Effectiveness of Clonazepam on Sleep Quality on Maintenance Haemodialysis Patients

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Abstract

Background: Patients receiving dialysis for chronic kidney disease (CKD) frequently experience sleep disorders. As a result, quality of life is degraded. These patients frequently utilize sedative-hypnotic drugs to maintain their sleep quality.

Methods: A cross-sectional study was done to assess the efficacy of Clonazepam on sleep quality of patients on maintenance hemodialysis in the Department of Nephrology, Sylhet MAG Osmani Medical College Hospital. A pre-tested semi-structured questionnaire was used for interviewing 50 CKD patients. The patients' sleep quality was evaluated by using the PSQI scale.

Results: The mean age of the Clonazepam treated group was 60.5±5.6 years and the male was predominant (56.0%). Two-thirds of the patients (65.3%) were improved sleep quality. Sleep quality was good among the age group 51-60 years (86.4%) and male patients (57.1%). The mean of PSQI scores was 17.1±0.9 at baseline before the initiation of treatment which decreased to 11.8±1.3 after the completion of 2 weeks of treatment. The difference from the baseline to the end point of treatment was significant ($p<0.05$).

Conclusion: The study revealed that Clonazepam is effectively improving the sleep quality of hemodialysis patients.

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Introduction

Chronic kidney disease (CKD) symptoms include a reduction in glomerular filtration rate, an increase in urine albumin excretion, or both, as well as an accumulation of uraemic toxins.[1,2] Globally, 8-16% population is living with CKD and around 1.0 million died due to CKD related complications.[3] Despite being a worldwide issue, people from developing nations are disproportionately affected by CKD. According to a 2015 estimate, 387.5 million persons in lower-middle income nations were affected by CKD, compared to 110 million in high-income countries.[4] The prevalence of CKD in Bangladesh is 16-18% and among them, 11% belong to stage-III and above.[5] As more CKD patients are predicted to advance to end-stage renal disease and require dialysis, CKD has become one of the major health issues and socioeconomic concerns in developed as well as developing countries.[6,7] In the form of dialysis, renal replacement therapy is given regularly to about 2 million patients worldwide.[5]

Sleep is a temporary state of unconsciousness during which the brain is less sensitive to outside stimuli.[8] A wide range of mental illnesses, including psychoses, mood disorders, anxiety disorders, panic disorders, and alcoholism, are associated with sleep disturbances. Degenerative illnesses, epilepsy, and headaches are all neurological conditions that have an association to sleep disturbance.[9]

Patients with CKD who depend on dialysis frequently experience sleep difficulties.[10]Patients on dialysis are more likely to suffer difficulties sleeping due to both potential inherent and extrinsic factors, including high body mass index, inflammatory status, low nutritional indices, presence of depression, insufficient dialysis, and nighttime rostral fluid shift.[11-14] The poor quality of life caused by the sleep disturbances furthered the decline in the health of dialysis patients' state of health.[15]

Patients on maintenance hemodialysis frequently experience with difficulties sleeping, and in particular, poor sleep quality.[16] The prevalence of sleep disorders among patients with CKD is 40-80%.[17] This is a critical issue because sleep disturbances can have a number of negative impacts on cognitive and occupational performance, and they even have the potential to lower life quality, increase the risk of cardiovascular disease, and increase mortality.[18] Poor sleep may contribute to the development of risk factors for the advancement of CKD in addition to their negative impact on life quality.[19,20] It has also a direct effect on kidney function in patients on dialysis.[21]

Many approaches have been used to enhance patients' quality of sleep, including intradialytic aerobic training, a form of exercise, has been shown to alleviate sleep disorders in hemodialysis patients.[22] Clonazepam, is widely used to treat sleep disorders in hemodialysis patients.[21]It affects the central nervous system by attaching to the benzodiazepine site of the gamma-aminobutyric acid receptors, which inhibits synaptic transmission.[23] Its onset of action is within 1-2 hours and half-life of 20-80 hours in healthy individuals. It does not produce any pharmacologically active metabolites, yet it however raises a risk for physical dependence and sleep apnea.[21]

Methods

Study design and settings

This was a cross-sectional study commenced to assess the efficacy of Clonazepam on sleep quality of patients on maintenance hemodialysis. This study was conducted in the Department of Nephrology, Sylhet MAG Osmani Medical College Hospital, Sylhet 3100, Bangladesh.

Patient's selection criteria

Patients with CKD on maintenance hemodialysis, aged ≥18 years and with poor sleep quality (PSQI scores above 5) were the study population in this study. Concurrent medications administered within the 2 weeks before the study that might have effects on the sleep quality or interact with Clonazepam were excluded from the study. Before starting treatment, the participants were assessed using Pittsburgh Sleep Quality Index (PSQI). For initiating the treatment, participants were prescribed Clonazepam (1mg), at night for 2 weeks. The Sleep quality was again assessed by using the PSQI scale after the completion of 2 weeks of treatment. Any drug-related adverse effects were noted.

Data collection procedures

A pre-tested semi-structured questionnaire was used for interviewing purposively selected 50 CKD patients during the study period July, 2018 to June, 2019.In the questionnaire, the PSQI scale was used to assess the sleep quality. The PSQI scale consist 9 questions and 19 items, self-report instruments designed to measure sleep quality and disturbance over 1 month. Each of these areas is self-rated by the patient. The scoring of answers is based on a '0' to '3' points, on which 3 reveals the negative impacts.

Data analysis

The data were checked and cleaned after the completion of data collection. All data were computed and analyzed through IBM SPSS v23. Both descriptive and inferential statistics were carried out. Descriptive statistics such as mean, standard deviation and percent were computed for continuous variables of the participants. Unpaired 't' test, Chi-square and Fisher's exact test were used done to assess the significance of associations. A p-value of <0.05 at a 95% confidence interval was taken as significant. The results were presented in tables and charts.

Ethical approval

Data confidentiality was ensured, and inappropriate access to data was cleaned. The study was validated by the ethical committee of the Sylhet MAG Osmani Medical College, Sylhet 3100, Bangladesh. (Reference: SOMC/2019/31)

Results

Table I depicts that the age of the patients ranged from 48 to 70 years with the mean age of 60.5±5.6 years and 50.0% of patients were in the age group of 61-70 years, 44.0% of patients were in the age group of 51-60 years and 6.0% of patients were in the age group of 41-50 years. More than half of the participants (56.0%) were male and 44.0% were female. The mean of CKD patient's BMI (Kg/M^2) was 25.4±1.4.

Figure 1 portrays the mean of PSQI scores was 17.1±0.9 at baseline (at day 1) and was 11.8±1.3 after the completion of 2 weeks of treatment.

Figure 2 illuminates the sleep quality of the patients after the completion of 2 weeks of treatment. Two-thirds of the patients (65.3%) were improved sleep quality and remains were poor sleep quality.

Table II interprets the association patient's age and sex with their sleep quality. There was no significant association found with the sleep quality (P>0.5). Sleep quality was good among the age group 51-60 years (86.4%) and male patients (57.1%).

Table III interprets the mean PSQI score was 17.1±0.9 at baseline which decreased to 11.8±1.3 after the completion of 2 weeks of treatment. The difference from the baseline to

end point of treatment was significant (p=0.001).

Figure 3 shows the adverse effects of Clonazepam after the completion of 2 weeks of treatment. Half of the patients (50.0%) suffered hangover effects, 44.0% suffered somnolence, 40.0% suffered drowsiness and 38.0% suffered dizziness.

Table I: Particulars of the CKD patients treated with the Clonazepam (n=50)

Particulars		Frequency (n)	Percent (%)
Age group (years)	41-50	3	6.0
	51-60	22	44.0
	61-70	25	50.0
	Mean±SD	60.5±5.6	
Sex	Male	28	56.0
	Female	22	44.0
Body mass index (BMI)	Mean±SD	25.4±1.4	

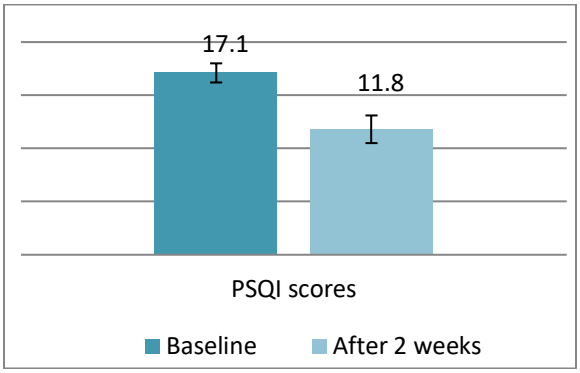

Figure 1. PSQI scores of the CKD patients (n=50)

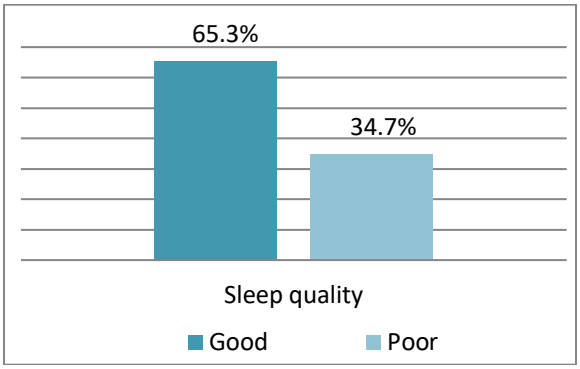

Figure 2. Sleep quality of the CKD patients (n=50)

Table II: Association of the patient's particulars with sleep quality (n=50)

Traits	Sleep quality			$\chi 2$ value	p-value
	Good	Poor	Total		
	n(%)	n(%)	n(%)		
Age groups					
41-50	1(33.3)	2(66.7)	3(100)	Fisher's exact test	0.513
51-60	19(86.4)	3(13.6)	22(100)	21.875	
61-70	19(76.0)	6(24.0)	25(100)		
Sex					
Male	16(57.1)	12(42.9)	28(100)	12.528	0.841
Female	10(45.5)	12(54.5)	22(100)		

*Statistically significant value

Table III: Effects of the Clonazepam on PSQI scores (n=50)

Study group	PSQI scores		t-value	†p-value
	Baseline	After 2 weeks		
	Mean±SD	Mean±SD		
Clonazepam group	17.1±0.9	11.8±1.3	28.925	*0.001

†Paired t test done *Statistically significant value

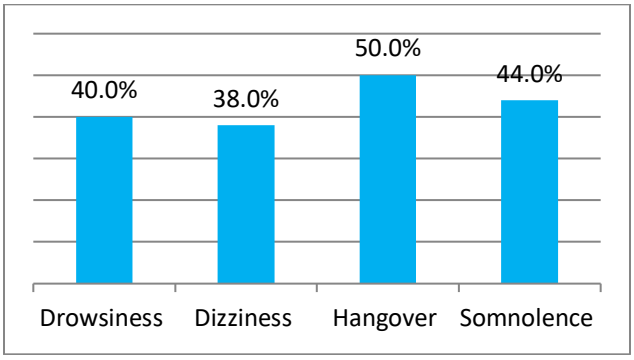

Figure 3. Adverse effects of Clonazepam

Discussion

In the present study, the mean age of the Clonazepam treated group was 60.5±5.6 years and male was predominant (56.0%). In a study, found that the mean age of their dialysis patients was 54.9±14.5 years[24] and male were predominant among the patients with CKD.[25]

In this study, the mean of PSQI scores was 17.1±0.9 at baseline before the initiation of treatment which decreased to 11.8±1.3 after the completion of 2 weeks of treatment. The difference from baseline to end point of treatment was significant (t=28.925; p=0.001). This result was similar to the study.[25] Two-thirds of the patients (65.3%) were improved sleep quality and remains were poor sleep quality. This finding revealed that sleep quality of patients on maintenance hemodialysis was improved.[25] There was no significant association found patient's age (p=0.513) and sex (p=0.841) with their sleep quality. This

result was supported by the study where the improvement of sleep quality did not differ significantly due to age and sex of the patient.[25]

In the current study revealed that the common adverse effects of Clonazepam after the completion of 2 weeks of treatment were hangover effects (50.0%), somnolence (44.0%), drowsiness (40.0%) and dizziness (38.0%). These findings were similar to the study, where they found that long-acting benzodiazepines can be prescribed to be confined in hemodialysis for the dialysis patients.[26]

Conclusion

This study revealed that improvement of sleep quality among the patients was good. Some adverse effects were present but its efficacy is good for the dialysis patients. Clonazepam could be considered for use among the dialysis patients.

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Conflict of interest

The authors declared no conflict of interest.

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