ANALYSIS OF HEMODIALYSIS PERIODS, AGE, AND SMOKING TOWARDS THE SEVERITY OF ERECTILE DYSFUNCTION IN PATIENTS WITH CHRONIC RENAL FAILURE ON ROUTINE HEMODIALYSIS

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ABSTRACT

Objective: *TThis study aims to analyze the factors associated such as hemodialysis periods, age, and smoking with ED severity in CKD patients undergoing routine hemodialysis.* ***Material & Methods:*** *A single-center, cross-sectional study was conducted involving a total 101 patients who were on routine hemodialysis who diagnosed with CKD and experienced complaint in sexual function were included. The severity of ED classified based on the International Index of Erectile Function (IIEF-5). The analysis was carried out descriptively and analytically using the ordinal regression method.* ***Results:*** *Hemodialysis duration (p = 0.044) were significantly related to severity of erectile dysfunction in patient with CKD and on routine hemodialysis. Meanwhile, although both older age (p =0.307) and smoking (p = 0.283) showed a positive estimate, they were not statistically significant.* ***Conclusion:*** *The study indicate that prevalence of ED observed in CKD patient with routine hemodialysis remain high. Several factors significantly contribute in ED severity such as shorter hemodialysis duration.*

Keywords*: Chronic kidney diseases (CKD), erectile dysfunction, hemodialysis.*

ABSTRAK

Tujuan: *Penelitian ini bertujuan untuk menganalisis faktor-faktor yang berhubungan seperti periode hemodialisis, usia, dan merokok dengan tingkat keparahan ED pada pasien CKD yang menjalani hemodialisis rutin.* ***Bahan & Cara:*** *Penelitian ini merupakan studi cross-sectional yang terpusat dengan melibatkan 101 pasien yang menjalani hemodialisis rutin yang didiagnosis dengan CKD. Kriteria inklusi adalah pasien dengan keluhan fungsi seksual. Tingkat keparahan DE diklasifikasikan berdasarkan International Index of Erectile Function (IIEF-5). Analisis dilakukan secara deskriptif dan metode regresi ordinal.* ***Hasil:*** *Durasi hemodialisis (p = 0.044) secara signifikan berhubungan dengan tingkat keparahan disfungsi ereksi pada pasien CKD dan menjalani hemodialisis rutin. Sementara itu, meskipun usia yang lebih tua (p = 0.307) dan merokok (p = 0.283) menunjukkan estimasi positif, keduanya tidak signifikan secara statistik.* ***Simpulan:*** *Prevalensi DE yang diamati pada pasien CKD dengan hemodialisis rutin tetap tinggi. Beberapa faktor yang secara signifikan berkontribusi dalam keparahan DE seperti durasi hemodialisis yang lebih singkat.*

Kata kunci: *CKD, disfungsi ereksi, hemodialisis.*

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INTRODUCTION

Chronic kidney disease is abnormalities regarding structure or function of the kidney, that present for 3 months evaluated from imaging studies, abnormal urinalysis, or histology.[1-4] It was reported that male patients with CKD frequently experience sexual dysfunction, infertility, loss of libido, and impotence.[1,3,5] Also noted that sexual dysfunction is present in most patients with CKD and caused a marked disturbance in sexual intercourse.[3,6]

Sexual dysfunction has been found to be significantly more common in men and women with CKD than in the general population.[5] Erectile dysfunction was found as one of the most prevalent manifestation of sexual dysfunction in men with CKD.[1,7]

Erectile Dysfunction (ED) defined as inability to achieve and/or maintain rigidity and

duration of erection sufficient to permit satisfactory sexual intercourse.[1,3,8] Several studies of men with CKD demonstrated a wide variability of any level erectile dysfunction prevalence, ranging from 51 to 93%.[1,3,6,8] ED also correlated with the severity of kidney disease.[9] Although ED is a benign condition, it mostly affected mental, physical, and social aspect in men thus can trigger anxiety and self-esteem problem.[2]

Many studies have analyzed erectile dysfunction in chronic kidney disease patients undergoing hemodialysis.[1-2] In CKD, associated factor regarding ED is inconsistent.

OBJECTIVE

In this way, the aim of this study is to analyze the factors associated such as hemodialysis periods, age, and smoking with ED severity in CKD patients undergoing routine hemodialysis.

MATERIAL & METHODS

A single-center, cross-sectional study was conducted during March 2021 in my Institution. Total 107 patients who were on routine hemodialysis who diagnosed with CKD and experienced complaint in sexual function were included. All patients were informed and gave consent about the study. Exclusion criteria are those who experienced ED before start of hemodialysis. Each subject completed interview or self-administered the simplified International Index of Erectile Function (IIEF-5) questionnaire adapted in Bahasa Indonesia.

On the basis of IIEF-5 grouping system, severity of ED classified into no ED (22-25), mild ED (17- 21), mild-moderate ED (12-16), moderate ED (8-11), and severe ED (2-7)10. Age group divided into three groups, <47, 47-53, >53 years old. The hemodialysis period was classified into less than a year and more than a year up to 18 years. The smoking status of these patients classified into smoking and non-smoking. Data was collected in Excel spreadsheet containing demographic data (age), duration of dialysis, history of smoking, and IIEF-5 score. The analysis was carried out descriptively and analytically using the ordinal regression method to see the effect of the independent variable on the dependent variable with the dependent variable data scale being ordinal, with a reference p-value of less than 0.05 that the results are said to be significant. Data was entered and analyzed using SPSS 24.0 for Windows. This study was approved by The Ethics Commission of General Hospital Dr. Saiful Anwar with number 400/185/K.3/102.7/2022.

RESULTS

From total of 107 participants, 101 patients who met the inclusion criteria were included in this study. Six patients were excluded because they experienced ED before the start of hemodialysis therapy. ED severe profile of the patient divided into 5 groups as mention in Figure 1. Most of the participants in this study were over 53 years old as mention in Table 1. The duration of the hemodialysis variable achieves a Wald value of 4.049 and a p-value of 0.044 ($p<0.05$). There is a significant effect between the duration of the hemodialysis and erectile dysfunction. The negative estimation value of -1.010 indicates that effect of increased hemodialysis duration could significantly reduce erectile dysfunction (Table 2).

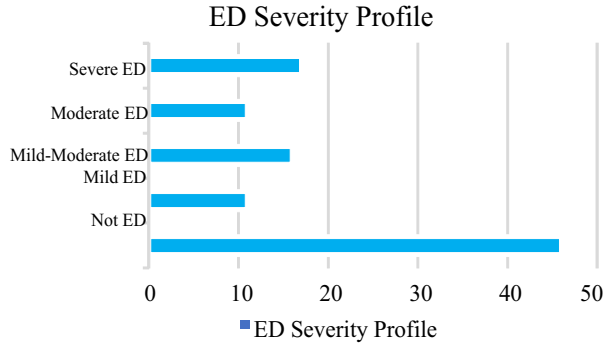

Figure 1. ED severity profile of the included patient in this study

The age categories of the participants were divided into 3 <47 y.o, 47-53 y.o, and >53 y.o. A negative estimation value is obtained for the age variable, which means that a decrease in the age rate can decrease the category of the DE variable. In contrary, increased age even though showed a positive relation, it is not significantly related to severe ED (Table 3).

Table 1. Age Categories in The Study Participants.

Age Categories	Number of Patients	Percentage
<47 y.o.	24	23.8%
47-53 y.o.	27	26.7%
>53 y.o.	50	49.5%

Table 2. The result of ordinal regression analysis of hemodialysis periods toward the severity of ED.

Variable	Estimate	*p-value*	Information
Hemodialysis duration	-1.010	0.044	Significant
α		= 0.050	
Goodness of Fit (Pearson)		= 2.445	

Table 3. The result of ordinal regression analysis of age towards severity of ED.

Variable	Category	Estimate	Sig.
[Age=1.00]	<47 y.o.	-1.203	0.015
[Age=2.00]	47-53 y.o.	0.307	0.479
[Age=3.00]	>53 y.o	0.212	1.334
α			
Goodness of Fit (Pearson)		5.352	

Table 4. The result of ordinal regression analysis of smoking towards severity of ED.

Variable	Estimate	*p-value*	Information
Smoking	0.407	0.283	Not Significant
α		= 0.050	
Goodness of Fit (Pearson)		= 3.839	

Positive estimation values were obtained in the smoking, which means that these categories have a positive effect on the severity of ED (IIEF score). However, with a p-value greater than (0.05) it shows that smoking variable has no significant effect on the severity of erectile dysfunction (Table 4).

DISCUSSION

Several previous studies already reported high prevalence of ED in CKD patients. Erectile dysfunction as one of the complication in CKD patients is a major health issue with implication in quality of life of these patients.[3] Thus many hypotheses aimed to explain factor associated with ED in CKD patient who undergone routine hemodialysis. Patients with chronic kidney disease (CKD) are usually associated with many hormonal changes, especially in end-stage renal disease (ESRD). Hypothalamic–pituitary gonadal axis disruption due to ESRD results in substantial impairment in males' sexual function.[11]

Multiple mechanisms for ED in CKD has been previously studied include vascular factor, neurologic, endocrine, and pharmacologic.[12] The consequent testicular damage manifests both with infertility and sexual dysfunction, as reported due to interstitial fibrosis, seminiferous tubular derangement, and calcification that caused reduced testicular size.[1,11] Many factors contributed in occurrence of sexual dysfunction in patient with routine hemodialysis due to CKD.[5] Several predictor for ED in CKD patients such as diabetes mellitus, hypertension, obesity, dyslipidemia, smoking, cardiovascular disease, endocrine, neurological, and psychological disorder.[3] Vascular system plays a key role in penile erection, thus, all vascular diseases may result in ED. Patients with CKD are commonly associated with vascular ED due to occlusive disease of the cavernosal artery or the more proximal ileac and pudendal.[1,11,13]

The prevalence of erectile dysfunction in male dialysis patients has been found to increase with age (52-75% in <50 years old vs 80.5-90% in ≥ 50 years old.[5,8,14,15] Several studies also reported negative impact of older age in severity of ED especially in patients >50 years old.[2,16] In our study, where older age group has higher risk to develop severe ED, it has no significance (p value 0.4790). Meanwhile, younger age group showed a negative estimation value. This result could be due to our relatively small sample size. A descriptive study by Furat and Malik in 2014 found that age was significantly high in men who experience ED in CKD patient who undergone routine dialysis.[3] Several other studies also stated that Increasing age (more than thirty five) is estimated to be responsible factor of high rate of ED in hemodialysis patient.[3,17,18] The prevalence of moderate to severe erectile dysfunction also increased from 8% in men aged 40s

to 40% in men aged >60 years old.[6] The prevalence and severity of ED showed significance increased as age increased.[19] This is due gradual changes in gonadal sexual organs.[3,14] Relation between age and ED can be explained by progressive reduction in hypothalamic pituitary gonadal (HPG) axis function then causes decreased testosterone level.[14] The correlation between age ED might also related with other condition in elderly such as atherosclerosis.[2]

Regarding hemodialysis duration and ED, several studies reported there is no correlation between them.[3,14,18] In contrary with our result that there is significant correlation between ED severity and hemodialysis duration (p value 0.044) where longer duration of routine hemodialysis could reduce the risk of severe ED. It is mentioned that adequate hemodialysis may contribute to prevent ED in patient with CKD and hemodialysis caused gradual alteration of ED9. Meanwhile, patients with Kt/V <1,2 is high risk to develop ED, this refer to ED patients that undergoing routine HD had significantly lower Kt/V.[8,16] Nishida et al. reported that ED frequency in long-term and short-term hemodialysis is equivalent, and this probably due to hyperuricemia state as independent risk factor. There is also similar IIEF-5 score and grade of ED both in patient with short and long-term hemodialysis.[20]

Association between ED and smoking already reported, but in patient with CKD, smoking and ED relation still not yet completely understood. Costa in 2017 found that smoking associated with two folded risk of ED compared to non-smoker and there is strong relation between years of smoking and the risk of developing ED.[2,11] Similar result also reported by Mashahit that there was positive association between smoking history and duration with ED in HD patients.[18] In this study, the correlation between smoking and development of severe ED was not statistically significant even though it show positive correlation. Furat also found that there is no significant difference between ED and no ED in smoker patients.[3] The tobacco used may interfere nitric oxide activity and neuronal nitric oxide synthase expression especially in penile due to oxidative stress and lead to endothelial dysfunction.[9,21,22] Other mechanism that probably explain the relationship between smoking and ED in this population is cigarette smoking as modifiable risk factor for arteriosclerosis.[23]

ED has substantial implication for the patients especially that also undergoing routine hemodialysis affecting quality of life, self-esteem, anxiety, and depression.[12] Thus, it is important to detect earlier risk factor contributing development of severe ED in CKD patient on routine hemodialysis.

This study has several limitations, such as relatively small number of included participant, the self- reporting nature of the data collection, which may aggravate source of bias and being a single-center study.

CONCLUSION

The study indicate that prevalence of ED observed in CKD patient with routine hemodialysis remain high. Several factor can contributing in ED severity such as shorter hemodialysis duration. This study can be used by physician and health professional regarding importance of these factors affecting severity of erectile dysfunction in patient diagnosed with CKD and on routine hemodialysis. Further research still need to carried out using prospective approach and reducing bias.

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