et al. (2017) also identified a higher prevalence of desire/arousal.

These are worrying results given the fact that only one-quarter of patients seek professional help or improve their image as measures to change the situation. Van Ek et al. (2017) explain that people do not seek help because sexual health is often ignored by health professionals during the posttransplant consultation. However, knowledge and the adoption of strategies for a more positive experience of posttransplant changes will allow overcoming some of the barriers.

The analysis of the association between age and sexual functioning showed that the sexual func-

tioning of transplant recipients decreases as age advances. In women, pain also worsens with age. These results are in line with other studies that found a progressive decline of sexual activity in both men and women as age advances. Antonucci et al. (2015) and Yavuz et al. (2013) found that male transplant recipients aged over 50 years are 7.2 times more likely to have erectile dysfunction than younger recipients. It should be noted that Mirone et al. (2009) concluded that erectile function worsens after kidney transplantation in younger patients. When it comes to female transplant recipients, Kurtulus et al. (2017) concluded that female sexual dysfunction increases with age and that age is the most important risk factor for sexual dysfunction. Küçük et al. (2013) also found a significant correlation between these variables.

No significant correlation was found between BMI and sexual functioning in both male and female transplant recipients. This situation would be particularly relevant in this study given that 51.1% of sampled individuals are pre-obese and obese.

With regard to the association between physical activity and the sexual functioning of kidney transplant recipients, no statistically significant correlations were found, that is, this healthy lifestyle does not seem to have an impact on sexual function. It should be noted that physical activity has been associated with a lower prevalence of sexual dysfunction and improved sex life (Wespes et al., 2013).

Pretransplant dialysis therapies are a factor influencing the sexuality and sexual function of kidney transplant recipients because of the prolonged duration of HD and the consequent exposure of the cavernous tissue and the penile vasculature to uremic toxins that impair erectile function (Branco et al., 2013). Thus, with a mean of 13 years of CRD and 52 months of dialysis therapy, the sexual function may have been impaired. No association was found between the duration of pretransplant dialysis and posttransplant sexual function, which is contrary to the results found by Filocamo et al. (2009), in which women had desire and arousal disorders before and after the transplant. However, these results are in line with those found by Antonucci et al. (2015), Branco et al. (2013), and Kettas et al. (2010), who found no statistically significant difference between the duration/dialysis therapy



and the presence of sexual dysfunction. The prevalence of depression in this study was 26.6%, which is similar to those found by Chilcot, Spencer, Maple, and Mamode (2014) and Kurtulus et al. (2017). Chilcot et al. (2014) consider that anxiety and depression screening should be integrated into patients' overall assessment during the posttransplant period because the reduction of depressive symptoms can improve sexual functioning and, in turn, improve health and quality of life. Given that depression is a prevalent and problematic comorbidity that is still underestimated and associated with sexual dysfunction (Chilcot et al., 2014; Filocamo et al., 2009; Kettas et al., 2010; Noohi et al., 2007; Özdemir et al., 2007; Yavuz et al., 2013), the association between high levels of depression and sexual functioning was analyzed. It seems that the higher the depression scores, the lower the male sexual functioning in the domains of Sexual desire, Erectile function, and Overall satisfaction. These results are consistent with those found by Noohi et al. (2007), who found that anxiety and depression contribute to higher morbidity, a poor quality of life, but also poor marital relations, sexual functions, and sleep quality among kidney transplant recipients; Özdemir et al. (2007), who found a significant association between BDI and sexual functioning in the domains of Desire, Lubrication, Erection, and Satisfaction; and Yavuz et al. (2013), who found a negative correlation between erectile dysfunction and depression scores. In this study, the highest levels of depression were associated with poor sexual functioning in the domains of Lubrication, Desire/arousal, and Satisfaction among women. These results differ from those found by Filocamo et al. (2009), Kettas et al. (2010), and Kurtulus et al. (2017), who found no significant association between BDI scores and female sexual functioning, although depression improved after the transplant. In this study, female transplant recipients with a menstrual cycle have better sexual functioning in the domains of Lubrication, Desire/arousal, and Orgasm, possibly as a result of vascular anastomosis, which is crucial in women's sexual functioning, particularly in lubrication. The positive effects of kidney transplantation in female sexual functioning and in the hormonal and menstrual status of perimenopausal women has implications in the menstrual cycle and fertility

when grafts are well-functioning (Filocamo et al., 2009). In Kurtulus et al. (2017), no statistically significant association was found between female sexual dysfunction and pre- or post-menopause. This study had some limitations. Considering the size of the sample and the fact that it was a nonprobability sample, in which the randomness and representativeness of the population were not guaranteed, the ability to generalize the results to the population of kidney transplant recipients is compromised. However, some results may guide the interventions with kidney transplantation recipients even in other contexts.

## Conclusion

Several studies confirm the prevalence of problems with sexual functioning in the population of kidney transplant recipients and the impact of sexual problems on their quality of life, well-being, self-esteem, and interpersonal relations. So, the promotion of sexual health among these patients is a relevant nursing intervention.

In this study, the prevalence of sexual dysfunction is both male and female participants. Sexual desire is the most affected dimension.

There is evidence that the sexual function of kidney transplant recipients is associated with age, depressive states, and, in women, the presence of menstrual cycle. No statistically significant associations were found between sexual function and BMI, physical activity, and duration of pretransplant dialysis.

Given the high prevalence of sexual dysfunction, the research findings suggest that health professionals should ask the patient about their sexual function; promote the continuity of care; identify, together with the nursing team, a structured way of educating the transplant recipient; adopt measures to promote the training process; undertake a regular assessment of the training outcomes and the responses of kidney transplant recipients.

Kidney transplant recipients should be assisted in managing their expectations regarding their sexual function, so as to help them understand that, although the kidney transplantation tends to improve sexual health, the persistence of sexual dysfunction is not uncommon. Based on these research findings, it is important to continue assessing the prevalence of sexual dysfunction in

kidney transplant recipients and the associated variables, as well as to explain why the results found in this study are considerably higher than those found in other studies. Further research should focus on the identification of the specific sexual concerns of these transplant recipients and both on the implementation and development of interventions aimed to minimize these concerns and difficulties while monitoring their outcomes.

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