

Sexual Dysfunction Reduction in Female Patients with Chronic Kidney Disease Undergoing Continuous Ambulatory Peritoneal Dialysis

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ABSTRAK

Latar belakang: penyakit ginjal kronis (PGK) merupakan masalah kesehatan utama di dunia. Salah satu pengobatan kunci untuk pasien PGK stadium akhir dilakukan dengan terapi dialisis seperti Continuous Ambulatory Peritoneal Dialysis (CAPD). Penelitian ini bertujuan untuk mengetahui perbedaan kejadian disfungsi seksual pada wanita dengan PGK oleh CAPD. **Metode:** penelitian ini merupakan penelitian observasional analitik multisenter dengan sampel wanita sebelum dan sesudah CAPD. Dilakukan antara November 2018 - Januari 2019 dengan 26 responden perempuan. Mereka dinilai menggunakan kuesioner Indeks Fungsi Seksual Wanita (FSFI) pada pra-CAPD dan pasca-CAPD. **Hasil:** hasil skor FSFI sebelum CAPD adalah 32,77 (SB 19,72) dan setelah CAPD adalah 48,88 (SB 20,29). Analisis perbedaan skor FSFI sebelum dan sesudah CAPD menunjukkan bahwa terdapat perbedaan yang signifikan ($p = 0,003$). **Kesimpulan:** wanita PGK yang menjalani CAPD mengalami peningkatan skor FSFI dibandingkan sebelum CAPD. Dengan demikian, penggunaan CAPD dapat dilihat untuk mengurangi disfungsi seksual dan meningkatkan kualitas hidup wanita dengan PGK.

Kata kunci: indeks fungsi seksual wanita, disfungsi seksual, terapi dialisis, penyakit ginjal stadium akhir.

ABSTRACT

Background: chronic kidney disease (CKD) is a major worldwide health problem. One key treatment for end-stage CKD patients is dialysis therapy such as Continuous Ambulatory Peritoneal Dialysis (CAPD). This study aimed to find out the differences in the incidence of sexual dysfunction in women with CKD by CAPD. **Methods:** this study was a multicenter observational analytic study design in female samples before CAPD and after CAPD. It was conducted between November 2018 - January 2019 with 26 female respondents. They were assessed using the Female Sexual Function Index (FSFI) questionnaire at pre-CAPD and post-CAPD. **Results:** the results of the FSFI score before CAPD were 32.77 (SD 19.72) and after CAPD was 48.88 (SD 20.29). Analysis of differences in FSFI scores before and after CAPD demonstrates that there was a significant difference ($p = 0.003$). **Conclusion:** women with CKD who underwent CAPD, had an increase in FSFI scores compared to before CAPD. Thus, the use of CAPD can be seen to reduce sexual dysfunction and therefore improve the quality of life of women with CKD.

Keywords: female sexual function index, sexual dysfunction, dialysis therapy, end-stage renal disease.

INTRODUCTION

Chronic kidney disease (CKD) is still a major health problem for people around the world. The prevalence of CKD varies from country to country. Population-based health surveys in Europe report a 10.2% prevalence of CKD in Norway.¹ Treatment for end-stage CKD patients is carried out by administering dialysis therapy such as hemodialysis (HD) and peritoneal dialysis aimed at maintaining the quality of life of patients. HD is the third choice of renal replacement therapy after kidney transplantation and peritoneal dialysis.

Besides HD, the use of peritoneal dialysis has also increased sharply. A large cohort in Canada with patient respondents using peritoneal dialysis showed an increase in patient life expectancy. During 2012, the mortality rates for Continuous Ambulatory Peritoneal Dialysis (CAPD) and HD were almost the same, 1.55 and 1.60 per 1,000 patients. This is due to better infection control and the application of vascular access and the use of cardioprotective drugs.² In 2017 according to the Indonesia Renal Registry (IRR), there were 30,831 new patients, and 77,892 active patients. The number of CKD patients who received CAPD therapy in December 2017 was 1,737, and the proportion between HD and CAPD patients were 98% and 2%, respectively.³

Dependence on HD and CAPD can cause changes in the lives of CKD patients. Changes that will occur in patients undergoing hemodialysis include physical changes, psychosocial changes, and financial changes. Various studies from diverse geographical and socio-cultural backgrounds show similar problems globally. Sexual dysfunction in women is a multifactorial problem that requires a valid and structured diagnostic instrument. One of the instruments to evaluate female sexual function is the Female Sexual Function Index (FSFI) questionnaire. This questionnaire can be used as a tool to detect early sexual dysfunction disorders in CKD women so that management can be undertaken earlier.⁴

A meta-analysis conducted by Stripolli et al.⁵ suggested that 84% of women undergoing dialysis experience sexual dysfunction using the FSFI questionnaire. Sexual dysfunction

very often occurs in around 60-70% of women with CKD, especially those who use dialysis therapy.⁶ In Italy in 2012, Santos et al.⁷ stated that the prevalence of sexual dysfunction in women undergoing hemodialysis had reached 84%. Based on the evidence above, we aimed at finding out the differences in the incidence of sexual dysfunction in women with CKD by CAPD.

METHODS

This study was a multicenter observational comparative study in both the Division of Nephrology, Department of Internal Medicine, Medical Faculty, Universitas Udayana, Sanglah General Hospital, Denpasar, Bali, and the Department of the Kidney and Hypertension, Renal Health Hospital Ny. R.A. Habibie Bandung. The study was conducted prospectively starting in November 2018 and running until January 2019. This research has been approved by the Research Ethical Committee of Medical Faculty Universitas Udayana and Sanglah General Hospital no 2655/UN 14.2.2.VII.14/LP/2018.

The inclusion criteria were female patients with CKD ranging in age from 17 years to 65 years, who performed CAPD for at least 3 months. Patients who met the inclusion criteria were assessed using FSFI questionnaire at pre-CAPD and post-CAPD. The FSFI or Female Sexual Function Index is a short questionnaire that describes a woman's sexual function in order to assess the domain of sexual function which includes sexual arousal, desire, orgasm, satisfaction, pain, lubrication, and was given to patients who met the inclusion criteria. This questionnaire has been examined by two groups of researchers in America, and validated and published in the *Journal of Sex and Marital Therapy* in 2000.⁸

Descriptive statistical analysis aims to describe the characteristics of research subjects and describe research variables. Numerical data scale variables are described using mean, median and standard deviation, while categorical data scale variables are described using relative frequency. The results of the descriptive statistical analysis are illustrated in a single table. Bivariate

analysis was used to determine differences in FSFI scores before and after CAPD. Before the bivariate analysis was performed, the data was tested for normality using Kolmogorov-Smirnov, and data homogeneity was assessed by the Levene test. If the data was found to be normally distributed then a paired t-test was performed. If the data was not normally distributed then the Wilcoxon Sign Rank Test was performed.

RESULTS

The study involved 26 female respondents with CKD, who underwent CAPD for at least 3 months in Sanglah General Hospital Denpasar and RSKG Ny. R.A. Habibie Bandung (**Table 1**). The mean age of respondents was 43.65 (SD 9.96) years. Respondents have a good body mass index, lipid profile, and blood sugar. The mean CAPD duration was 4.4 (SD 2.4) years and CKD duration was 5.3 (SD 2.5) years.

Table 1. Characteristics of Respondents Undergoing CAPD.

Variables	n
Ages - mean (SD), years old	43.65 (9.96)
BMI - mean (SD), kg/m ²	21.9 (5.19)
Systolic blood pressure - mean (SD), mmHg	136.15 (22.15)
Diastolic blood pressure - mean (SD), mmHg	86.54 (10.56)
Blood sugar - mean (SD), mg/dL	114.4 (27.4)
Total cholesterol - mean (SD), mg/dL	195.1 (52.04)
LDL - mean (SD), mg/dL	120.7 (49.4)
HDL - mean (SD), mg/dL	45.5 (12.28)
Triglyceride - mean (SD), mg/dL	170.5 (88.13)
CAPD duration - mean (SD), years	4.4 (2.4)
CKD duration - mean (SD), years	5.3 (2.5)
Menopause period, n (%)	
- Yes	14 (53.00)
- Non	12 (47.00)
FSFI score before CAPD - mean (SD)	32.77 (19.72)
FSFI score after CAPD - mean (SD)	48.88 (20.29)

BMI: body mass index, LDL: low density lipoprotein, HDL: high density lipoprotein, FSFI: Female Sexual Function Index, SD: standard deviation.

When analysing the FSFI score before and after the CAPD, it was noted that there was an increase in the mean score after the CAPD. The Wilcoxon sign rank test was then performed to

Table 2. Difference between FSFI score before and after CAPD.

Variables	Mean rank	p value
FSFI score after CAPD treatment < FSFI score before CAPD	10.2	0.003
FSFI score after CAPD treatment > FSFI score before CAPD	13.7	

determine the difference between the FSFI score before the CAPD and after the CAPD (**Table 2**). The results of the analysis contained different FSFI scores before and after CAPD ($p = 0.003$).

DISCUSSION

A study by Hansson and Watnick² stated that the prevalence of peritoneal dialysis use increased by 9.7% among CKD patients. This increase was due to more cost-effective financing compared to HD. The availability of proper and functioning peritoneum is very important for the success of treatment in peritoneal dialysis. Sinnakirouchenan and Holley⁹ also stated that quality of life was better in CAPD, especially at the beginning of dialysis.

In this study, the mean BMI, blood pressure, blood sugar levels, and lipid profile of respondents were still within normal limits. Esposito et al.^{3,10} research, examining the relationship between obesity and sexual function in women who use the FSFI score, found that there is an inverse relationship between BMI and FSFI scores, where a high BMI is found to have a low FSFI score. In addition, the condition of hypertension was found to cause sexual dysfunction in 42.1% of women.¹¹ Saraswati and Funistera's research,¹² highlighted that sexual dysfunction in women with diabetes was significantly higher than in the control group (27% and 15%, $p = 0.04$). Women with diabetes generally have more dysfunction in sexual interests / desires, lust, lubrication, and orgasm, than women without diabetes. Research by Esposito et al.¹³ found a positive association of HDL cholesterol levels with FSFI scores. In addition, women with hyperlipidaemia have a higher prevalence of sexual dysfunction.

The results showed that there was a significant difference when comparing the FSFI score before the CAPD was performed with the FSFI score

after the CAPD was performed, ($p = 0.003$). Endocrine abnormalities in women with CKD primarily decrease estrogen production causing vaginal dryness and dyspareunia, which can contribute to decreased sexual function. About 65% of women who have HD report sexual dysfunction problems and up to 40% report that they no longer have sexual relations. So, it can be concluded that although infertility in women with kidney disease, especially as a result of abnormal endocrine function, causes anovulation, lack of sexual activity can also contribute to the low rate of pregnancy in these women.¹⁴

Lowstarovikz's research in Asdifard,¹⁵ mentions that the sexual problems of women undergoing HD are disorders of sexual arousal and failure to orgasm. The main problems suffered by CKD women are lack of sexual desire, decreased vaginal lubrication, failure of orgasm, vaginism, and dyspareunia and infertility. Depression, anxiety and sleep disorders are among the factors related to the sexual function of women undergoing HD.¹⁶

Based on a multinational study, cross-sectional analysis has evaluated potential associations for each domain, but only one of them conducted an analysis that was adjusted for demographic and clinical characteristics. Older age, hypertriglyceridemia and higher scores on the Beck Depression Inventory (BDI) scale for assessment of depression symptoms were associated with lower scores in each sexual dimension of women on hemodialysis. The presence of depression was associated with worse lubrication and pain scores (mean difference for depressed versus non-depressed women, respectively) while women who had experienced a previous cardiovascular event reported higher pain scores. In conclusion, women in hemodialysis reported scores consistent with marked low sexual functioning across a range of domains; the low functioning appeared to be associated with a comorbidity.¹⁷

Francois and Bargman¹⁶ stated that CAPD is an effective kidney replacement strategy for patients suffering from end-stage renal disease. CAPD offers patient survival comparable to or better than regular HD in maintaining residual kidney function, empowering patient autonomy,

and reducing financial burdens. In patients with cardio renal syndrome and uncontrolled fluid status, it can reduce the level of hospitalization and duration.

Scientific reports demonstrate that research aimed to compare health-related quality of life (HRQOL) over time in patients initiating hemodialysis (HD) or peritoneal dialysis (PD). HRQOL was assessed 3, 12, and 24 months after the start of dialysis. The adjusted three-month scores of patients on PD showed better HRQOL in eight end-stage renal disease (ESRD), three physical component summary domains and one mental component summary domain, compared with patients on HD. Both patients on HD and PD experienced significant decreases in different HRQOL domains over two years and the degree of changes in HRQOL over time was not different between dialysis modality. However, the scores of three domains (effects of kidney disease, burden of kidney disease, and dialysis staff encouragement, all $p < 0.05$) and two other ESRD domains (sexual function and dialysis staff encouragement, all $p < 0.05$) were still higher in patients on PD compared with patients on HD at one and two years after initiation of dialysis, respectively. PD shows better HRQOL during the initial period after dialysis even after adjusting for clinical and socioeconomic characteristics, and the effect lasts up to two years. Patients on PD were bothered less by the burden of ESRD, symptoms, and pain, and were able to continue their jobs more compared with those on HD. These results can be explained by the fundamental differences in dialysis method between HD and PD. Further, patients receiving PD maintained social interaction and social support more actively, had more satisfaction with dialysis staff encouragement, and ultimately felt better general physical health and emotional wellbeing compared with those undergoing HD. The results of a longitudinal follow-up revealed that patients on HD had more problems with sexual function and sleep, as well as experiencing decreased patient satisfaction over time since beginning dialysis.¹⁸

Loss of clearance in CKD leads to accumulation of waste products from metabolism that increase to potentially damaging concentrations and

thereby become uremic toxins. In ESRD, potentially noxious metabolites may increase >10-fold, particularly preceding a dialysis session. Among classes of uremic toxins are catabolic and degradation products of essential nutrients and cofactors. Although similar in structure to their precursor but nonfunctional, uremic toxins may have a potentially damaging function as antimetabolites. The inhibition of transketolase was reversible, although the identity of the inhibitor was difficult to discern. The inhibitor was of low molecular weight and was initially considered to be guanidinosuccinic acid. Low levels of guanidinosuccinic acid in the plasma of patients with decreased red blood cell transketolase activity, a lack of correlation of guanidinosuccinic acid concentration to inhibition of transketolase activity, and the failure of guanidinosuccinic acid to inhibit transketolase activity in red blood cells *ex vivo* suggested that other compounds are likely involved. Disturbance of levels of pentose phosphate pathway metabolites in peripheral nerves *in vivo* regulated by transketolase activity and recovery of this by hemodialysis (HD) indicated reversible inhibition of transketolase. Transketolase activity was also decreased in patients with CAPD. This occurred in the presence of normal levels of plasma thiamine and red blood cell TPP. The mechanism of reversible inhibition of transketolase in renal failure has remained unresolved for more than 40 years.¹⁹

CONCLUSION

Sexual dysfunction in women with CKD is quite high. In CKD women who underwent CAPD, had an increase in FSFI scores compared to those before CAPD. Thus, the use of CAPD can be seen to reduce sexual dysfunction and can improve the quality of life of women with CKD.

AUTHORSHIP

All authors state that they meet the current ICMJE criteria for Authorship. Conceptualization, G.W.K.D.; Methodology, G.W.K.D., and G.W.; Investigation, K.B.S., I.W.Y., P.M.W.T., and A.A.G.O.; Writing – Original Draft, L.; Writing – Review & Editing, G.W.K.D., I.B.P.P., and

G.W.; Supervision and Resources, G.W.K.D., and I.B.P.P.; Data Curation, L., and Y.K.; Formal Analysis, G.W.

DECLARATION OF COMPETING INTEREST

The authors state that they do not have any competing interests with regard to this research.

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