



Factors related to insomnia among end-stage renal disease patients on hemodialysis in Jakarta, Indonesia[☆]



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Abstract

Objective: Insomnia is the most frequent sleep disorder experienced by patients with end-stage renal disease (ESRD). Sleep disorder is not only related with the decrease in the quality of life ESRD patients but are associated with health risk problems for ESRD. The purpose of this study was to examine the prevalence and factors related to insomnia in hemodialysis patients.

Method: A total of 125 ESRD patients undergoing hemodialysis twice a week for at least had dialysis for one month at hospitals in East Jakarta, Indonesia were recruited in this study. The Insomnia Severity Index (ISI) questionnaire was used to assess the incidence of insomnia, the Numeric Visual Scale used to measure the level of depression. The gathered data were analyzed using descriptive and bivariate analysis.

Results: More than a half (56%) of patients experiencing insomnia. The finding showed that two factors, the depression (p -value = 0.001) and the duration of hemodialysis (p -value = 0.042), were statistically significant.

Conclusions: The prevalence of insomnia in this study tends to increase from previous studies. Depression is a common problem in hemodialysis (HD) patients and is associated with insomnia. Intervention to decrease depression level is needed to improve the quality of sleep ERSP patient on HD.

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Introduction

Insomnia is a sleep disorder that is often experienced by end-stage renal disease (ESRD) patients undergoing

hemodialysis. The prevalence of insomnia in this population is estimated to be around 69–80%, while the prevalence in the general population is only around 33%.^{1–3} The increased prevalence of insomnia in this group is due to the type of kidney replacement therapy chosen; the Indonesian Nephrology Association noted that 97% of ESRD patients chose hemodialysis, and only about 3% chose continuous ambulatory peritoneal dialysis (CAPD).⁴ A lack of kidney donors⁵ and increased awareness of peritoneal dialysis therapy⁴ are factors that influence the choice of dialysis therapy.

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The incidence of insomnia in hemodialysis patients remains unknown due to lack of knowledge about many factors, including the duration of hemodialysis, psychological factors such as depression, biochemical factors such as low hemoglobin (Hb) level and high level of urea in the blood, and demographic characteristics such as age and gender.^{6–9} In addition, dialysis factors such as adequacy of dialysis (Kt/V), time of dialysis, quick of blood (Qb), type of vascular access, and shifts in hemodialysis are thought to be related to the incidence of insomnia.^{10–16}

Untreated insomnia can lead to decreased cognitive function, decreased emotional control, altered social functions, decreased quality of life, worsening disease due to cardiovascular disorders, and death.⁶ Thus, this study aims to determine the prevalence of insomnia and identify the factors that influence insomnia among ESRD patients undergoing hemodialysis.

Method

A total of 125 ESRD patients undergoing hemodialysis at hospitals in East Jakarta, Indonesia, were recruited for this research. Patients were included if they had undergone dialysis at least twice a week for one month. The instrument used in this study consisted of three questionnaires, which included one questionnaire to obtain demographic data, the Visual Numeric Scale to identify depression, and the Insomnia Severity Index (ISI). The ISI questionnaire was translated into Bahasa and was tested to determine its validity and reliability. All components of the ISI questionnaire exceeded the validity value ($r = 0.334$) and achieved a data reliability value of 0.632. The Kt/V value was adequate as it was more than 1.2, in line with the guidelines of the National Kidney Foundation. This research obtained ethical clearance from the Faculty of Nursing University of Indonesia. The prevalence of insomnia and demographic data were analyzed univariately. In addition, bivariate analysis was performed to identify factors related to insomnia among hemodialysis patients using the chi-square, *t*-independent (urea), and Mann–Whitney tests (Qb and dialysis duration).

Results

Most of the ESRD patients in this study received hemodialysis via cimini fistula vascular access (79.2%). Middle-aged patients (41–60 years) were most common, and more male patients were included, although the difference between the number of males and females is trivial. There are only two hemodialysis shifts in Indonesia: the morning shift (7:00–12:30) and the afternoon shift (13:00–20:00). Of the patients in this study, 61.6% underwent hemodialysis in the morning. Only 5.6% of the ESRD patients survived for more than 10 years, while 49.6% survived for 1–5 years. In addition, over half of the patients had anemia, and a quarter experienced depression. The frequency of hemodialysis for all patients in this study was twice a week, and the target was 1.2 Kt/V. It was found that 71.2% of patients received adequate dialysis. The Qb value ranged from 150 to 300 ml/min, and the duration of dialysis ranged from 210 to 300 min. The amount of ureum before hemodialysis was, on average, 167.15 mg/dL.

The prevalence of insomnia in this study was fairly high (56%). There was a relationship between the duration of hemodialysis and the incidence of insomnia ($p = 0.042$), particularly for patients who had received hemodialysis therapy for under five years. In addition, psychological factors such as depression had a very significant relationship with the incidence of insomnia ($p = 0.001$), even though the results of this study indicate that most people did not experience depression (Tables 1–3).

Discussion

This study found that more than half of the ESRD patients undergoing hemodialysis complained of sleep insomnia. Insomnia is characterized by three main symptoms: difficulty getting to sleep, difficulty maintaining sleep or being easily awakened, and waking up earlier or faster than desired.¹⁷ The type of insomnia examined in this study was sub-chronic insomnia, which is diagnosed when individuals experience these symptoms for 1–3 months.¹⁸ The prevalence of insomnia in this study was higher than that reported by previous studies conducted in Indonesia.^{12,19} The results of the data analysis showed that only the duration of hemodialysis and depression factors had a significant relationship with the incidence of insomnia.

Several studies support the finding that long-standing factors related to hemodialysis affect ESRD patients who experience insomnia.^{8,11,13} Sabbatini stated that the longer ESRD patients undergo hemodialysis therapy, the greater their risk of insomnia due to worsening physical (i.e., cardiovascular and neurological) problems.¹³ In contrast, the results of this study show that patients who underwent hemodialysis for less than 5 years are at high risk of insomnia. This finding is supported by the results of Rustagi et al.⁸ Researchers assume that this difference is influenced by patients' acceptance of the disease and psychological factors.²⁰ Early disease acceptance accelerates adaptation to changes in health conditions, while depression slows adaptation.²⁰ Thus, it is important for nephrological nurses to be able to screen for depression, especially when patients receive their first hemodialysis treatment. Psychologists must be present in the hemodialysis room so that patients can explore their feelings and find appropriate adaptive coping mechanisms.

This study analyzed the depression factors that were significantly associated with the incidence of insomnia using a subjective measurement scale, the Numerical Visual Scale. The results showed that more patients did not experience depression. Previous research indicated that more researcher uses sensitive questionnaires, such as the Hospital Anxiety and Depression Scale.^{21,22} Although this study uses a different questionnaire, the results still show that depression significantly affects ESRD patients undergoing hemodialysis who experience insomnia. Thus, it is necessary to perform interventions to decrease depression among ESRD patients on HD to improve their quality of sleep.

No correlation was found between Hb level and insomnia.^{6,10} Hamzi et al.'s work supported the results of this study.⁶ Sabbatini revealed that several other physical problems, including cardiovascular disease, pain, pruritus, and hyperparathyroidism, play a role in insomnia.¹³ However,

Table 1 Distribution characteristics of respondents concerning the incidence of insomnia and the independent variables (age, gender, shift of hemodialysis, vascular access, anemia, and depression) ($n = 125$).

	Insomnia				N	p value
	Yes		No			
	n (70)	%	n (55)	%		
<i>Aged</i>						
Elderly (>60 years)	11	47.8	12	52.2	23	0.162
Middle adult (41–60 years)	58	58	42	42	100	
Early adult (≥18–40 years)	1	50	1	50	2	
<i>Gender</i>						
Male	32	49.2	33	50.8	65	0.160
Female	38	63.3	22	36.7	60	
<i>Vascular access</i>						
Cimino	59	56.2	46	43.8	105	1.000
Others	11	55	9	45	20	
<i>Shift of hemodialysis</i>						
Morning	47	61	24	39	77	0.210
Afternoon	23	47.9	22	52.1	48	
<i>Duration of hemodialysis</i>						
≤1 year	19	50	19	50	38	0.042*
≤5 years	34	54.8	28	45.2	62	
≤10 years	15	83.3	3	16.7	18	
>10 years	2	28.6	5	71.2	7	
<i>Anemia</i>						
Hb < 10	63	58.9	44	41.1	107	0.185
Hb ≥ 10	7	38.9	11	61.1	18	
<i>Depression</i>						
No depression	28	41.2	40	58.8	68	0.001*
Depression	42	73.7	15	26.3	57	
<i>Adequacy of dialysis</i>						
Inadequate (Kt/V) < 1.2	23	63.9	13	36.1	36	0.352
Adequate (Kt/V) ≥ 1.2	47	52.8	42	47.2	89	

* There is a relationship with insomnia based on the results of the chi-square p -value analysis ($\alpha < 0.05$).

Table 2 Distribution of independent variable (urea pre-hemodialysis) compared to the incidence of insomnia ($n = 125$).

Variable	Insomnia	Mean $\pm$ SD	SE	95% CI	p value
Urem pre-HD	Yes	161.20 $\pm$ 53.895	6.442	148.35–174.05	0.163
	No	174.73 $\pm$ 52.854	7.127	160.44–189.02	

Table 3 Independent variable distribution (Qb and dialysis duration) compared to the incidence of insomnia ($n = 125$).

Variable	Insomnia	N	Median (min–max)	p value
Qb	Yes	70	200 (150–250)	0.095
	No	55	200 (150–300)	
Time of dialysis	Yes	70	240 (210–300)	0.214
	No	55	240 (215–300)	

pre-hemodialysis ureum does not have a significant role. In contrast, Rustagi et al. found that the concentration of urea and creatinine had a very significant relationship due to their large number of male patients and the influence of high protein intake. Hypoalbumin can also lead to a higher

risk of insomnia.²³ Thus, it is important for nurses to provide nutrition education to ESRD patients.

Age was not found to have a significant relationship to the incidence of insomnia. Hamzi et al. and several other studies supported these results.^{6,8,11–13} Interestingly, the data

analysis in this study revealed that the incidence of insomnia is more prevalent among early adults than the elderly. In contrast, Al-Ameedy found that insomnia is more common among older people due to changes in non-rapid eye movement IV sleep waves, increased nighttime wakefulness, and sensitivity to environmental stimuli that interfere with sleep.¹⁶ Researchers assume that insomnia in early adults is caused by psychological changes; early adulthood is a period of psychosocial maturation involving psychological tasks to build self-identity and adapt to demanding conditions.²⁴

Women more often experienced insomnia compared to men. This aligns with the results of Hamzi et al. and Al-Jahdali et al.^{6,10} This may be because women are more likely to bear the most burden for existing familial problems, making it easier for them to feel anxious.²⁵

According to Kt/V measurements, adequate hemodialysis was defined as one dose. Interestingly, the results of this study show that an adequacy target of 1.2 can be obtained twice a week, reaching 71.2%. Patients who do not reach adequacy are at more risk of developing insomnia. In this study, no significant relationship was found. Some studies support these results,^{7,8,13,21} but several other studies contradict them.^{23,26} The cause of this difference is assumed to be the duration and frequency of dialysis; previous studies administered five hours of hemodialysis three times a week, while very few patients reached five hours in this study. Although this study did not find an association between dialysis duration and Qb against insomnia, the results of the data analysis showed that shorter duration of dialysis and smaller Qb value increase the likelihood of insomnia.

The limitations of this study include discrepancies in data collection. Almost all the respondents had limited movement of the upper extremities and lying down caused discomfort when filling out the questionnaire. Thus, the researchers helped to read and convey the purpose of the ISI questionnaire questions to all patients, leading to high risk of inaccurate patient answers. Further research should use a questionnaire that is more sensitive for assessing insomnia and is easier for patients to understand. Additionally, it should investigate insomnia due to other diseases suffered by the patient.

Conflict of interests

The authors declare no conflict of interest.

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