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Original Article

Interplay of Sleep Quality, Insomnia and Quality of Life in Individuals Undergoing Hemodialysis

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ABSTRACT

Insomnia is the most commonly occurring disorder of sleep experienced by individuals with chronic kidney disease. It is associated with physical and psychological health issues specifically the ones on hemodialysis. **Objectives:** Insomnia is the most commonly occurring disorder of sleep experienced by individuals undergoing hemodialysis. It is associated with physical and psychological health issues and could reduce the quality of life of these patients. The aim of the current study is to find out the frequency of insomnia as well as to examine the relationship between sleep quality and quality of life in individuals on hemodialysis. **Methods:** It was a cross sectional study and non-probability purposive sampling technique was used for selecting the sample of patients undergoing hemodialysis from a dialysis center of Lahore. The sample consisted of both men and women (N=100) with age range 40 and above (M=51.40, SD=7.25). Insomnia, general sleep scale and quality of life scale were used to collect data from the participants. **Results:** Insomnia was found to be prevalent in 6% of the patients. QOL was significantly poor in individuals with insomnia and poor sleep quality as compared to the ones with better sleep. Older age, increasing duration of hemodialysis and poor sleep quality were significant predictors of quality of life in our sample. **Conclusions:** Insomnia and/or poor quality sleep have a detrimental effect on patients' quality of life in kidney disease. These findings can provide basis for awareness campaigns and health promotion programs aimed at timely diagnosis and management of insomnia and improvement in sleep quality as well as quality of life in individuals undergoing hemodialysis.

INTRODUCTION

Chronic kidney disease (CKD) affects more than 10% of the general world population which is about 800 million individuals. The number of patients with renal disease requiring dialysis are increasing rapidly worldwide and is burdening the health care systems and gradually turning into a major economic burden [1]. Given this considerable impact on public health and its rising prevalence, it is vital to undertake collaborative efforts in advancing its comprehension and management, aiming to alleviate its adverse effects it poses on individuals and healthcare systems alike. Around the world, over three million individuals rely on maintenance dialysis to fight kidney failure, a life-saving treatment that comes with an extensive burden of symptoms and challenges. Sadly, these patients' quality of life is often compromised, with fatigue, cramps, depression, anxiety, and sleep difficulties taking a toll on their wellbeing. Sleep disorders and poor sleep quality are particularly prevalent, affecting an estimated 40-85% of hemodialysis patients [2]. Among the sleep disorders, insomnia is observed to be a common sleep disorder among these patients with prevalence between 67 to 80%. Symptoms of insomnia include difficulty initiating and maintaining sleep, early morning awakenings, fragmented sleep and poor sleep quality. In patients undergoing hemodialysis, insomnia is observed to be associated with increased fatigue and reduced quality of life and also lead to low immunity, increased cardiovascular issues and depression [3]. These patients often report irregular sleeping patterns, morning headaches, daytime sleepiness, and nightmares. Specifically, individuals with sleep disorders are at a heightened risk of experiencing mental health issues in

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addition to physical health complications as compared to ones without sleep issues [4]. Poor nocturnal sleep and daytime sleepiness also has several other consequences including increased fatigue, poor concentration and irritability [5], decline in memory, and heightened levels of anxiety and depression [6]. It is essential to recognize that poor sleep quality significantly impacts an individual's overall quality of life which is already deteriorated by hemodialysis complications [4]. Considering the interconnectedness of sleep disorders, fatigue, and mental well-being, it becomes crucial to address sleep-related concerns proactively, aiming to improve the overall health and quality of life of these patients. Adverse consequences of CKD like uremic toxin accumulation, pain, anemia as well as psychological problems also affect sleep and could be a cause of insomnia [7]. Uremic pruritus can also cause restless legs syndrome that could lead to insomnia. A notable characteristic of uremia is the disruption of normal day/night sleep patterns. This suggests that the severity of sleep problems may be linked to the build-up of various uremic toxins in the body [8]. Hemodialysis while partially effective in removing uremic toxins, also has an impact on sleep quality. HD patients sleep less, their sleep is less efficient and more fragmented compared to patients with advanced kidney disease who are not undergoing dialysis [9]. The irregular HD treatment schedules, such as early morning or late evening shifts, make it challenging for patients to maintain consistent sleep and wake routines, further contributing to sleep disturbances. About half of HD patients take naps during their dialysis treatment sessions, leading to disruptions in their homeostatic sleep drive and circadian rhythm patterns [10]. These disruptions can exacerbate the already compromised sleep quality experienced by these patients. Several studies conducted on diverse populations have emphasized the detrimental impact of chronic kidney disease as well as hemodialysis on patients' QoL, their functionality, along with their social and personal relationships [11]. The chronic nature of the disease and its treatment gives rise to ongoing stressors that adversely affect patients' well-being and daily functioning [12]. The restrictions imposed by hemodialysis exert an influence on all aspects of a patient's life, including financial status, employment, physical performance, and sexual activity [13]. A decline in the quality of life has been strongly linked to an elevated risk of death and hospitalization among HD patients. Various factors lead to this lower quality of life in HD patients and research has shown that sleep quality is predictive of the patients' quality of life and mortality risk [14]. Research on chronic kidney disease (CKD) and its associated risk factors in Pakistan remains limited. Among adults in Pakistan, the overall prevalence of CKD is noted to be 21.2% [15]. Interestingly, several high-quality studies have yielded varying prevalence rates, with the highest reported at 29.9% and the lowest at 12.5% [16]. In a United States-based study, involving 1,643 patients from 335 dialysis centers, it was revealed that 50% of patients struggled to fall asleep, 59% woke up during the night, and 49% woke up early in the morning, with 53% experiencing one or more of these symptoms regularly [17]. Sleep disturbances are consistently reported in estimates ranging from 40% to 85% of dialysis patients. Similarly, a study conducted in Singapore in 2022 examined factors associated with insomnia in patients undergoing hemodialysis. The findings pointed to strong associations between insomnia and factors like age, comorbidities, fatigue, changes in body appearance, pruritus, and limitations in clothing choices [3]. Early diagnosis and effective treatment of sleep disorders are essential for improving the patients' lives' quality and reducing morbidity and mortality in HD patients.

Moreover, focusing on sleep quality can also act as a protective factor against potential mental health disorders, underscoring its significance in the overall healthcare approach. Very less work has been done on insomnia and quality of life in patients undergoing hemodialysis in Pakistan so it is important to study the significance of these variables in Pakistan. The current study aimed to find out the prevalence of insomnia in patients undergoing hemodialysis. It also examined the predictive association of sleep quality and hemodialysis treatment duration with QoL.

METHODS

It was a cross-sectional study and the data for the study were collected between April 2023 to July 2023. The sample of the study consisted of 100 hemodialysis patient (48 men and 52 women) selected through non probability purposive sampling technique. The sample size was calculated by G power analysis. The sample was collected from the dialysis center of a government hospital of Lahore. Adults with age range above 40 and on dialysis for at least past three months were included in this study. Patients with any diagnosed psychological disorders or the ones taking any sedatives were excluded from this study to control for any confounding effect. Insomnia scale was used to assess insomnia symptoms in the individuals. It is a self-reported measure which consists of five items according to DSM symptom criteria. It assesses insomnia symptoms on a five-point Likert type format ranging from never to all the time. The score ranges from zero to 20 and a score of 15-20 indicates insomnia [18]. Both the insomnia and general sleep scale are validated for use in patient population and have good internal consistency reliability (α=.86) [19]. Sleep quality was assessed through general

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sleep scale which consists of six items. It assesses sleep on a five-point response format and scores range between zero to 24. Higher scores indicate poor sleep [18]. The Quality-of-Life Scale (QOLS), originally developed by Flanagan and adapted by Burckhardt was used to assess QoL. It is a 16-item questionnaire with score range between 16-112. It is validated for use in patient groups. Higher scores indicate better QoL [20]. Demographic Performa was attached along with the measures, which included information about the participants, age, gender, education, marital status, family status and treatment duration. For conducting this research, permission was sought from the Institutional ethical review board of Lahore College for Women University. Approval was also sought from the hospital authority for data collection. Informed consent was obtained from all the participants after briefing them about the nature of the study. The data collection was completed and analyzed using SPSS version 26.0. Sample demographics were calculated and prevalence of insomnia was assessed in our sample. Bivariate correlation was used to find out the relationship among study variables. Multiple linear regression was applied to assess if hemodialysis treatment duration and sleep quality significantly predict quality of life in our sample.

RESULTS

Our study included 100 individuals on hemodialysis who met the inclusion criteria. The age range of the participants was 40-69 years. The socio demographic characteristics of the sample are numerically represented in Table 1. Sample comprised of both men (48%) and women (52%). The age range was above 40 (M=53.73, SD=8.87). 76% of the individuals were married, 12% were single and 12% were divorced/widowed. The duration of hemodialysis ranged between 3 months to 14 years with majority of the individuals having it for the last five years(69%).

Table 1: Demographic Characteristics of Study Participants

Category	Frequency (%)
Gender	
Male	48
Female	52
Education	
Matriculation	74
Bachelors	19
Masters	07
Age (years)	
Mean + SD	53.73 + 8.87
Duration of hemodialysis	
Mean + SD	4.62 + 3.26
3 Months - 1 Year	17
2 Years	20
3 Years	14
4 Years	11
5 Years	07
6 Years	09
7 Years	09
9 - 10 Years	07
12-14 Years	06
Insomnia	
Mild	3
Moderate	2
Severe	1

Note: M = mean, S.D = Standard deviation

Table 2 represents inter correlations among the study variables. Results reveal sleep quality to have significant negative correlation with QoL (p = 0.001) indicating poor quality of life with low quality of sleep and insomnia. Treatment duration was also negatively correlated with insomnia showing insomnia to be more prevalent with increasing duration of disease (p<.05). QoL was reduced in patients with increased age as compared to younger ones.

Table 2: Bivariate Correlation among Study Variables (N = 100)

Variable	1	2	3	4	5	6
Gender	-	-	-	-	-	-
Age	.51	-	-	-	-	-
Education	-.15	.14	-	-	-	-
Treatment Duration	.05	.08	-.14	-	-	-
Sleep Quality	.14	.18	-.12	-.06	-	-
QoL	.09	-.37**	.02	-.25*	-.39**	-
Mean ± SD	1.50 ± .50	53.73 ± 8.87	11.33 ± 1.67	4.62 ± 3.26	20.65 ± 12.5	78.31 ± 16.24

Note: QOL = Quality of Life scale; * p < 0.05; ** p < 0.01.

Table 3 indicates the findings of linear regression model carried out to examine the variables which predict QoL significantly. The model came out to be significant [F(4, 95) = 11.85, p <.01] and explained 33% of the variance in outcome variable which is quality of life. Increasing age (p<.001), treatment duration (p<.01) and sleep quality (p<.001) predicted quality of life significantly.

Table 3: Multiple regression for predicting Quality of Life

Predictors	B	SE	β	5	6
(Constant)	114.62	9.19		96.37	132.88
Gender	5.49	2.74	.17	.04	10.93
Age	-.53	.16	-.29***	-.84	-.22
Treatment duration	-1.28	.42	-.26**	-2.12	-.45
Sleep quality	-.48	.11	-.37***	-.71	-.26
R	.58***				
R2	.33				

Note: N= 100, B= unstandardized beta, β= standardized beta, SE= Standard Error; LL=lower limit; UL=upper limit

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DISCUSSION

The current study found poor sleep to be prevalent in individuals undergoing hemodialysis and insomnia symptoms were also present among them. Poor sleep quality is observed to be significantly associated with reduced quality of life in HD patients. In the current study, insomnia was prevalent in 6% individuals on hemodialysis and sleep quality was poor in 44% of the individuals which is consistent with the range observed in other studies on HD (42-83%) [21,22,23]. A study conducted on individuals undergoing hemodialysis in a kidney institute in Karachi Pakistan found 66% of the sample having poor sleep quality [21]. Studies have also reported 33-53% prevalence of daytime sleepiness in these individuals [22]. Other studies have also observed that about 40-85% individuals undergoing HD face sleep disturbances [2]. A multicenter, large sample study in the US also reported that 53% of the patients either had one or more of these symptoms including trouble in falling asleep at night, waking up during the night or waking up early morning and not being able to go back to sleep [17]. Another study in Iran found 84% of people on hemodialysis to have lower sleep quality [23]. Poor quality sleep considerably affects these patients and is also a predictor of morbidity, medication use and quality of life. Our study found poor sleep quality to be significantly associated with deteriorated quality of life. Studies have reported poor sleep to be strongly correlated with both physical and mental components of quality of life [4]. The scores of qualities of life ranged between 43-109 (78.31+16.24) in the current study and similar studies of QoL conducted on patient populations have found similar values with mean scores ranging from 70 to 92 for different patient groups [20].Comorbid insomnia and CKD are also linked with greater physical and mental repercussions, frequently resulting in depression, compromised immune function, and an increased vulnerability to cardiovascular problems, all of which can significantly impact the quality of life of these patients [2]. Furthermore, consistent with our study, other studies have reported similar findings that older age patients and those with frequent or lengthy hemodialysis sessions have been found to have more sleep problems [5]. Sleep quality is also affected by duration of hemodialysis as well as by the symptoms and associated comorbidities such as peripheral neuropathy, cramps, and bone pain [4]. If left unaddressed, insomnia can profoundly impact various aspects of a patient's life. Cognitive function, emotional regulation, social functioning, overall quality of life, and even cardiovascular health may all suffer as a consequence, eventually leading to fatal outcomes. Our findings strongly suggest that poor sleep quality is a significant predictor of quality of life. These are in line with previous researches which have suggested that poor sleep further deteriorates the quality of life in patients on hemodialysis [24, 25]. Sleep hygiene practices and counseling could also be incorporated into the patients' medical regimen to improve their sleep quality and overall quality of life.

CONCLUSIONS

The study concludes that patients on hemodialysis often experience sleep issues and could also suffer from insomnia and poor sleep quality, hence a regular assessment of sleep is essential in addressing these problems in a timely manner. This also affects various aspects of their physical and mental functioning and deteriorates their quality of life further.

Authors Contribution

Conceptualization: FS, NM
Methodology: FS
Formal analysis: NM
Writing-review and editing: FS, NM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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