



Assessment of Sleep Quality in CKD Patients Undergoing Hemodialysis

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Abstract

Patients receiving from dialysis frequently experience sleep disruptions, which have a substantial negative influence on their general health and quality of life. Effective management of poor sleep quality depends on determining its prevalence and contributing variables

Objective: *To evaluate the hemodialysis patient's sleep quality and identify the clinical and demographic aspects that affect it.*

Methods: *We examined 60 patients in dialysis unit for a period of time. The quality of sleep was assessed using the Pittsburgh Sleep Quality Index (PSQI). A Global PSQI score exceeding 5 was thought to signify Poor Sleep Quality. Clinical and demographic characteristics were summarized using descriptive statistics. To find the factors linked to poor sleep, inferential statistics such as logistic regression, t-test, and chi-square tests and ANOVA were used.*

Results: *It was discovered that 85% of the cases had poor sleep quality [PSQI>5]. In terms of BMI value increases odds of poor sleep quality. The remaining 25% were discovered as having good sleep quality.*

Introduction

Sleep disorders are a common but often overlooked complications in patients. Then undergoing hemodialysis (HD) for end-stage renal disease (ESRD). This population has much high prevalence of sleep disturbances than general population, with many people reporting symptoms of obstructive sleep apnea (OSA), insomnia, restless leg syndrome (RLS), periodic limb movement disorder (PLMD) and Excessive day time sleepiness. These disruptions not only lower quality of life but also healthcare utilization, lower dialysis compliance, and increase morbidity and mortality

Poor sleep quality may caused by a number of physiological, biochemical and psychological aspects of dialysis treatment and chronic kidney disease (CKD). These include comorbidities like diabetes and cardiovascular disease, anemia, uremic toxins, changes in melatonin secretion and variations in fluid and electrolyte balance. Furthermore, the dialysis schedule may interfere with circadian rhythms and sleep

patterns, particularly if it involves in centre nocturnal or early morning sessions

Despite the clinical significance of sleep disorder, many hemodialysis (HD) patients have them on diagnosed and untreated standardised screening methods and comprehensive evaluation tools are required to accurately identify and treat these conditions. Early detection and appropriate interventions may improve patient satisfaction, overall health outcomes and sleep quality.

Assessing the frequency and features of sleep disorders in hemodialysis (HD) patients, identifying risk factors linked to these disorders, and investigating possible associations with clinical and demographic parameters are the objectives of this study. In the end, improving the well-being of people with end stage renal disease (ESRD) will require targeted screening and management strategies that are informed by an understanding of these factors.

Methodology

Study Design

This descriptive cross-sectional study was carried out to assess the quality of sleep in patients receiving maintenance hemodialysis at a Tertiary Hospital in Bengaluru, Karnataka.

The Total number of cases in the hemodialysis unit was obtained from 60 patients in that 29 females and 31 males.

Patients who underwent three days a week, four- hour dialysis sessions for Over three months were considered. Socio-demographic and clinical information was gathered by interviews and Biochemical information was gathered from the medical records of the patients.

Inclusion Criteria

- Consent to participation for interviews.
- Patients above 18 years and below 60 years were considered.
- Patient undergoing hemodialysis four hours, three days per week.
- Patients undergoing maintenance hemodialysis for more than three months.

Exclusion Criteria

- Patients with diagnosed mental health conditions such as anxiety and depressions.
- Patients suffering from neurological conditions that affects mental abilities such as stroke and dementia.
- Acute kidney damage in the patient.
- Patients who were hospitalized or in critical conditions.
- Patients who are unable to understanding or communicating, including those who have severe speaking or hearing difficulties.

Assessment Procedure

The Pittsburgh Sleep Quality Index (PSQI) is used to evaluate the sleep quality in the hemodialysis patients.

The Pittsburgh Sleep Quality Index Scale has Seven components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medications, day time dysfunctions.

PSQI Scorings

The PSQI's component scores range from 0 to 3, where 3 indicates the greatest disturbance .

The seven component scores are added to get a global PSQI score, which ranges From 0 to 21.

0 to 5 indicates good sleep quality.

> 5 indicates poor sleep quality

Biochemical data such as Serum Albumin, Hemoglobin, Serum iron , Ferritin, Parathyroid hormone, kt/v were also collected. Additionally Calcium, phosphorous, Creatinine, were obtained from the medical records.

Body Mass Index (BMI) was calculated using the patients dry weight, height, age, gender.

Statistical Analysis

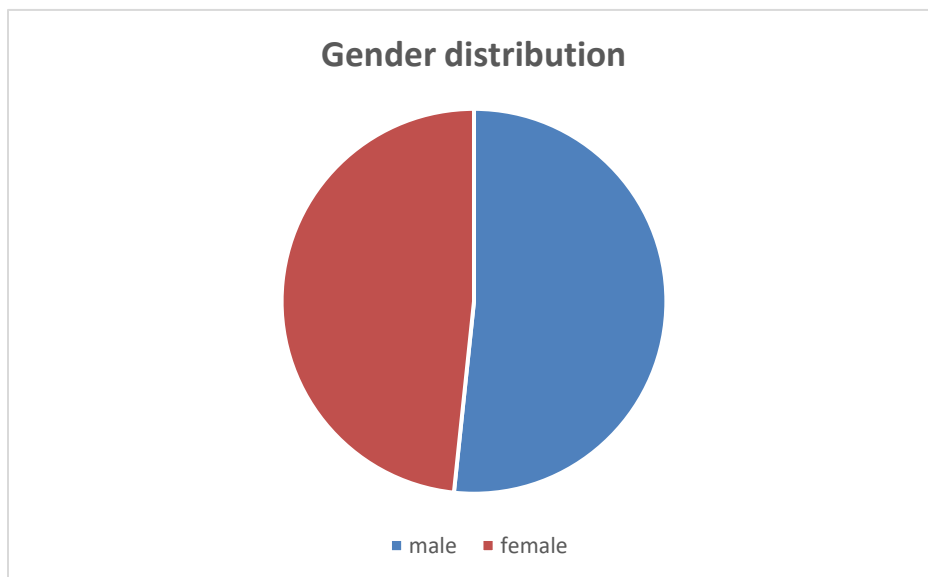
To conduct the statistical analysis of data, which was performed by using anova and the chi-square test. The mean value for qualitative data was used to describe the data that was obtained. To address poor sleep quality and possible contributing factors such as age, gender, BMI, snoring and Kt/v and logistical regression analysis was applied by systematically. Statistical significance was defined ($P=0.017$).

Results

Characteristics of the patient based on dialysis table 1. A total of 60 patients are selected, of whom 31 are male and 29 are female with regard to BMI, Age, Gender and the existence of the kt/v index. According to table 2 overall Hemoglobin levels were ($P=0.2058$), Creatinine levels were ($P=0.9047$), Ferritin levels were ($P=0.1569$), Calcium levels were ($P=0.8785$), Phosphorous levels were ($P=0.744$), PTH levels are ($P=0.0675$), Albumin levels are ($P=0.1547$), Iron levels are ($P=0.2031$).

Characteristics	Mean value
Age	47.53
Gender(M/F)	31/29

Table 1: Demographic Data of 60 Patients



Characteristics	Mean value	F-statistic	P-value
PTH (pg/ml)	258.19	3.47	0.0675
Calcium (mg/dl)	8.6	0.02	0.8785
Phosphorous(mg/dl)	4.5	0.11	0.7444
Creatinine (mg/dl)	6.92	0.1	0.9047
Albumin (g/dl)	4.12	2.08	0.1547
Iron (ug/dl)	45.2	1.66	0.2031
Hemoglobin (g/dl)	9.6	1.64	0.2058
Ferritin (ng/dl)	331.7	2.06	0.1569

Among all the clinical parameters, only BMI shows a statistically difference ($P=0.0296$) between patients with good and poor sleep quality

Table2 Clinical characteristics of 60 patients in ESRD in Hemodialysis

PTH is borderline significant ($P=0.0675$), suggesting a potential trend worth further investigations. Other variables (Ca, P, Creatinine, Albumin, etc.) do not significantly differ between sleep groups

CHI-Square test= Gender vs Sleep quality

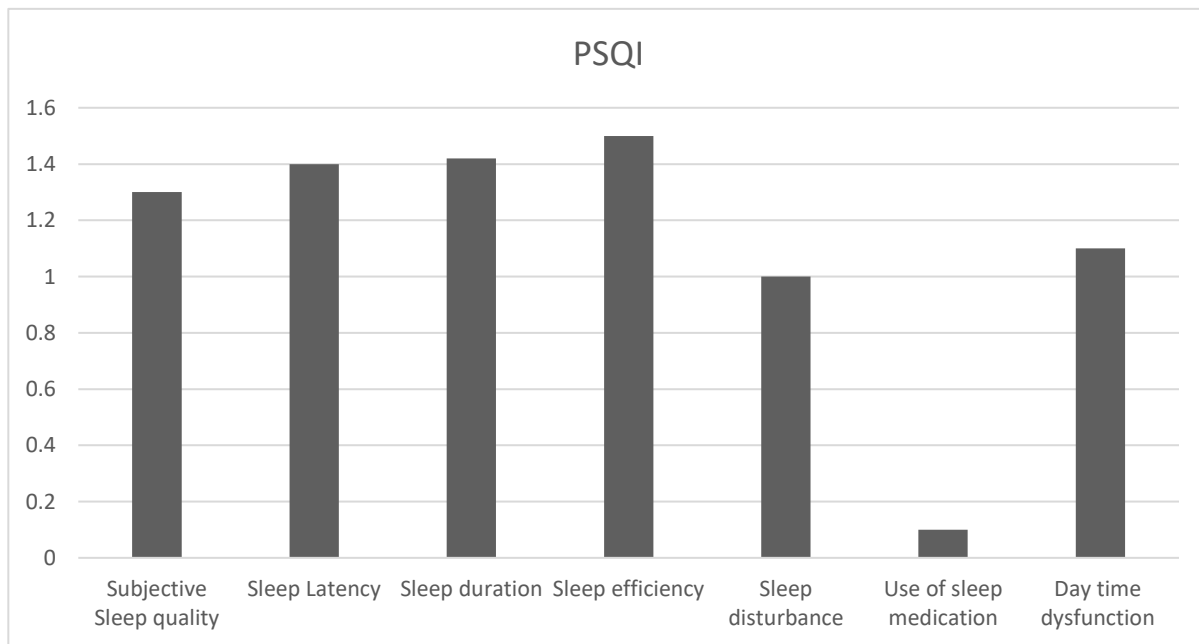
Chi2=0.00, P value=1.0000

The P value = 1.0004 indicates no statistically significant between gender and Sleep quality(whether good or bad).

In similar terms the disturbance of poor and good sleepers is the same across males and females.

COMPONENTS	MEAN VALUE
subjective Sleep quality	1.3
sleep Latency	1.4
sleep duration	1.42
sleep efficiency	1.5
sleep disturbance	1
use of sleep medication	0.1
day time dysfunction	1.1
Total PSQI value	7.6

Table 1.3 Results from the PITTSBURGH Sleep Quality index in 60 Hemodialysis patients with ESRD



	coef	Std err	z	p> z 	0.025	0.975
Const	-6.2459	6.307	-0.990	0.322	-18.607	6.116
Age	0.0526	0.036	-1.466	0.143	-0.123	0.018
Gender	0.4476	0.475	0.942	0.346	-0.484	1.379
BMI	0.1502	0.063	2.379	0.017	0.026	0.274
Kt/v Index	3.9774	5.238	0.759	0.448	-6.289	14.244

Table 1.4 Logistic Regression Results

Variables |coefficient()| P-value| Interpretation|

Constant |-6.25| 0.322|

Age not significant. Suggest increasing age might slightly reduce risk of poor sleep but not statistically supported.

Gender bin does not influence sleep quality

BMI- Statistically significant. Each unit increase in BMI increases odds of poor sleep.

Kt/v index No meaningful relationship with sleep quality in this model.

Among all factors analyzed only BMI is the statistical significant predictor of poor sleep quality (P=0.017).

Higher BMI is associated with increase of poor sleep. Age, Gender and kt/v index do not show significant effects in this model.

This model itself is marginally significant (P=0.075).

It was discovered that 85% of the cases had poor sleep quality[PSQI>5]. In terms of BMI value increases odds of poor sleep quality. The remaining 25% were discovered as having good sleep quality.

Discussion

According to our data, dialysis patient's sleep quality is poor. Directly linked to sleep apnea, restless legs syndrome, quality of life, and sleeplessness.

Poor sleep quality gives negative impact on patients which leads to anxiety, depression, low quality of life, mentally disturbed, dissatisfaction about them dependent on others, powerlessness etc.

Recent research has demonstrated that the temperature of the dialysate affects sleep and demonstrated that hemodialysis patients receiving treatment in the morning experience more sleeplessness as the result of the dialysis shift.

Sleep quality will be decreased when the patient has uremic toxins which leads to fluid overload, breathlessness, respiratory disorders, and other complication.

One of the things affecting the quality of sleep was snoring. It is regarded as an indicator of obstructive sleep apnea, this could be connected to temporary arousal by increasing respiratory effort while you sleep.

Additionally, other research indicates that nocturnal hemodialysis enhances sleep apnea, which has been linked to a reduction in extra cellular fluid volume.

Comorbidities, age and poor sleep hygiene are additional clinical factors that can contribute to drowsiness during the day. Additionally, blood chemistry is a key factor in the quality of sleep.

Sleep quality will be improved if better increase in clearance of the hemodialysis patients.

Conclusion

Our data confirms that the poor sleep quality has the greatest impact on the End Stage Renal Disease (ESRD) is on hemodialysis with high BMI values.



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