Pinnacle Medicine & Medical Sciences (ISSN: 2360-9516)

http:/www.pjpub.org © Author(s) 2015. CC Attribution 3.0 License.

Research Article Vol. 2 (6), 2015.

Gender and Age Associate With Sexual Dissatisfaction in Stage 5 Chronic Kidney Disease Patients

João Paulo Lian Branco Martins¹, Sirlene Reis Caramello¹, Jane Cleide Galindo Rocha¹, Natalia Parolin Bonini¹, Marcus Vinicius de Souza João-Luiz²*, Carmen Tzanno Branco Martins¹, Dr. Cristoforo Scavone²

¹Integrated Centre of Nephrology (CINE), Av. Estilac Leal, 242 – Vila das Palmeiras – Guarulhos - SP, Brazil.

> ²Department of Pharmacology, Institute of Biomedical Sciences, University of São Paulo, São Paulo - Brazil.

Accepted 25 June, 2015.

ABSTRACT

Background: Physicians and psychologists have been noticing some degree of sexual dissatisfaction and dysfunction among patients attending our dialysis centre. This motivated us to consider the evaluation of sexual satisfaction among stage 5 chronic kidney disease (CKD 5D) patients, in order to identify possible causes for sexual disorders and thereby contribute to improving their quality of life. **Objective:** The aim of this study was to evaluate the sexual behavior and sexual satisfaction of CKD 5D patients undergoing hemodialysis. **Participants and Methods:** a single-centre, cross- sectional, prospective study was designed with 100 CKD 5D patients. Their quality of life was assessed using the Kidney Disease and Quality of Life - short form (KDQOL-sf) questionnaire, with the sexual assessment component of the KDQOL-sf being statistically evaluated to provide measures of sexual functioning and satisfaction. **Main Results:** a significant difference in sexual satisfaction was evident when comparing males and females (p < 0.05). In addition, age significantly contributed to levels of sexual satisfaction (p < 0.05). **Conclusions:** Gender and age significantly modulate the high prevalence of sexual dissatisfaction in CKD 5D patients.

Keywords: Quality of Life, Sexuality, hemodialysis, Chronic Kidney Disease.

Introduction

Sexual dysfunction is the inability to perform satisfying sexual activity. Sexual function plays an important role in quality of life (Abdo CHN *et al*, 2006). Furthermore, compliance can be impaired whenever sexual activity is jeopardized during the course of treatment (Medscape). According to Rosen and colleagues (2000), sexual problems affect 43% of women and 31% of men in the general population (Rosen RC, 2000). The Brazilian Sexual Life Study showed that 18.2% of Brazilians complain about sexual difficulties (Abdo CHN et al, 2006).

Sexual dissatisfaction is also common among chronic kidney disease (CKD) patients. Recent studies provide interesting findings about sexual functioning of stage 5 CKD (CKD 5D) patients (Kim *et al*, 2014; Santos *et al*, 2012). Santos and colleagues studied sexual satisfaction in women undergoing hemodialysis, identifying a high prevalence of sexual dissatisfaction (Santos *et al*, 2012). An older study showed that CKD 5D male patients on hemodialysis complain about erectile dysfunction, decreased libido and orgasmic difficulties (Lessan-Pezeshki M, Ghazizade S, 2008).

During their visits, physicians and psychologist have noticed a significant degree of sexual dissatisfaction and dysfunction among patients at our dialysis centre. This motivated us to evaluate levels of sexual functioning and satisfaction among CKD 5D patients in order to identify possible causes for sexual disorders and improve patients' quality of life.

Objective

The aim of this study is to evaluate the sexual functioning and satisfaction of CKD 5D patients undergoing hemodialysis.

Participants and Methods

Study Classification: a single-centre, cross-sectional, prospective study was designed with approval given by the Ethics Committee of the University of Guarulhos, Sao Paulo, Brazil. Study Time: the clinical study was carried out from January 2009 to June 2010. Study Site: the clinical investigation took place at the Centro Integrado de Nefrologia (Integrated Centre of Nephrology), situated in Guarulhos City, Sao Paulo State, Brazil. At the time of the study, three hundred patients were enrolled in the chronic hemodialysis program. Sample Size: 100 patients were selected from a total of 300 patients for this study.

Participant Selection - Inclusion criteria: Both male and female CKD 5D patients that were undergoing chronic hemodialysis and aged over 18 years old were included. All patients were voluntary participants with the study only starting after approval of a signed Informed Consent by the independent ethics committee of the University of Guarulhos. Exclusion criteria: patients not voluntarily consenting; patients with cognitive impairment and/or psychiatric disorders; patients with cancer; pregnant patients.

Hemodialysis Parameters: the high-efficiency hemodialysis session was carried out over a period of 4

Corresponding Author: Marcus Vinicius de Souza João-Luiz^{2*}

Department of Pharmacology, Institute of Biomedical Sciences, University of São Paulo, São Paulo - Brazil.

Email: luizmvsj@icb.usp.br / joaoluiz_mvs@yahoo.com.br

hours, three times a week, using polysulfone dialyser (F10), blood flow of 350 mL/min and dialysate flow of 500 mL/min. All patients had total dialysis clearance (Kt/V) within the parameters established by the appropriate guidelines (KDOQI, *Kidney Disease Outcomes Quality Initiative*). During the study, there were no alterations in the dialysis prescription, including the maintenance of the dialyzer, hemodialysis time and frequency of sessions, solution composition, hemodialysis machine and period of day.

Study Design: Procedures: Patient characteristics recorded in the study include: Gender, age, time enrolled on hemodialysis program and current medications. The clinical study protocol was initiated by visits from

medical staff. During these visits, patients were asked about their quality of life, investigated using the Kidney Disease and Quality of Life - short form (KDQOL-sf) questionnaire (Hays RD et al, 1997). KDQOL-sf is a multiitem scale targeted at particular health-related concerns of individual with kidney disease and on dialysis. the KDQOL-sf measures following factors: symptoms/problems; effects of kidney disease on daily life; burden of kidney disease; cognitive function; work status; sexual functioning; quality of social interaction; sleep. Question 16 looks at sexual functioning and satisfaction. This question is presented below:

Question 16a (First Part): "Have you had any sexual activity in the past 4 weeks?

Question 16b (Second Part) "How much of a problem was each of the following in the past 4 weeks?"

Question 100 (Second 1 art) from much of a problem was each of the following in the past 4 weeks:										
Question/Answer	Not a problem	A little problem	Somewhat of a problem	Very much a problem	Severe problem					
Enjoying Sex?										
Becoming sexually aroused?										

We used the following criteria to determine whether a patient was sexually satisfied or not: Patients who answered 'yes' for question 16a and answered 'not a problem' for question 16b were considered 'satisfied' (Group S). Patients who answered 'yes' for question 16a but answered with any answer different from 'not a problem' for question 16b were considered 'not satisfied' (Group D). Patient who answered 'no' to Question 16a were considered 'not sexually satisfied' and also allocated to Group D.

Statistical Analysis

The statistical analyses were performed with the Statistical Product and Service Solutions (SPSS) for Windows version 13.0 (IBM, CA, USA). Descriptive Analysis: The data were summarized using appropriate descriptive statistics for each type of variable. Frequency and percentages were determined for category variables. The number of valid occurrences (n), mean, median, standard deviation (sd), minimum value. maximum value were determined for continuous variables. *Comparative Analysis*: The comparison between categorical variables, including gender and categories of the time on program of hemodialysis (TPHD), and group allocation (Group S and Group D) was performed using the Chi- square Test. Student's t-tests were used to compare age, Kt/V and body mass index (BMI), whilst

Fisher's Test was used for comparison of categories of age with group (S or D). A value of p < 0.05 is considered statistically significant (Confidence Interval (CI) equal to 95%).

Results and Discussion

Of a total of 100 patients commencing this clinical investigation, 17 patients (17%) were sexually satisfied (Group S), while 83 patients (83%) complained of sexual dissatisfaction (Group D). Patient characteristics are shown in Table I.

The cross-comparison of Sexual Satisfaction with Gender shows 20% (n=45) of males and 14.5% of females (n=55) to be sexual satisfied, showing no significant difference (p 0.656; Table I). Given the proportion of satisfaction/dissatisfaction across Gender and a null hypothesis equal to 0.5, we identified a significant difference in sexual satisfaction among males (p-value = 0.0001) as well as among females (p-value < 0.001) .In the comparison of age across sexual satisfaction, the mean age in Group S is 45.1 (sd 15.8) years and 52.6 (sd 13) in group D, giving a significant difference in mean age between Group D and Group S (p-value = 0.039; Table I and Figures 1). Figure 1 shows the age comparison S between groups and D in а boxplot.

Patient Characteristics

Characteristic	Group (n=36)	S	Group (n=64)	D	All (n=100)	p-value
Gender - Male (%)	9 (19,6)		36 (80,4)		45 (100)	0.656*
Gender – Female (%)	8 (14,3)		47 (85,7)		56 (100)	
Age – Me (SD) - years	45.1 (15,8)		52,6 (13)		51,4 (13,7)	0,039**
Age – below or equal to 60 years	16 (21,9)		57 (78,1)		73 (100)	0,036***
Age – above 60 years	1 (3,7)		26 (96,3)		27 (100)	
BMI- Me (SD) - kg/m ²	22,9 (3,6)		24,3 (5,2)		24 (5)	0,321**
Kt/V – Me (SD)	1,1 (0,3)		1,2 (0,3)		1,2 (0,3)	0,435**
TPHD < 1 year	7 (17,5)		33 (82,5)		40 (100)	1,000*
TPHD > or equal to 1 year	10 (16,7)		50 (83,3)		60 (100)	

Table I - Patient Characteristics. Legend – - *Chi-Square Test; ** T-student Test. ***Fisher's Test. CI – Confidence Interval: 95%. Level of Significance: p-value <0.05. TPHD: Time in Program of hemodialysis; Gender, Male or Female; Age, in years. Me: mean; SD: standard deviation; BMI: Body Mass Index, in kg/m².

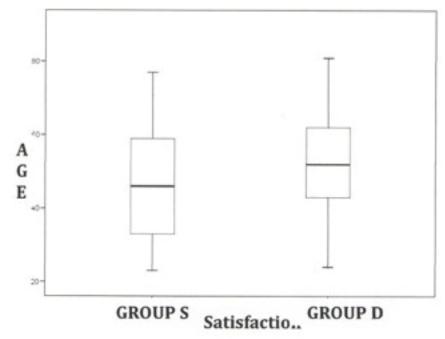


Figure 1: Comparison of Age with Sexual Satisfaction. S: group of sexually satisfied patients; D: group of not sexually satisfied patients. Age, in years. Analysis made using Student's t-test (p- value = 0.039; CI = 95%).

Splitting age into two categories, namely 60 years or below versus above 60 years, shows a significant difference between Group S and Group D. Among patients under 60, 16 patients (21.9%) were in Group S, whilst only 1 patient above 60 was in Group S. Figure 2 shows the comparison of age categories across Group S and Group D.

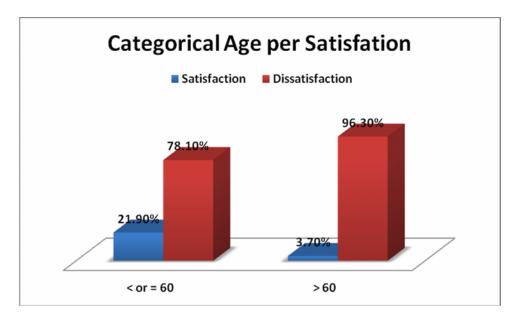


Figure 2: Categorical Age and Sexual Satisfaction. Percentage of patients (n=100) according sexual satisfaction. Age categories: below or equal to 60 years; above 60 years. Fisher's test was used, with the value of p=0.036 (CI=95%).

The mean BMI of the total sample was 24 (sd 5) Kg/m². The analysis of BMI with group shows a mean BMI of 22.9 (sd 3.6) Kg/m² in Group S and a mean BMI of 24.3 (SD 5.2) Kg/m² in Group D. No significant differences in BMI were identified between groups (p-value = 0.321). Comparison of sexual satisfaction with Kt/V shows a mean Kt/V of 1.1 (sd 0.3) in Group S and a mean Kt/V of 1.2 (sd 0.3) in Group D, with no statistically significant difference between Groups D and S (p = 0.435).

In analyzing the interaction between TPHD and Sexual Satisfaction, showed 17.5% (n=7) of sexually satisfied patients on hemodialysis program for under one year (n=40) and 16.7% (n=10) of sexually satisfied patients on hemodialysis program for one year or above. There was no significant difference between these groups (p-value = 1.0).

Once we identified an association between age and sexual satisfaction, further analysis was carried out that included gender across the age x group interaction. Within the male group, 38% of patients under 60 years were in Group S with 62% in Group D. 16% of male patients 60 years or above, were in Group S and 84% in Group D (p-value = 0.0008). In the female group, 39% of patients under 60 years were in Group S and 61% in Group D. 43% of patients 60 years or above, were in Group S and 57% in Group D (p-value = 0.662).

Based on the results above, this study provides relevant findings about sexual satisfaction, an important aspect of quality of life, among CKD 5D patients.

Firstly, it is important to emphasize the patient characteristics and hemodialysis parameters. The CKD 5D patients sample was considered homogeneous; patients of both genders, mean age 51.4 (SD 13.7) years-old, with a mean BMI of 24 (SD 5) kg/m² and similar

proportion of patients undergoing the program of hemodialysis for less than 1 year (40%) or above 1 year (60%). Such a range of patient characteristics are typical of those seen in a clinical setting.

As to hemodialysis parameters, all patients were on high-efficiency hemodialysis, carried out in 4-hour sessions, three times a week, using polysulfone dialyzer F10, 350 mL/min blood flow and 500 mL/min dialysate flow. The mean Kt/V was 1.2 (SD 0.3) for all patients (Table I). Our study provides a homogeneous distribution of patients, given the adequacy of hemodialysis. Furthermore, our study also demonstrates that a small variation in mean Kt/V has no effect on sexual satisfaction in the studied sample. Our findings corroborate the data of Kim and colleagues (Kim *et al*, 2014). These authors studied the effect of dialysis adequacy on sexual dysfunction in women, concluding that dialysis adequacy alone does not have a significant impact on sexual dysfunction (Kim *et al*, 2014).

Our results show the proportion of sexual dissatisfaction is much higher than that of the general population of Brazil (18.2%) (Abdo CHN et al, 2006), which can be explained by at least three factors, namely the illness (CKD) itself, age and gender (Zamd et al, 2005; Toorians et al, 1997). CKD and its related comorbidities are the major factor in decreased sexual functioning and satisfaction. Hypertension, diabetes, coronary arterial diseases and rheumatoid arthritis are common comorbidities among CKD 5D patients (Parazzini et al, 2000). Decreased libido and increased sexual impotence are frequent complains among CKD 5D patients. Body urea nitrogen (BUN) levels may contribute to sexual dysfunction in CKD 5D patients. However, the relationship **BUN** level sexual to

dysfunction/satisfaction requires further investigation (Lessan-Pezeshki M, Ghazizade S, 2008).

The second factor contributing to sexual dysfunction/satisfaction is ageing-related changes. Patients above 60 years showed higher dissatisfaction than patients less than 60 years. Previous work suggests that this is at least partly mediated by hormonal declines in patients above 60 years of age (Zamd et al, 2005; Bello et al, 2014). The decreased mean age of 45.1 years among sexually satisfied patients versus 52 years among sexually dissatisfied patients would also support a role for an ageing related hormonal decline. At 40-45 years, the hormone alterations become gradually more evident, with significant declines in sex hormones at 60-65 years (Zamd et al, 2005; Bello et al, 2014). In regard to age, our data are in concordance with the 2013 Brazilian Society of Nephrology Census, which showed a significant number of CKD patients aged above 50 years ("The Brazilian Society of Nephrology", 2013). Overall, hormonal alterations are likely to significantly contribute to the high prevalence of sexual dissatisfaction among CKD 5D patients above 60 years of age.

The third factor is gender. Although there is no significant difference in sexual dissatisfaction across gender, we noticed a high prevalence of sexual dissatisfaction among males and females, with a combined average of 83% dissatisfaction. Our findings are in concordance with those of Santos and colleagues (Santos et al, 2012). These authors conducted a cross-sectional observational study, using the Female Sexual Function Index (FSFI), in 58 females diagnosed with CKD 5D and currently on a hemodialysis program. They found sexual dysfunction to have a prevalence of 80%, which contributed to a poorer quality of life, especially in physical aspects, when compared to women without sexual dysfunction (Santos et al. 2012). The data in our study also shows a high prevalence of sexual dysfunction/inactivity and sexual dissatisfaction among CKD 5D female patients.

Our data also highlights a high prevalence of sexual dissatisfaction among males, which is in concordance with the work of Zamd and colleagues (2005). These authors conducted a cohort study to evaluate the prevalence of sexual dysfunction and its nature in 86 male CKD 5D patients on hemodialysis. 81.4% of their patient sample suffered from a decrease in sexual activity after the onset of CKD and treatment with hemodialysis. They also found other problems: decreased or lost libido in 59.3% of patients; total impotence in 22.1% of patients and partial impotence in a further 36%. The comparison between the group of patients who had no sexual dysfunction and the group who had this problem showed significant differences in age or sexual activity before CKD and hemodialysis. Other significant differences in the same direction were also found for frequency of sexual intercourse and sexual satisfaction (Zamd et al, 2005).

The high prevalence of sexual dissatisfaction among male CKD 5D patients suggest a role for alterations in hormones associated with the regulation of sexual functioning. For example, low levels of the adrenal hormone dehydroepiandrosterone sulfate (DHEA-S) are associated with high levels of cardiovascular disease and cardiovascular disease in CKD 5D [cardiovascular disease: hazard ratio (HR)=3.877; p =0.021: non-cardiovascular disease (HR=3.522: p=0.016)], but not women (Hsu et al, 2012). In this study, Hsu and colleagues also found plasma DHEA-S levels to be negatively correlated with age in hemodialysis men. This could suggest that some of the sexual dysfunction in CKD 5D men is driven by decreased DHEA-S, including indirectly via its impact on cardiovascular functioning. The hypothalamic pituitary adrenal (HPA) axis is often dysregulated in CKD, with increased cortisol/DHEA-S ratio being associated with decreased sexual arousal (Hamilton and Meston, 2011).

In addition, low serum testosterone concentration could be associated with adverse clinical outcomes in hemodialysis patients. The role of testosterone in adverse outcomes and quality of life was investigated in an incident cohort of male Canadian hemodialysis patients (Bello et al, 2014). In this study, Bello and colleagues searched for all-cause mortality, fatal and nonfatal cardiovascular events, and Health Utility Index (HUI) assessed health-related quality of life. During a median follow-up of 20 months, 166 (27%) patients died and 98 (20%) had a cardiovascular event. Those with higher serum testosterone levels showed a significantly decreased unadjusted risk of death, with a statistically significant increase in all-cause mortality for those with low serum testosterone levels, in an adjusted analysis. Log-transformed testosterone positively correlated with HUI scores, the authors suggesting that low serum testosterone concentration may be a modifiable risk factor for adverse outcomes and poor quality of life in male hemodialysis patients (Bello et al, 2014).

Women showed as high a prevalence of sexual dissatisfaction as men. Unlike in men, female sexual dissatisfaction is not modulated by age. This may be a function of the female menopause, which can be related to sexual dysfunction (Cabral *et al*, 2013), and which often starts prior to CKD diagnosis and the beginning of hemodialysis. Gender-related problems can be found in middle aged women, with the andropause occurring later in males. Such a later andropause may explains our findings about higher sexual dissatisfaction among men above 60 years, both in this study and previously (Cabral *et al*, 2013).

Recently, lower testosterone levels have been linked with metabolic syndrome and type II diabetes, both conditions associated with cardiovascular disease, and shown to predict higher overall and cardiovascular-related mortality in middle-aged and older men, as well

as being associated with increased sexual dysfunction. To some extent these conditions are inter-related, with ageing, lower testosterone levels, erectile dysfunction and cardiovascular disease being positively correlated (Dimitriadis and Sofikitis, 2014). Such data is mostly correlational and future studies are required to better delineate the underlying causal processes.

It should be noted that the management of CKD 5D and its co-morbidities commonly involves the prescription of medications that have sexual dysfunction as a frequent side-effect. Patients in this study have a similar drug profile (data not published), with drugs such as calcitriol associated with decreased (www.lexi.com/online). Likewise, other commonly prescribed drugs, such asomeprazole and simvastatin can decrease libido, as can the antidepressants that are widely prescribed for the high levels of depression in CKD 5D patients (www.lexi.com/online). Drugs used for hypertension management in CKD 5D patients, such as angiotensin converting enzyme inhibitors (e.g. captopril, enalapril and lisinopril) and angiotensin II receptor blockers (e.g. losartan, valsartan) may also increase sexual dysfunction (www.lexi.com/online). Given the comorbidities of CKD and the influence of gender and age on sexual satisfaction, time on hemodialysis program of under versus above 1 year does not relevantly modulate sexual satisfaction. This result corroborates the data of Toorians and colleagues, who noted that 70% of patients complain about sexual dysfunction on starting hemodialysis (Toorians et al, 1997).

With all these caveats and the need for future studies, it is recommended that careful therapeutic monitoring is carried out in order to detect sexual disorders. This may often be achieved through effective communication among members of the healthcare team (physicians, nurses, pharmacists and psychologists), which provided the clinical impetus for this study to be carried out. Hopefully, the monitoring and management of sexual dysfunctions in CKD 5D patients will contribute to a better patient quality of life and possibly to more widely beneficial treatments.

Conclusions

In conclusion, CKD and its comorbidities, as well as gender and age play major roles in the high prevalence of sexual dissatisfaction in CKD 5D patients. Future work should clarify the relative influences of these factors and how their management may improve the treatment and quality of life of CKD 5D patients.

Acknowledgements

The authors thank all participants in the study, the dialysis staff of CINE-HDC-RENALCLASS Group. We also thank Marcus Vinicius de Souza João Luiz who was supported by a student research fellowship from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). We also

thank George Anderson at CRC Scotland & London for English editing services.

References

- Abdo CHN et al. (2006): Erectil Dysfunction Outcomes from the Brazilian Sexual Life Study. Rev Assoc Med Bras 52: 4242-9.
- Medscape:
- Rosen RC (2000): Prevalence and Risk Factors of Sexual Dysfintion in Men and Women. Current Psychiatric Reports 2:189-95.
- Kim et al. (2014): Association between Hemodialysis Adequacy and Sexual Dysfunction in chronic renal failure: a preliminar study. Bmc Urology 14: 4 doi: http://www.biomedcentral.com/1471-2490/14/4
- Toorians AW, Janssen E, Laan E, Gooren LJ, Giltay EJ, Oe PL, Donker AJ, Everaerd W (1997): Chronic renal failure and sexual functioning: clinical status versus objectively assessed sexual response. Nephrol Dial Transplant 12:2654–2663.
- Kettas E, Cayan F, Akbay E, Kiykim A, Cayan S (2008): Sexual dysfunction and associated risk factors in women with end-stage renal disease. J Sex Med 5:872– 877
- Santos et al. (2012): Quality of Life among women with sexual dysfunction undergoing hemodialysis: a cross-sectional observational study. Health and Quality of Life Outcomes 10:103 doi: http://www.hqlo.com/content/10/1/103
- 8. Lessan-Pezeshki M, Ghazizade S (2008): **Sexual and reproductive function in end-stage renal disease and effect of kidney transplantation**. Asian J Androl 10: 441-446.
- Hays RD et al. (1997): Kidney Disease and Quality of Life

 short form™: Manual for Use and Scoring. RAND,
 Santa Monica, CA, USA.
- The Brazilian Society of Nephrology: 2013 Census Report. Available at: http://www.sbn.org.br/pdf/censo_2013-14-05.pdf
- Zamd M1, Gharbi MB, Ramdani B, Zaid D (2005): Sexual dysfunction in male patients undergoing hemodialysis in morocco. Saudi J Kidney Dis Transpl. 16:33-9.
- Hsu HJ1, Yen CH, Chen CK, Hsu KH, Hsiao CC, Lee CC, Wu IW, Sun CY, Chou CC, Hsieh MF, Chen CY, Hsu CY, Tsai CJ, Wu MS (2012): Low serum DHEA-S increases mortality risk among male hemodialysis patients. Exp Gerontol. 47:950-7.
- Bello AK, Stenvinkel P, Lin M, Hemmelgarn B, Thadhani R, Klarenbach S, Chan C, Zimmerman D, Cembrowski G, Strippoli G, Carrero JJ, Tonelli M (2014): Serum testosterone levels and clinical outcomes in male hemodialysis patients. Am J Kidney Dis. 63:268-75. doi: 10.1053/j.ajkd.2013.06.010.
- 14. Parazzini F, Fabris FM, Bortolotti A, Calabro A, Chatenoud L, Colli E, (2000) *et al.* **Frequency and determinants of erectile dysfunction in Italy**. Eur Urol. 37:43-9.
- 15. Laumann EO, Paik A, Rosen RC (1999). The epidemiology of erectile dysfunction: results from the National Health and Social Life Survey. Int J Impot Res. 11 (Suppl 1):S60-4.

- Pinnock CB, Stapleton AMF, Marshall VR (1999). Erectile dysfunction in the community: a prevalence study. Med J Aust. 171:353-7.
- Laumann EO, Paik A, Rosen RC (1999). Sexual dysfunction in the United States. Prevalence and predictors. JAMA. 281:537-44.
- Araújo AB, Durante R, Feldman HA, Goldstein I, McKinlay JB (1998). The relationship between depressive symptoms and male erectile dysfunction: Cross-sectional results from The Massachusetts Male Aging Study. Psychosom Med. 60:458-65.
- Satta E, Magno C, Galì A, Inferrera A, Granese R, Aloisi C, Buemi M, Bellinghieri G, Santoro D (2014): Sexual dysfunction in women with diabetic kidney. Int J Endocrinol. doi: 10.1155/2014/346834.
- 20. Mutagaywa RK, Lutale J, Aboud M2, Kamala BA (2014): Prevalence of erectile dysfunction and associated factors among diabetic men attending diabetic clinic at

- Muhimbili National Hospital in Dar-es-Salaam, Tanzania. Pan Afr Med J. 17: doi: 10.11604/pamj.2014.
- 21. Lexi.com. Drug Information Monographs. Available at: www.lexi.com/online
- Cabral PU, Canário AC, Spyrides MH, Uchôa SA, Eleutério J Jr, Gonçalves AK (2013): **Determinants of sexual dysfunction among middle-aged women.** Int J Gynaecol Obstet. 120:271-4. doi: 10.1016/j.ijgo.2012.09.023.
- 23. Dimitriadis F1, Sofikitis N (2014): Effect of testosterone replacement treatment on constitutional and sexual symptoms in type 2 diabetic men: need for rules. Asian J Androl. doi: 10.4103/1008-682X.140967. [Epub ahead of print]
- 24. Toorians AW, Janssen E, Laan E, Gooren LJ, Giltay EJ, Oe PL, Donker AJ, Everaerd W (1997): **Chronic renal failure and sexual functioning: clinical status versus objectively assessed sexual response**. Nephrol Dial Transplant 12:2654–2663.