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ORIGINAL ARTICLE

Frequency of Sleep Pattern Abnormalities among End Stage Renal Disease Patients on Maintenance Hemodialysis

AFTAB AZAM[1], SHAHID ANWAR[2], MATEEN AKRAM[3], SAJAD AHMAD[4], HAFIZ TAHIR USMAN[5], ZAHID ANWAR[6]
[1,5]Medical Officer, [2]Associate Professor, [4]Assistant Professor, Department of Nephrology, Fatima Jinnah Medical university/Sir Ganga Ram hospital, Lahore
[3]Assistant Professor, Department of Nephrology Shaikh Zayed postgraduate Medical Institute Lahore
[6]Assistant Professor, Department in Pediatrics, Fatima Memorial Hospital and Medical College, Lahore
Correspondence to: Dr. Aftab Azam, E-mail: ravian_3411@hotmail.com Cell: 03334955825

ABSTRACT

Background: End-stage renal disease patients getting hemodialysis (HD) frequently report sleep problems. There are various sorts of sleep disorders, generally classified into different categories depending upon initiation of sleep, duration, and continuity of sleep, calmness during sleep, respiration pattern during sleep, and daytime alertness. Sleep abnormalities have a significant and well-documented effect on daily routine activities thereby reducing the quality of life.

Objective: To determine the frequency of sleep pattern abnormalities in patients with chronic kidney disease on maintenance hemodialysis.

Study Design: Cross-sectional study

Place and Duration of Study: Department of Nephrology, Sir Ganga Ram Hospital, Lahore from 24th January 2019 to 24th July 2019.

Methodology: Ninety one cases ages between 14-70 years of either gender, having ESRD, and are on maintenance HD for at least 3 months were included. All those patients who were having HD for acute kidney injury were excluded. Sleeping disorders were evaluated using Pittsburgh Sleep Quality Index by a single interviewer.

Results: Fifty five (60.4%) were males and 36 (39.6%) were females. The mean age was 51.1±12.1 years, mean BMI was 25.1±5.2, and mean duration of dialysis was 5.1±2.8 years, 74(81.3%) patients had sleep disorders. Among patients having sleep disorders, 38(41.8%) had Insomnia, Narcolepsy in 41(51.6%), Sleep Apnoea Syndrome in 38(41.8%), restless leg syndrome in 35(38.5%) and parasomnia in 17(18.7%) patients.

Conclusion: Sleep disorders are common in regular hemodialysis patients affecting 81.3% of individuals.

Key words: Chronic kidney disease, Haemodialysis, Sleep disorders.

INTRODUCTION

In the general population, sleep abnormalities have a significant and well-documented effect on daily routine activities thereby reducing the quality of life. In patients with chronic kidney disease (CKD), sleep disorders (SD) are more predominant that further burden overall disease-related morbidity and mortality rates. It has been detailed that 80% of end-stage renal disease (ESRD) patients getting hemodialysis (HD) report sleep problems.[1] There are various sorts of sleep disorders. SD are generally classified into different categories depending upon initiation of sleep, duration, and continuity of sleep, calmness during sleep, respiration pattern during sleep, and daytime alertness.[2] Insomnia, too known as restlessness, is a SD in which individuals have an inconvenient sleep. They may have trouble falling asleep or remain sleeping as long as craved.[3] Most often revealed sleep anomaly is Insomnia which is present in almost 86% of CKD patients.[4]

Sleep apnea is considered a chronic SD that causes rehashed discontinuance of breathing while an individual is sleeping. Attributes of sleep apnea incorporate snoring, awakening from rest, and daytime tiredness. In the general population sleep apnea prevalence is roughly 2%-4% whereas it affects 60% of ESRD patients based on subjective evaluation and up to 80% when polysomnography is utilized.[5] Sleep apnea can prompt an expansion in the pace of kidney function regression, there is likewise proof that the presence of ESRD can prompt deteriorating of sleep apnea showing a bidirectional connection between sleep apnea and CKD. Sleep apnea is also a strong predictor of enhanced cardiovascular mortality.[6] Another common SD in ESRD patients is Narcolepsy. Narcolepsy often termed excessive daytime sleepiness is characterized as the failure to remain awake or alert throughout the day, bringing about drowsiness or napping during, sitting in front of the TV, driving, discussions, and routine dailyphysical activities.[7] It has been observed that 66% of HD subjects recorded daytime drowsiness as a fundamental problem.[8] Restless legs syndrome (RLS), otherwise called Willis-Ekbom condition, is a tangible central and peripheral nervous system disorder characterized by upsetting night time sensations in the legs that are mitigated by limb movements. In HD patients, the RLS prevalence is almost 30% as compared to 7% within the general population.[9]

Lastly, parasomnia is a troublesome SD related to unusual body movements, talking, and activities that occur while patients are sleeping even though bed accomplice may believe the patient is alert. Parasomnia can be simple or complex; Simple parasomnia just includes one body region and are generally confined to movements of that body part only, whereas complex parasomnias are more peculiar movements of multiple body parts, which can be problematic for a continuation of sleep and have the capability of mischief to self or bed accomplice.[10] Among HD patients prevalence of complex parasomnia is around 17%.[11]

The purpose of this research is to determine the frequency of sleep pattern abnormalities among patients of ESRD on maintenance hemodialysis

MATERIALS AND METHODS

This cross-sectional study was conducted, using a non-probability consecutive sampling technique, at the dialysis unit, Nephrology Department, Sir Ganga Ram Hospital, Lahore from January 24, 2019 to July 24, 2019. The sample size of 91 cases was calculated by 95% confidence level with a 10% margin of error and taking an expected percentage of insomnia as 38% among patients of end-stage renal disease on maintenance hemodialysis.[12] All patients of ages between 14-70 years of either gender, having ESRD, and are on maintenance HD for at least 3 months were included. All those patients who were having HD for acute kidney injury were excluded. After approval from the institutional research review board, data were collected by taking informed consent from each patient. Patients were interviewed by the interviewer himself. Sleeping disorders were evaluated using Pittsburgh Sleep Quality Index (PSQI)[13] and scoring was done for various SD. Effect modifiers like age, gender, BMI, and duration of dialysis were addressed through stratification of data. The collected data were entered and analyzed in Statistical Package for Social Science (SPSS) v23.0. Data were stratified for age, gender, BMI, and duration of dialysis to deal with the effect modifiers. Post-stratification, the Chi-square test was used. A p-value ≤0.05 was considered significant.

RESULTS

Fifty five (60.4%) were males and 36(39.6%) were females. Thirteen patients (14.3%) were between 20-35 age group while 19(20.9%), 59(64.8%) 36-50 and >50 age groups respectively. The mean age of the patients was 51.1±12.1 years. The mean BMI of the patients was 25.1±5.2 kg/m^2. The mean duration of dialysis of the patients was 5.1±2.8 years. Six (6.6%) were underweight and 47(51.6%) patients had normal weight, while 38(41.8%) were overweight. Thirty one (34.1%) were on dialysis for 1-3 years, while 22(24.2%) and 38(41.8%) were on dialysis for 3-5 years and >5 years respectively. Among ESRD patients, 74(81.3%) patients had sleep disorders. Among patients having sleep disorders, 38(41.8%) had Insomnia followed by Narcolepsy in 41(51.6%), Sleep Apnea Syndrome in 38 (41.8%), restless leg syndrome in 35(38.5%), and Parasomnia in 17(18.7%) patients. By applying the Chi-Square test, it was concluded that there was no significant difference among Gender and BMI (p>0.211, 0.166) respectively, while there was a significant difference among Age groups and Duration of dialysis and Sleep abnormality (p>0.0001, 0.040) respectively (Table 1).

Table 1: Descriptive statistics of the patients (n=91)

Variable	Sleep disorders		P value
	Yes	No	
Gender			
Male	47 (85.5%)	8 (14.5%)	0.211
Female	27 (75%)	9 (25%)	
Age (years)			
20-35	5 (38.5%)	8 (61.5%)	0.0001
36-50	17 (89.5%)	2 (10.5%)	
>60	52 (88.1%)	7 (11.9%)	
Body mass index (kg/m^2)			
underweight	6 (100%)		0.166
Normal	35 (74.5%)	12 (25.5%)	
Overweight	33 (86.8%)	5 (13.2%)	
HD duration (years)			
1-3	27 (87.1%)	4 (12.9%)	0.040
3-5	14 (63.6%)	8 (36.4%)	
>5	33 (86.8%)	5 (13.2%)	

DISCUSSION

Sleep disorders are frequently encountered problems in CKD patients either in the early stages or on standard hemodialysis treatment. Various variables likely contribute to the high frequency of SD in HD patients counting psychological distress, metabolic changes, and treatment-related components. Interestingly, the SD of patients with CKD not on HD has gotten little consideration. Nonetheless, SD is likewise pervasive in this gathering, yet might be more connected with mental factors rather than metabolic changes related to renal disease.[14]

The exact pathological process of SD in HD patients is not known yet, however, it is so far concluded that it is multifactorial and hormonal imbalance plays a pivotal role. Melatonin which is responsible for the normal sleep awake cycle tends to increase during night time. Its production is decreased in CKD patients, even HD fails to improve its normal secretion through the pineal gland.[15] In normal individuals sympathetic activity is decreased and blood pressure dipping is seen at night time, however, in CKD patients as well as HD patients exhibit loss of nocturnal dipping of blood pressure and increased sympathetic stimulation at night leading to sleep disturbances.[16] Other known factors contributing to SD are psychological stress, depression, female gender, old age, and longer duration on HD. Studies have proved the prevalence of an SD is a lot higher in old patients with ESRD and patients who have been on dialysis for longer timeframes.[17] This fact is observed in our study where old age has a statically significant association with SD, but the long duration of HD didn't show any impact on SD.

A large review of studies from different parts of the world in patients with ESRD indicated that SD is a frequently reported problem, with a prevalence range of 44% to 80%.[1] In our single-center study 81.3% of patients reported some form of sleep disturbance. Most frequently reported SD in HD patients are Insomnia (38-71%),[18] Restless leg syndrome (14%-23%),[19] Narcolepsy (11.8%),[7] sleep apnea (23.6%),[20] and periodic limb movement(18%).[21] In our study different results are revealed having Insomnia in 41.8%, Narcolepsy in 51.6%, Sleep Apnea Syndrome in 41.8%, restless leg syndrome in 38.5%, and Parasomnia in 18.7% of patients. This is probably due to fact that Narcolepsy, sleep apnea, restless leg syndrome, and parasomnias share some common symptoms. Clear-cut demarcating features are lacking for this SD in CKD patients, therefore further research in this field is required.

CONCLUSION

Sleep disorders are common in regular hemodialysis patients affecting 81.3% of individuals.

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