15741-51870-1-PB.pdf

by

Submission date: 15-Jul-2020 01:28PM (UTC+0700)
Submission ID: 1357733336
File name: 15741-51870-1-PB.pdf (476.07K)
Word count: 6692
Character count: 36866

Nurse Media Journal of Nursing, (1), 2018, 44-57
Available Online at http://ejournal.undip.ac.id/index.php/medianers

Relating Factors of Insomnia among Haemodialysis Patients

Henni Kusuma[1], Chandra Bagus Ropyanto[2], Susana Widyaningsih[3], Untung Sujianto[4]

[1,2,3,4] Department of Nursing, Faculty of Medicine, Diponegoro University, Indonesia
Corresponding Author: Henni Kusuma (hen_hen8@yahoo.com)

ABSTRACT

Background: Insomnia is a sleep disturbance which commonly occurs in haemodialysis patients. Some factors contribute to insomnia in dialysis patients such as demographic, biological, psychological, lifestyle, and dialysis factors. However, there are limited studies which investigate the relating factors of insomnia in haemodialysis patients in Indonesia.
Purpose: This study aimed to analyze the relating factors of insomnia in haemodialysis patients in Semarang, Central Java, Indonesia.
Methods: This study was a cross-sectional study which involved 102 samples recruited by consecutive sampling technique from two dialysis units in Semarang, Central Java. Data were collected by questionnaires and analyzed using Chi-square and multiple logistic regression to know the most relating factors of insomnia.
Results: The result showed that insomnia occurred in 63 respondents (61.8%). Further analysis indicated that insomnia was related to anxiety (p=0.034, OR=2.36) and age (p=0.049; OR=1.75). There was no relationship between insomnia and the other factors such as gender, education level, occupation status, marital status, haemoglobin level, smoking and coffee consumption habit, and dialysis factor (period of dialysis). Moreover, anxiety was the most relating factors of insomnia among haemodyalsis patients.
Conclusion: This study concluded that anxiety and age were independent factors related to insomnia. This study recommends that anxiety screening should be performed on haemodialysis patients. Anxiety in haemodialysis patients needs to be treated properly so that it will not develop into insomnia.

Keywords: Chronic kidney disease; haemodialysis; insomnia

BACKGROUND

Patients with End-Stage Renal Disease (ESRD) will lose 85% of kidney function or more, and therefore, the body's function to maintain fluid and electrolyte balances will be altered. The function of excretion will not be adequate, hormonal function will be altered as well, and this will lead to uremic and azotemia (Smeltzer & Bare, 2002). Patients with ESRD need to follow kidney replacement therapies. One of the most common kidney replacement therapies is haemodialysis.

Dialysis is a process to filter metabolism waste in the body using a semi-permeable membrane (dialyzer) which functions as an artificial kidney (Thomas, 2002). The therapy is to promote alteration of fluid and electrolyte, and also to eliminate

metabolism waste. However, dialysis only maintains metabolic activities as well as an endocrine function which are performed by the kidney. Thus, patients will continue to experience disease complication and side effects of the therapy (Mollaoglu, 2006). One of the complications mostly experienced by dialysis patients is sleep disturbance or insomnia.

Sleep disturbance was experienced by at least 50% of patients undergoing dialysis (Ahmed & Gehan, 2014; Danielle, Mahamat, Franchois, Patrice, & Gloria, 2017; Kosmadakis & Medcalf, 2008; Pai et al., 2007; Perl, Unruh, & Chan, 2006; Rosdiana, 2011). Moreover, insomnia had been reported as the highest sleep disturbance that occurred among patients with dialysis (Merlino et al., 2006; Mucsi, Molnar, & Rethelyi, 2004; Chen et al., 2006; Sabry et al., 2010; Novak, Shapiro, Mendelssohn, Mucsi, 2006; Sabbatini et al., 2002). Being unable to maintain sleep and inadequate sleep will cause dialysis patients to wake up early before having enough sleep. This condition will cause patients to get some consequences such as sleepy feeling during the day, depression, lack of energy, cognitive disturbance, memory disturbance, cranky, psychomotor disturbance, alert and concentration decrease (Szentkiralyi, Madarasz, & Novak, 2009; Unruh et al., 2011). Therefore, the quality of life among ESRD patients with insomnia will decrease (Elder et al., 2008; Unruh et al., 2011; Ishak et al., 2012; Szentkiralyi et al., 2009).

Haemodialysis patients not only experience insomnia but also other physical as well as psychological problems. Patients undergoing dialysis experience anxiety regarding dialysis therapy procedures, cannula initiation, dialysis complication, and therapy effectiveness (Coccossis, Theofilou, Synodinou, Tomaras, & Soldatos, 2008; Kosmadakis & Medcalf, 2008; Lee, Kim, Cho, & Kim, 2013; Vasilopoulou et al., 2015). Stress or anxiety in patients with dialysis would initiate the sympathetic nervous system to release catecholamine, glucagon, and cortisol-steroid hormones (Feroze, Martin, Reina-Patton, Kalantar-Zadeh, & Kopple, 2010). These hormones would alter center nervous system and can cause frustration, shortness of breath, hypertension, and muscle strain. Furthermore, those hormones would stimulate reticular activating system (RAS) function which manages all body cycles, i.e., sleep pattern, sleep latency, and sleep efficiency (Krystal, 2012; Paparrigopoulos et al., 2010). Some studies found that anxiety as a psychological problem can cause insomnia among haemodialysis patients (Elder et al., 2008; Rosdiana, 2011; Sabry et al., 2010). Unfortunately, only one study (Rosdiana, 2011) which was indicated to investigate anxiety as a psychological problem causing insomnia in haemodialysis patients in Indonesia.

The normal sleeping pattern will also change individuals who get older (Merlino et al., 2006; Ohayon & Roth, 2003). This condition happens because there is a reduction of central nervous system function which cause the loss of reaction towards extrinsic, bio-rhythm, and decrease of relation substance (Ohayon & Roth, 2003). However, some previous studies showed that age was not related to insomnia (Al-Jahdali et al., 2010; Chen et al., 2006; Mucsi et al., 2004; Rosdiana, 2011). Furthermore, gender can also be a factor that contributes to insomnia (Al-Jahdali et al., 2010; Elder et al., 2008; Pai et al., 2007; Paparigopoulus et al., 2010). Female patients usually have multi-roles in their lives. When they are diagnosed with ESRD and have to undergo dialysis, their

functional status decreases significantly causing insomnia (Al-Jahdali et al., 2010; Elder et al., 2008; Pai et al., 2007). On the other hand, the other studies showed different results (Mucsi et al., 2004; Rosdiana, 2011; Sabry et al., 2010). Another demographic factor such as education level was also generally related to insomnia but it was not in dialysis patients (Paparrigopoulos et al., 2010; Rosdiana, 2011). Such demographic factors which were not related to insomnia in dialysis patients are marital status and occupation (Rosdiana, 2011). Overall, there were different results related to the correlation between demographic factors and insomnia among haemodialysis patients.

Insomnia also mostly occurrs in patients with smoking and coffee consumption habit (Merlino et al., 2006). Smoke in cigarette contains nicotine which is a stimulant to keep the smokers awake and alert. Moreover, caffeine is related to prevent the release of adenosine. Caffeine causes an increase in norepinephrine, epinephrine, dopamine, and serotonin which keep individuals alert (Chen et al., 2006). However, some studies showed that these habits were not related to insomnia (Al-Jahdali et al., 2010; Rosdiana, 2011; Sabbatini et al., 2002; Sabry et al., 2010). Moreover, anemia is a possible condition that will cause patients to get sleepy feeling and fatigue during the day (Danielle et al., 2007; Pai, et al., 2007; Sabry et al., 2010) though some studies showed different results (Al-Jahdali et al., 2010; Mucsi et al., 2004; Rosdiana, 2011). Period of dialysis also contributed to insomnia among dialysis patients (Ahmed & Gehan, 2014; Rosdiana, 2011; Sabbatini et al., 2002). These studies showed that patients with more than 12 months on dialysis were at risk to have sleep disturbance such as insomnia. Other studies showed that period of dialysis was not related to insomnia (Chen et al., 2006; Mucsi et al., 2004). From the various findings above, it can be concluded that the correlation between lifestyle, anemia, a period of dialysis, and insomnia still lacks of evidence.

Nurses' understanding regarding insomnia in patients undergoing haemodialysis is an important factor for effective nursing care. Unluckily, some contributing factors such as demographic factors (age, gender, education level, occupation status, marital status), biological factor (haemoglobin level), psychological factor (anxiety), lifestyle factors (smoking and coffee consumption habit), and dialysis factor (dialysis period) are lack of evidence to be related to insomnia. Nurses need to asses other factors as a routine screening of nursing care in dialysis patients. Therefore, it is important to investigate the relating factors of insomnia among patients with dialysis in Semarang, Central Java. The results of this study will help the health professionals provide the best nursing care to reduce insomnia.

PURPOSE

This study aimed to analyze the relating factors of insomnia among dialysis patients. In particular, the study aimed to: (1) identify insomnia in haemodialysis patient, (2) analyze the correlation between such potential factors as demographic factors (age, gender, education level, occupation status, and marital status), biological factor (haemoglobin level), psychological factor (anxiety), lifestyle factors (smoking and coffee consumption habit), and dialysis factor (period of dialysis) and insomnia, and (3) analyze the most relating factors of insomnia among haemodialysis patients.

METHODS

This research was conducted from June to November 2015 in two dialysis units in Semarang, Central Java. The average number of patients undergoing haemodialysis every month was about 70-80 patients. This study involved 102 respondents recruited using consecutive sampling. The inclusion criteria in this study were patients with full consciousness, undergoing dialysis for more than one month, and able to communicate normally. Patients would be excluded when they had motoric, sensory, and global aphasia and experienced intradialysis complication. The measurement tools of this study consist of demographic data, smoking habit, coffee consumption, period of dialysis, hemoglobin level, Tailor Manifest Anxiety Scale (TMAS) for psychological factor, and insomnia level according to International Classification of Sleep Disorder version 2 (ICSD-2). The TMAS questionnaire was a valid and reliable instrument with r-value of 0.444 (r table=0.361) and Cronbach's alpha coefficient of 0.915 respectively. ICSD-2 questionnaire was also valid and reliable with r-value of 0.654 (r table=0.444) and Cronbach's alpha coefficient of 0.73. Distribution of frequency was used to analyze univariate data, and Chi-Square was utilized to test the correlation between independent and dependent variables (CI 95%). Multiple logistic regression was used to analyze the most relating factors of insomnia among patients with haemodialysis .

This research had obtained approval from the Ethics Committee of Dr. Kariadi Hospital and Faculty of Medicine, Diponegoro University. All respondents had signed an informed consent after receiving a clear explanation regarding this study.

RESULTS

The demographic profile of respondents

The results of this study showed that the majority of respondents were female (51%), in late adulthood (41.1%), having high educational level (56.9%), unemployment (73.5%), married (86.3%), not smoking (92.5%), having no coffee consumption habit (86.3%), undergoing dialysis for more than twelve months (67.6%), having anemia (82.4%), and were in mild anxiety (55.9%) as shown in Table 1. Furthermore, Table 2 showed that more than half of the total respondents experienced insomnia (61.8%).

Table 1. Demographic characteristics of respondents and anemia occurence (n=102)

Variables	f	%
Gender		
Female	52	51
Male	50	49
Age		
Early Adulthood	7	6.9
Middle Adulthood	26	25.5
Late Adulthood	42	41.1
Elderly	27	26.5

Variables	f	%
Education Level		
High	58	56.9
Low	44	43.1
Occupation		
Employed	27	26.5
Unemployed	75	73.5
Marital Status		
Married	88	86.3
Single/Widow/Widower	14	13.7
Smoking Habit		
Smoking	11	7.5
Not Smoking	91	92.5
Coffee Consumption Habit		
Yes	14	86.3
No	88	13.7
Period of dialysis		
Recent Period (< 12 months)	33	32.4
Long Term Period (≥ 12 months)	69	67.6
Hemoglobin level		
Anemia (≤ 11 gr%)	84	82.4
Not Anemia (>11 gr%)	18	17.6
Anxiety level		
Mild anxiety	57	55.9
Severe anxiety	45	44.1
Insomnia occurence		
Insomnia	63	61.8
Not insomnia	39	38.2

Relating factors of insomnia

Table 2 shows that only two factors have a significant correlation with insomnia among haemodialysis patients. The factors were anxiety with p=0.022 and age with p=0.041. There were 32 respondents (71.1%) with severe anxiety and 30 respondents (71.4%) of late adulthood respondents who experienced insomnia. It was also shown that other factors did not have correlations with insomnia (p>0.05).

Table 2. Correlation between the relating factors and insomnia (n=102)

Relating factors	Insomnia		Not Insomnia		*p*
	f	%	f	%	
Anxiety					
Mild Anxiety	31	54.4	26	45.6	0.022*
Severe Anxiety	32	71.1	13	29.9	
Gender					
Female	29	55.8	23	44.2	0.286
Male	34	68	16	32	

Relating factors	Insomnia		Not Insomnia		p
	f	%	f	%	
Age					
Early Adulthood	4	57.1	3	42.9	0.041*
Middle Adulthood	11	42.3	15	57.7	
Late Adulthood	30	71.4	12	29.6	
Elderly	18	66.7	9	43.3	
Education Level					
High	37	63.8	21	36.2	0.781
Low	26	59.1	18	40.9	
Occupation					
Employed	13	48.1	14	51.9	0.142
Unemployed	50	66.7	25	43.3	
Marital Status					
Married	55	62.5	33	37.5	0.931
Single/Widow/Widower	8	57.1	6	42.9	
Smoking Habit					
Smoking	5	45.5	6	54.5	0.326
Not Smoking	58	63.7	33	36.3	
Coffee Consumption Habit					
Yes	6	42.9	8	57.1	0.204
No	57	64.8	31	35.2	
Haemoglobin Level					
Anemia	53	63.1	31	36.9	0.741
Not Anemia	10	55.6	8	44.4	
Haemodialysis Period					
Recent Period	19	57.6	14	42.4	0.701
Long Term Period	44	63.8	25	36.2	

*Correlation is statistically significant at the 0.05 level

The most relating factors of insomnia among haemodialysis patients

The results of this study showed that anxiety was more significant to yield insomnia than age in haemodialysis patients. Table 3 describes that anxiety was a dominant factor related to insomnia (*OR*=2.363) compared to age (*OR*=1.75). This meant that haemodialysis patients who suffered from severe anxiety had 2.36 times of risk to get insomnia compared to patients suffering from mild anxiety. Also, haemodialysis patients in the late adulthood had 1.75 times higher risk to get insomnia than patients in the other age groups.

Tabel 4. Multivariate Analysis of the most relating factors of Insomnia

Variable	B	Wald	*p*	OR	95% CI
Anxiety	1.197	7.173	0.034	2.363	0.970-5.756
Age	0.624	0.584	0.049	1.755	0.307-14.722

DISCUSSION

The result of this study showed that more than a half of total respondents experienced insomnia (61.8%). It was similar with some previous studies which reported that the occurrence of insomnia among ESRD patients was high such as Sabry et al. (2010) and

Al-Jahdali et al. (2010) who found that about 65.9% and 11.8% of patients with kidney failure respectively experienced insomnia. The incident of insomnia in this study was higher than the previous studies (Rosdiana, 2011; Sabbatini et al., 2001). The high incidence rates of insomnia in this study are likely to be associated with nearly half of respondents experiencing severe anxiety and in late adulthood, where these conditions were reported to have a significant association with incidence of insomnia (Merlino et al., 2006; Ohayon & Roth, 2003; Paparrigopoulos et al., 2010; Rosdiana, 2011; Sabry et al., 2010).

Sleep disturbance was experienced by at least 50% of patients undergoing dialysis (Kosmadakis & Undcalf, 2008; Merlino et al., 2006; Mucsi et al., 2004; Novak et al., 2006; Pai, et al., 2007; Perl et al., 2006; Rosdiana, 2011; Sabry et al., 2010). Moreover, Elder et al. (2008) reported that nearly half of haemodialysis patients experienced poor sleep quality (49%). In another study conducted by Ahmed and Gehan (2014), it was reported that all studied samples (ESRD patients undergoing haemodialysis in Egypt) had a poor quality of sleep (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficacy, sleep disturbances, and day time dysfunction). Danielle et al. (2017) also reported that the majority of haemodialysis patients in Cameroon had poor sleep quality. Insomnia has been reported as the highest factor of sleep disturbance conditions that occurred among patients with dialysis (Chen et al., 2006; Merlino et al., 2006; Mucsi et al., 2004; Novak et al., 2006; Sabbatini et al., 2002 Sabry et al., 2010).

Insomnia highly occurred among dialysis patients because most patients have some syndromes of sleep disturbance related to their health conditions (uremia, excessive fluid intake, imbalanced electrolytes, and hypoalbuminemia) such as restless leg syndrome, obstructive sleep apnea syndrome, and shift-wake sleep disorder (Szentkiralyi et al., 2009). Being unable to maintain sleep and inadequate sleep will cause dialysis patients to wake up early before having enough sleep. This condition will cause patients to get some consequences such as sleepy feeling during the day, depression, lack of energy, cognitive disturbance, memory disturbance, cranky, psychomotor disturbance, alert and decreased concentration (Szentkiralyi et al., 2009; Unruh et al., 2011). Therefore, the quality of life among ESRD patients with insomnia will also decrease (Elder et al., 2008; Ishak et al., 2012; Novak et al., 2006; Szentkiralyi et al., 2009; Unruh et al., 2011). However, assessment of sleep quality, preferably with polysomnography, is necessary to confirm our results. Interventional studies for the management of sleep disorders in haemodialysis patients are recommended to do in the next study. This result also implies that routine screening of insomnia in nursing care in haemodialysis patients need to be regularly applied so that nurses can provide appropriate interventions directly to patients.

The results indicated that anxiety and age were related to insomnia while the other factors such as gender, education, occupation, marital status, life Style, hemoglobin level, and period of dialysis were not related to insomnia. Furthermore, anxiety was the most significant factor relating to insomnia.

This study found that almost half of respondents experienced severe anxiety. This result was a little higher than Lee et al. (2013) which reported that 27.6% of patients with dialysis felt anxious. However, this result was lower than Vasilopoulou et al. (2015) which reported that 47.8% of patients with haemodialysis had high anxiety levels. Stress and anxiety are parts of daily life. According to Reinhardt (2001), well adaptation towards stress would decrease anxiety. On the contrary, patients who are not able to manage their stress would find difficulty in their daily function. Patients with long term dialysis used to feel worried regarding the uncertainty of their condition in the future. They also face a financial problem, unable to maintain their job, loss of sexual desire, impotence, depression, and fear of death (Coccossis et al., 2008).

Feroze et al (2010) reported that more than 70% of patients with dialysis experienced depression or anxiety. However, they were not aware to seek for medical help for their condition. Physicians and nurses in the dialysis unit, who are not experts in mental health, often failed to recognize the signs and symptoms, including somatic complaints related to psychological distress (anxiety and depression). Thus, those conditions went undiagnosed. A study reported that anxiety is one of the factors which causes suicide attempt in patients with dialysis and is closely related to physical comorbidity such as low quality of life and weakness (Lee et al., 2013). Stress or anxiety in patients with dialysis would initiate the sympathetic nervous system to release catecholamine, glucagon, and cortisol-steroid hormones (Feroze et al., 2010). These hormones would alter center nervous system and can cause frustration, shortness of breath, hypertension, and muscle strain. Furthermore, those hormones would stimulate reticular activating system (RAS) function which manages all body cycles, i.e., sleep pattern, sleep latency, and sleep efficiency (Krystal, 2012; Paparrigopoulos et al., 2010).

This study also indicated that anxiety was the most significant factor relating to insomnia in which haemodialysis patients who suffered from severe anxiety had 2.36 times of risk to get insomnia compared to patients suffering from mild anxiety. This result is in accordance with many studies showing that anxiety as a psychological problem which can cause insomnia in haemodialysis patients (Elder et al., 2008; Rosdiana, 2011; Sabry et al., 2010). The relationship between anxiety and insomnia is reciprocal, in which patients who have insomnia would have anxiety. On the other hand, those who feel anxious would get insomnia or sleep disturbance. Krisytal (2012) supported this result, saying that the increase in anxiety is two times higher than those who obtain enough sleep. On the other hand, it was reported that a sleep disturbance (difficulty of sleeping or staying asleep) affected over half of those with generalized anxiety disorder (Krisytal, 2012).

Anxiety is a trigger of chronic insomnia. There are many patients who feel anxious before they get to sleep since they are afraid of being unable to sleep. They will get the consequence in the following day when they do not get enough sleep. The increase of anxiety will decrease “arousal” when “arousal state” should have decreased, and this will decrease the chance to sleep, hence it will create a loop or cycle of insomnia-anxiety (Nutt, Wilson, & Paterson, 2008). Based on the phenomena, it is very crucial for nurses in the dialysis unit and medical team to perform a screening regarding anxiety and insomnia, because these two things influence each other and will decrease patients’

quality of life in general. Nurses can detect anxiety and insomnia by performing a comprehensive assessment, not only covering the patients' biological factor, but also the psychological, social, and spiritual aspects. After a diagnosis is determined, professional nurses should be able to perform anxiety management and constructive coping development to prevent psychological disturbance and to prevent insomnia.

The result showed that insomnia highly occurred in late adulthood patients. This finding is in line with some previous studies which reported that insomnia was experienced by elderly patients (Merlino et al., 2006; Ohayon & Roth, 2003). This study also reported that age was related to insomnia. This result is in line with a study by Merlino et al. (2006) which reported that age was a significant independent predictor for patients with ESRD who have insomnia condition (p=0.001). However, some previous studies showed that age was not related to insomnia among haemodialysis patients (Al-Jahdali et al., 2010; Chen et al., 2006; Mucsi, et al., 2004; Rosdiana, 2011). Normal sleep pattern would also change especially in individuals who get older (Merlino et al., 2006; Ohayon & Roth, 2003). This condition happens because there is a reduction of central nervous system function which is caused by the loss of reaction towards extrinsic, bio-rhythm, and decrease of relation substance (Ohayon & Roth, 2003).

Late adulthood is generally considered to begin at about old age. Furthermore, National Sleep Foundation (2005) found that the majority of older people reported that they wake up a lot during the night and feeling fatigue in the morning. It becomes harder for men and women with ages more than 50 years to stay asleep throughout the night. In other words, aging seems to make certain aspects of sleep more difficult. There are certain biological changes that make sleep more difficult as getting older. For example, older adults can experience a shift in the circadian rhythm that causes them to become sleepy in the early evening and to wake up too early in the morning. Indeed, the 2005 NSF poll found that 64% of adults over 65 consider themselves a "morning person." Medical conditions and other sleep disorders can also cause insomnia such as gastrointestinal and respiratory problems. Patient ESRD with ascites mostly feel heavy breath when they sleep (Merlino et al., 2006). Sleep apnea in which a person briefly but repeatedly stops breathing during sleep can also cause insomnia.

The result of this study showed that insomnia occurred among the majority of female respondents. Al-Jahdali (2010) reported that female patients have a higher risk (1.5 times) to get insomnia compared to male patients. This probably happens because female patients have more emotions in dealing with situations. Female patients also usually have multi-roles in their lives. Therefore, when they are diagnosed with ESRD, physical alteration and have to undergo dialysis, their functional status decrease significantly (Elder et al., 2008; Pai et al., 2007). Guilt and threaten in self-esteem could be the results of the alteration in roles and responsibility in female patients with ESRD (Elder et al., 2008; Paparigopoulus et al., 2010). Female patients usually have multi-roles in their lives, and when they are diagnosed with ESRD, physical alteration and have to undergo dialysis, their functional status decrease significantly and can cause insomnia. These conditions lead to anxiety and moreover to depression. Thus, it is understandable that almost half of female respondents suffered from severe anxiety (Al-Jahdali et al., 2010; Elder et al., 2008; Pai et al., 2007; Sabry et al., 2010). Although the

early test showed that insomnia often happened in female patients, a further statistical test yielded that there was no relationship between insomnia and gender. This result was supported by two previous studies which found no significant relationship between gender and insomnia (Mucsi, et al., 2004; Sabry et al., 2010; Rosdiana, 2011;). In this study, there was evidence that anxiety was the most significant factor related to insomnia. Not only women but also men can have a bad feeling caused by their health condition and maybe change their lives a lot, such as loss of job, divorce, etc.

The result showed that insomnia occurred in more than a half of respondents with high education level. However, this factor was not related to insomnia in dialysis patients. Education level is generally related to insomnia as a coping source and possible condition but it was not in dialysis patients (Paparrigopoulos et al., 2010; Rosdiana, 2011). It is in contrast with the health behaviors in which patients with high education level can obtain information for self-care management to prevent insomnia (Notoatmojo, 2014). This phenomenon happens because it is not only education level which supports capability of health care behaviors but also motivation (Lee et al., 2013). Patients with chronic kidney disease can be getting bored to manage their self-care even they have high education level. As a result, they can experience insomnia. Furthermore, insomnia may also due to the complexity of life in people with high education level, and sometimes it can cause stress and not enough time for sleep. The quality of their activities might be lower than they usually expect. Many patients with high education level have to cease their job since they experience much physical distress and have to adapt with dialysis schedule. The situation will make them bored, helpless, feel useless and then lead to anxiety and insomnia.

The result of this study showed that insomnia mostly occurred in unemployed respondents. In other words, occupation was not related to insomnia among dialysis patients in this study. It is congruent with the result of a previous study which found no significant correlation between occupation and insomnia (Rosdiana, 2011). If ESRD patients are still doing their work, it can make them exhausted and have a high risk to get insomnia. Also, insomnia may be caused by the complexity of life among employed people which can lead to stress and inadequate sleep. However, if haemodialysis patients are not doing some work for their lives, it also can also make them frustrated and have high risk to get insomnia (Ahmed & Gehan, 2014; Elder et al., 2008; Vasilopoulou et al., 2015).

The result showed that insomnia occurred more often in respondents who were married compared to those who were not. This result is on the opposite with Paparrigopoulos et al. (2010) which reported that Odd Ratio for insomnia in unmarried patients was high. A spouse will help a patient, and a spouse can be a coping resource in dealing with the stressor. However if the support from a spouse is not adequate and the family initiates conflict related to patient's health problem, anxiety will increase (Xhulia et al., 2015; Reinhardt, 2010). Further analysis revealed that there was no relationship between marriage and insomnia. This result was in line with Al-Jahdali et al. (2010) and Rosdiana, (2011) which reported that insomnia in patients was not related to marital status. Married person may also have problems that can cause them to have insomnia (Al-Jahdali et al., 2010; Rosdiana, 2011)

In this study, respondents who did not smoke and have coffee consumption habit experienced severe insomnia higher than those who had those habits. This result was supported by Al-Jahdali et al. (2010) who reported that there was no relationship between smoking-coffee consumption habit and insomnia. This finding was quite surprising because of some previous studies reported differently (Merlino et al., 2006). Insomnia mostly occurred in patients with smoking and coffee consumption habit. Smoke in cigarette contains nicotine which is a stimulant to keep the smokers awake and alert. Moreover, caffeine is related to prevent the release of adenosine. Caffeine causes the increase of norepinephrine, epinephrine, dopamine, and serotonin which keep individuals alert (Mucsi et al., 2014). Merlino et al. (2006) reported that smoking habit has a significant relationship with and an independent predictor of insomnia. However, this study concluded that there were no relationships between smoking habit and coffee consumption with insomnia. This result might be caused by the low sample size of respondents who had smoking and coffee consumption habits.

The number of respondents with anemia in this study was far more than those without anemia. This result is almost the same with a study by Ishak et al. (2012) which reported the number of patients with dialysis who suffered from anemia (Hb<11gr/100ml) was 88.7%. Similar result was also identified in some other studies (Chen et al., 2006; Danielle et al., 2017; Pai et al., 2007; Sabry et al., 2010). Anemia in patients with chronic kidney failure has started since the beginning of the disease process. Anemia is always found in patients with ESRD (80-95%), except in patients with chronic kidney disease because of polycystic. The main factor which causes anemia in patients with ESRD is the deficiency of erythropoietin (EPO). This happens because of the alteration of cells producer of EPO (peritubular cells) in the kidney (Smeltzer & Bare, 2002). However, in further analysis in this study, it was revealed that there was no relationship between hemoglobin level and insomnia. The sample size which was small might be the reason of this insignificant relationship. Although statistically insignificant, the condition might be clinically significant.

The result showed that insomnia mostly occurred in patients who had undergone long-term dialysis than in those who just recently had dialysis. This result is in line with some previous studies (Ahmed and Gehan, 2014; Pai et al., 2007; Sabbatini et al., 2002; Rosdiana, 2011). Sabbatini et al. (2002) reported that the increase of insomnia in patients with long-term dialysis is due to the progressive nature of ESRD's symptoms, disease complications and suffering from other diseases related to the kidney. Patients with long-term dialysis often experience complications from ESRD, for example, cardiovascular and neurological problems. According to Coccossis et al. (2008), patients with long-term dialysis often suffer from insomnia due to increased physical and social deficits. The patients' QoL also decreases along with the alteration of their psychological or mental aspect. Sabbatini et al. (2002) reported that there was a significant increase in insomnia occurrence in patients with long-term dialysis ($p<.005$). However, this study reported different finding that there was no relationship between insomnia occurrence and the period of dialysis. The sample size which was small might be the reason of this insignificant relationship. Although statistically insignificant, the condition might be clinically significant. The phenomenon showed that the longer the

patients undergoing dialysis, the higher the complications and insomnia occurrence would be.

CONCLUSION

Insomnia occurred in many patients undergoing dialysis. Anxiety was a factor which was associated with insomnia. Patients who had severe anxiety had 2.63 times higher risk to get insomnia rather than those with mild anxiety. The age was also related to insomnia occurrence in which patients in late adulthood had 1.75 times higher risk to get insomnia than patients in the other age. Such other factors as gender, education level, occupational status, marital status, lifestyle (smoking and coffee consumption habit), hemoglobin level, and dialysis period were not related to insomnia occurrence. This study recommends that anxiety screening should be performed to patients with dialysis. Anxiety in dialysis patients need to be treated properly so that it will not develop into insomnia.

ACKNOWLEDGMENT

We are very thankful for the research grants provided by the Faculty of Medicine, Diponegoro University. We also thank all research participants in this study.

REFERENCES

Ahmed, S. E. S., & Gehan, A. Y. (2014). Effect relaxation techniques on quality of sleep HD patients. *International Journal of Innovative and Applied Research, 2*(7), 83-94. http://www.journalijiar.com/uploads/2014-07-31_102535_59.pdf

Al-Jahdali, H., Khogeer, H. A., Al-Qadhi, W.A., Baharoon, S., Tamim, H., Al-Jehaili, F.F., … & Al-Sayyari, A.A. (2010). Insomnia in chronic renal patients on dialysis in Saudi Arabia. *Journal of Circadian Rhythms, 2*(7), 83-94. https://www.jcircadianrhythms.com/article/10.1186/1740-3391-8-7/.

Chen, W.C, Lim, P. S, Wu, W. C, Chiu, H. C, Chen, C. H, Kuo, H. Y, ... Woods, H. F. (2006). Sleep behavior disorders in a large cohort of Chinese (Taiwanese) patients maintained by long-term haemodialysis. *American Journal of Kidney Disease*, 48 (2), 277–284. doi: 10.1053/j.ajkd.2006.04.079

Coccossis, M.G., Theofilou, P., Synodinou, C., Tomaras, V., & Soldatos, C. (2008). Quality of life, mental health, and health beliefs in haemodialysis and peritoneal dialysis patients: investigating differences in early and later years of current treatment. *BMC Nephrology, 9*, 14. https://bmcnephrol.biomedcentral.com/articles/10.1186/1471-2369-9-14.

Danielle, F. M. E. H., Mahamat, M., Francois, K. F., Patrice, H. M., & Gloria, A. (2017). Sleep quality haemodialysis. *Open Journal of Nephrology*, *7*, 61-68. http://www.scirp.org/journal/ojneph.

Elder, S. J., Pisoni, R. L., Akizawa, T., Fissell, R., Andreucci, V. E., Fukuhara, S ..., Saran, R. (2008). Sleep quality predicts quality of life and mortality risk in haemodialysis patients: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). *Nephrology, Dialysis, Transplantation*, *23*(3), 998-1004. https://academic.oup.com/ndt/article/23/3/998/1829479.

Feroze, U., Martin, D., Reina-Patton, A., Kalantar-Zadeh, K., & Kopple J. D. (2010). Mental health, depression, and anxiety in patients on maintenance dialysis. *Iranian Journal of Kidney Diseases*, *4*(3), 173–80. https://www.ncbi.nlm.nih.gov/pubmed/20622304.

Ishak, W. W., Bagot, K., Thomas, S., Magakian, N., Bedwani, D., Larson, D ..., Zaky, C. (2012). Quality of life in patients suffering from insomnia. *Innovations in Clinical Neuroscience*, *9*(10), 13-26. https://www.ncbi.nlm.nih.gov/pubmed/23198273.

Kosmadakis, G. C., & Medcalf, J. F. (2008). Sleep disorders in dialysis patients. *International Journal Artificial Organs*, *31* (11), 919-927. https://www.ncbi.nlm.nih.gov/pubmed/19089793.

Krystal, A. D. (2012). Psychiatric disorders and sleep. *Neurology Clinical, 30*, 1389–1413. doi: 10.1016/J.Ncl.2012.08.018

Lee, Y. J., Kim, M. S., Cho, S., & Kim, S. R. (2013). Association of depression and anxiety with reduced quality of life in patients with predialysis chronic kidney disease. *Internasional Journal of Clinical Practice*, *67*(4), 363-378. doi: 10.1111/ijcp.12020.

Merlino, G., Piani, A., Dolso, P., Adorati, M., Cancelli, L., Valente, M., & Gigli, G. L. (2006). Sleep disorders in patients with end-stage renal disease undergoing dialysis therapy. *Nephrology, Dialysis, Transplantation*, *21*, 184-190. https://www.ncbi.nlm.nih.gov/pubmed/16144846.

Mucsi, I., Molnar, M. Z., & Rethelyi, J. (2004). Sleep disorders and illness intrusiveness in patients on chronic dialysis. *Nephrology, Dialysis, Transplantation, 19*, 1815-1822. http://ndt.oxfordjournals.org/cgi/content/abstract/19/7/1815.

Mollaoglu, M. (2006). Perceived social support, anxiety, and self-care among patients receiving haemodialysis. *Clinical Perspective*. *Dialysis & Transplantation*, *35*(3), 144-155. doi: 10.1002/dat.20002

National Sleep Foundation. (2015). *Insomnia & Older Adults.* Retrieved from https://sleepfoundation.org/.

Notoatmodjo, S. (2014). *Ilmu Perilaku Kesehatan [Health Behavior Science]* (2ed.). Jakarta: Rineka Cipta.

Novak, M., Shapiro, C. M., Mendelssohn, D., & Mucsi, I. (2006). Diagnosis and management of insomnia in dialysis patients. *Seminar in Dialysis*, *19* (1), 25-31. doi: 10.1111/j.1525-139X.2006.00116.x

Nutt, D., Wilson, S., & Paterson, L. (2008). Sleep disorders as core symptoms of depression. *Dialogues in Clinical Neuroscience*, 10(3), 329-336. https://www.ncbi.nlm.nih.gov/pubmed/18979946.

Ohayon, M. M., & Roth, T. (2003). Place of chronic insomnia in the course of depressive and anxiety disorders. *Journal of Psychiatric Research*, *37*(1), 9–15. https://www.ncbi.nlm.nih.gov/pubmed/12482465.

Pai, M. F., Hsu, S. P., Yang, S. Y., Ho, T. L., Lai, C. F., & Peng, Y. S. (2007). Sleep disturbance in chronic haemodialysis patients: the impact of depression and anemia. *Renal Failure*, *29*(6), 673-687. doi: 10.1080/08860220701459642.

Paparrigopoulus, T., Tzavara, C., Theleritis, C., Psarros, C., Soldatos, C., & Tountas, Y. (2010). Insomnia and it's correlates in a representative sample of the Greek population. *BMC Public Health*, *10*, 531. doi: 10.1186/1471-2458-10-531.

Perl, J., Unruh, M. L., & Chan, C. T. (2006). Sleep disorders in ESRD: markers of inadequate dialysis?. *Kidney International*, *70*(10), 1687-1693. doi: 10.1038/sj.ki.5001791

Reinhardt, J. P. (2001). Effect of positive & negative social support received and provided on adaptation to chronic visual impairment. *Applied Developmental Science Journal*, *5* (2). doi: 10.1207/S1532480XADS0502_3

Rosdiana, I. (2011). *Analisis faktor yang berhubungan dengan kejadian insomnia pada pasien gagal ginjal kronik yang menjalani hemodialisis di RSUD Kota Tasikmalaya dan Garut [Factors analysis related to the incidence of insomnia in patients with chronic renal failure undergoing haemodialysis in RSUD Tasikmalaya and RSUD Garut]* (Master's Thesis), University of Indonesia, Jakarta, Indonesia. Retrieved from http://lib.ui.ac.id/detail?id=20281435&lokasi=lokal#parentHorizontalTab5.

Sabbatini, M., Minale, B., Crispo, A., Pisani, A., Ragosta, A., Esposito, R., ... Andreucci, V. E. (2002). Insomnia in maintenance haemodialysis patients. *Nephrology, Dialysis, Transplantation*, *17*, 852-856. http://ndt.oxfordjournals.org/cgi/content/short/17/5/852.

Sabry, A. A., Zenah, H. A., Wafa, E., Mahmoud, K., El-Dahshan, K., Hassan, A., ... Okasha, K. (2010). Sleep disorders in haemodialysis patients. *Saudi Journal of Kidney Diseases and Transplantation*, *21* (2), 300-305. http://www.sjkdt.org/text.asp?2010/21/2/300/60199.

Smeltzer, S. C., & Bare, B. G. (2002). *Textbook of medical-surgical nursing* (11th ed.). Philadelphia: Lippincott Williams & Wilkins.

Szentkiralyi, A., Madarasz, C. Z., & Novak, M. (2009). Sleep disorders: impact on daytime functioning and quality of life. *Expert Review of Pharmacoeconomics & Outcomes Research*, *9*(1), 49-64. doi: 10.1586/14737167.9.1.49

Thomas, N. (2002). *Renal nursing* (2nd ed.). London United Kingdom: Elsevier Science.

Unruh, M. L., Tamura, M. K., Larive, B., Rastogi, A., James, S., Schiller, B., ... Kliger, A. (2011). Impact of sleep quality on cardiovascular outcomes in haemodialysis patients: results from the frequent haemodialysis network study. *American Journal of Nephrology, 33*, 398–406. doi: 10.1159/000326343

Vasiopoulou, C., Bourtsi, E., Giaple, S., Koutelekos, I., Theofilou, P., & Polikondrioti, M. (2015). Anxiety, depression, and QOL haemodialysis patients. *Global Journal of Health Science*, *8*(1), 45-55. doi: 10.5539/gjhs.v8n1p45

Xhulia, D., Gerta, J., Dajana, Z., Koutelekos, I., Vasilopoulou, C., Skopelitou, M., & Polikondrioti, M. (2016). Needs of HD patients. *Global Journal of Health Science, 8*(6), 109-120. doi: 10.5539/gjhs.v8n6p109

15741-51870-1-PB.pdf

ORIGINALITY REPORT

18%	11%	9%	13%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to The Maldives National University Student Paper	4%
2	www.sleepfoundation.org Internet Source	2%
3	onlinelibrary.wiley.com Internet Source	1%
4	media.neliti.com Internet Source	1%
5	docplayer.net Internet Source	1%
6	es.scribd.com Internet Source	1%
7	Submitted to Royal Melbourne Institute of Technology Student Paper	<1%
8	Submitted to Fu Jen Catholic University Student Paper	<1%
9	linknovate.com	

	Internet Source	<1%
10	Submitted to Mahidol University Student Paper	<1%
11	Indri Lufiyani, Anggri Noorana Zahra, Sri Yona. "Factors related to insomnia among end-stage renal disease patients on hemodialysis in Jakarta, Indonesia", Enfermería Clínica, 2019 Publication	<1%
12	"Enhancing Capacity of Healthcare Scholars and professionals in Responding to the Global Health Issues", Walter de Gruyter GmbH, 2019 Publication	<1%
13	Alifah Indrarini, Anggri Noorana Zahra, Sri Yona. "The relationship between anemia, depression, duration of hemodialysis, and quality of sleep among end-stage renal disease patients", Enfermería Clínica, 2019 Publication	<1%
14	Chairul Huda Al Husna, Krisna Yetti, Lestari Sukmarini. "Determinant of fluid adherence among hemodialysis patients in Malang, Indonesia", Enfermería Clínica, 2019 Publication	<1%
15	Shu-Fen Chan, Tso-Hsiao Chen, Yuan-Mei Liao, Kuei-Ru Chou, Pei-Shan Tsai.	<1%

	"Development and preliminary validation of the Chinese version of the Sleep-Associated Monitoring Index", International Journal of Nursing Studies, 2012 Publication	
16	Ida Rosdiana, Ai Cahyati. "PENGARUH RELAKSASI OTOT TERHADAP INSOMNIA PASIEN HEMODIALISIS", Media Informasi, 2018 Publication	<1%
17	Submitted to EDMC Student Paper	<1%
18	Submitted to University of Glamorgan Student Paper	<1%
19	Charles J. Foulks. "INSOMNIA: I", Seminars in Dialysis, 11/1993 Publication	<1%
20	Xueying Ma, Yan Zhang, Shaohui Ma, Peng Li, Dun Ding, Hua Liu, Jixin Liu, Ming Zhang. "Association between abnormal thalamic metabolites and sleep disturbance in patients with end-stage renal disease", Metabolic Brain Disease, 2018 Publication	<1%
21	Submitted to Itä-Suomen yliopisto Student Paper	<1%

22	Submitted to University of Luton Student Paper	<1%
23	reumatologi.or.id Internet Source	<1%
24	Submitted to University of Melbourne Student Paper	<1%
25	Tosun, Nuran, Nurten Kalender, Fatma Ilknur Cinar, Gulcan Bagcivan, Mujdat Yenicesu, Dilek Dikici, and Dilek Kaya. "Relationship between dialysis adequacy and sleep quality in haemodialysis patients", Journal of Clinical Nursing, 2015. Publication	<1%
26	Submitted to University of Dammam Student Paper	<1%
27	hdl.handle.net Internet Source	<1%
28	cetd.tmu.edu.tw Internet Source	<1%
29	journals.sagepub.com Internet Source	<1%
30	Yavuz Selvi, Pinar Guzel Ozdemir, Yasemin Soyoral, Mehmet Tasdemir, Mehmet Aslan. "The evaluation of dream anxiety and sleep quality in hemodialysis patients", Sleep and	<1%

	Hypnosis - International Journal, 2016 Publication	
31	Submitted to King's College Student Paper	<1%
32	Submitted to University of Santo Tomas Student Paper	<1%
33	ndltd.ncl.edu.tw Internet Source	<1%
34	Submitted to Liverpool Hope Student Paper	<1%
35	researcharchive.vuw.ac.nz Internet Source	<1%
36	Submitted to University of Western Sydney Student Paper	<1%
37	Chou, F.F.. "Sleep disturbances before and after parathyroidectomy for secondary hyperparathyroidism", Surgery, 200504 Publication	<1%
38	Wang, Mei-Yeh, Shu-Fen Chan, Lu-I. Chang, Tso-Hsiao Chen, and Pei-Shan Tsai. "Better sleep quality in chronic haemodialyzed patients is associated with morning-shift dialysis: A cross-sectional observational study", International Journal of Nursing Studies, 2013. Publication	<1%

39	ccsenet.org Internet Source	<1%
40	Hengameh Barzegar, Hedayat Jafari, Jamshid Yazdani Charati, Ravanbakhsh Esmaeili. "Relationship Between Duration of Dialysis and Quality of Life in Hemodialysis Patients", Iranian Journal of Psychiatry and Behavioral Sciences, 2017 Publication	<1%
41	Marta Novak. "Diagnosis and Management of Insomnia in Dialysis Patients", Seminars in Dialysis, 1/2006 Publication	<1%
42	studentsrepo.um.edu.my Internet Source	<1%
43	lib.bioinfo.pl Internet Source	<1%
44	Submitted to University of Worcester Student Paper	<1%
45	András Szentkirályi, Csilla Z Madarász, Márta Novák. "Sleep disorders: impact on daytime functioning and quality of life", Expert Review of Pharmacoeconomics & Outcomes Research, 2014 Publication	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		