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Association of Obstructive Sleep Apnea and Restless Legs Syndrome with Depression among Hemodialysis Patients

Jayabharathy M[1]*, Sheba Yesu Priya S[1], Mohan Raj D[2], Keerthana M[3], Devadharshini R[4], Malini Sri D P[4]

[1]Assistant Professor, [2]Intern, [3]Demonstrator, [4]Lecturer, Department of Renal dialysis Technology, Faculty of Allied Health Sciences, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India.
E-mail: jb19595@gmail.com

***Corresponding author:**

Mrs. J a y a b h a r a t h y M
Assistant Professor,
Department of Renal Dialysis Technology,
Faculty of Allied Health Science, Dr. M.G.R Educational and Research Institute, Chennai, Tamil Nadu, India.

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ABSTRACT

This study emphasis on assessing the impact of Obstructive Sleep Apnoea (OSA) and Restless Leg Syndrome (RLS) in relation to depression, particularly among patients undergoing hemodialysis (HD). A total of 45 patients from the dialysis unit at A.C.S. Medical College and Hospitals were evaluated using the STOP-BANG questionnaire for OSA, the RLS Rating Scale questionnaire, and the Beck Depression Inventory (BDI) for depression. Findings revealed that the majority of patients exhibited moderate to severe symptoms of RLS and OSA, along with moderate to severe levels of depression. Notably, 18 patients (11 males and 7 females) demonstrated significant symptoms of both OSA and RLS. These patients also had higher BDI scores, with 40% showing severe depressive symptoms, compared to those with only mild to moderate symptoms of OSA and RLS. Statistical analysis showed a highly significant correlation between OSA and depression (n=18, p=0.000; n=45, p=0.000), as well as between RLS and depression (n=18, p=0.000; n=45, p=0.000). Additionally, a strong association between OSA and RLS was observed among the 18 patients with co-occurring symptoms of depression (p=0.010). In conclusion, OSA and RLS are prevalent comorbidities in HD patients and are strongly associated with depression and reduced quality of life. Early diagnosis and appropriate treatment of these conditions are crucial for improving mental health outcomes and overall quality of life in this vulnerable population.

Keywords: Obstructive Sleep Apnoea, Restless Leg Syndrome, Depression, hemodialysis.

INTRODUCTION

Patients with chronic kidney disease (CKD) who requires maintenance hemodialysis often deal with multiple complications, some of which include neuropsychiatric and sleep-related issues that are not well recognized. With improvements to survival rates and quality of life achieved through renal replacement therapy, monitoring quality of life continues to be a primary focus when providing dialysis care. In this population, the most frequently observed sleep disorders are obstructive sleep apnea (OSA) and restless legs syndrome (RLS). Both are more common in dialysis patients than the general population [1,2].

Obstructive sleep apnea (OSA) is associated with intermittent obstruction of the upper airway during sleep and is seen in 50-60% of hemodialysis patients. Fluid overload, fluid shifts, muscle weakness related to uremia, and altered chemoreceptor sensitivity also play a part [3]. Similar to OSA, RLS also occurs in roughly 20-30% of patients on dialysis. This disorder is characterized by an uncontrollable urge to move one's limbs during rest and is linked to dopaminergic dysfunction, anemia, and iron deficiency [4]. Depression is one of the most common mental illnesses in CKD patients, particularly among those undergoing haemodialysis, with prevalence estimates ranging from 20 to 40 percent [5]. Sleep disorders and depression may be linked by underlying biological variables such as inflammation, oxidative stress, dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, and neurotransmitter abnormalities [6]. The present study aims to investigate the association of obstructive sleep apnea and restless legs syndrome with depression among patients undergoing maintenance hemodialysis, and to assess whether the presence of these sleep disorders correlates with the severity of depressive symptoms.

MATERIALS AND METHODS:

This Cross sectional study was performed with 45 dialysis patients, who have been treated with hemodialysis for at least 3 months. The ESRD patients undergoing hemodialysis twice and thrice a weekly whose age >18years were included in this study and Patients on peritoneal dialysis and AKI patients were excluded from this study. All the patients were explained about the aim and protocol of the study and a written informed consent was obtained. The socio-demographics data were collected from the patient's files which includes; age; gender, basic kidney disease, Hemodialysis characteristics were accessed, such as dialysis frequency, hours of dialysis vascular access and duration of dialysis , body mass was presented using the Body Mass Index (BMI,Kg/m2) and biochemical parameters including hemoglobin, BUN and serum creatinine were also been collected.

During routine HD visits, patients were given a series of questionnaires to complete, such as the International Restless Legs Study Group [IRLSSG] questionnaire, the Beck Depression Inventory (BDI) and the STOP-Bang. After conducting interview with the patients, an investigator reviewed the details and verified that the patients' answers appropriately scored on subjective symptoms.

The International Restless Legs Study Group [IRLSSG] questionnaire's criteria were used to diagnose RLS. The IRLS is a 10-item scale that was created by the IRLSSG and allows for a simple, proven way to quantify the severity of RLS. Based on their responses, patients are categorised as having mild, moderate, severe, and very severe RLS, respectively, with scores ranging from 1 to 10, 11 to 20, 21 to 30, and 31 to 40 [7]. OSA risk is evaluated with the STOP-Bang questionnaires, which also check for OSA symptoms. The following is how the survey is graded: One point is awarded for answering "yes" to the first four yes/no questions. Every one of the following conditions earns an extra point.[8] The most widely used self- reporting instrument for measuring symptoms of depression is the Beck Depression Inventory (BDI). ESRD patients' mental health has been assessed using this well-validated depression measure, which has a strong connection with the diagnosis of depression. Individuals with a BDI score of higher than 14 were considered to be undergoing symptoms of depression [9].

RESULTS

Sleep problems and sleep related disorders like OSA and RLS are common disturbances in patients undergoing haemodialysis. These disturbances are being neglected, remain under diagnosed and untreated in most of the HD centres.[10] Out of 45 HD patients there were 29 Male and 16 Female with a mean age of 70 ± 25. Hypertension 42% (n=19) was the most common cause of renal failure among 45 HD patients and other common causes includes Diabetes Mellitus 31% (n=14), Drug induced renal failure and other disease 2% (n=1). Among 45 Hemodialysis patients 9%(n=4) are in mild risk, 40% (n=18) in intermediate risk and 51% (n=23) in higher risk with symptoms of OSA and prevalence of RLS was milder in 11% (n=8), Moderate risk in 27%(n=12), severe risk in 51% (n=20) and Very severe risk in 5% (n=18) of the patients. The overall prevalence of depression was MODERATE in 31% (n=14) , SEVERE in 49% (n=22) and EXTREME in 20% of the patients (n=9) as shown in fig 3.1. The study didn’t found any association between OSA, RLS, Depression and the age, sex , BMI, frequency of dialysis, duration of dialysis, access, blood pressure and haemoglobin.

Therefore the patients are classified according to presence of severe risk in both OSA and RLS. Out of 45 HD patients, 18 patients presented with severe risk of both OSA and RLS and these patients were taken into consideration to compare with depression. In 18 patients of severe scores there were 12 Male and 6 Female. The majority of the patients were male with severe symptoms of OSA, and then Male gender could be a one of the risk factor for OSA. The symptoms of RLS typically occurs during inactivity (dialysis session) and often interfere with sleep.[11] So both OSA and RLS impairs patients sleep, which has negative impact on physical and mental health, which may contribute to cause depression among them. These 18 patients presented with BDI score of ≥15, indicates the presence of depression level. On a statistical analysis with paired T test, There was a substantial correlation between depression and OSA symptoms (n=18, p=0.001). Also there was a high association between RLS and depression (n=18, p=0.001).

VARIABLES	**OBSTRUCTIVE SLEEP APNEA**	**RESTLESS LEGS SYNDROME**	**DEPRESSION**
AGE	.129	.129	.129
SEX	.507	.485	.772
BASIC KIDNEY DISEASE	.238	.204	.648
DURATION OF DIALYSIS	.409	.699	.355
FREQUENCY OF DIALYSIS	.763	.312	.717
ACCESS	.101	.708	.267
HEMOGLOBIN	.327	.207	.558
BLOOD PRESSURE	.953	.519	.114
BMI	.125	.555	.299

Table-1: Comparison of demographics and dialysis data with OSA, RLS and Depression in HD patients.

Paired T test		N	Mean	Std. Deviation	T	df	Sig. (2 tailed)
Pair 1	OBSTRUCTIVE SLEEP APNEA - DEPRESSION - BDI	18	-2.389	.502	-20.204	17	.000
Pair 2	RESTLESS LEGS SYNDROME - DEPRESSION - BDI	18	-2.056	.802	-10.869	17	.000

Table-2: Paired T test results – comparison of OSA, RLS with depression

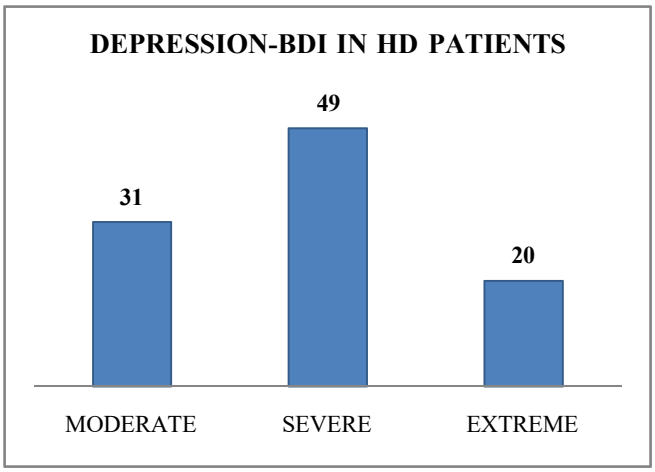

Figure-1 Prevalence o f Depression among HD patients

DISCUSSION

Sleep problems and sleep related disorders like OSA and RLS are common disturbances in patients undergoing haemodialysis. These disturbances are being neglected, remain under diagnosed and untreated in most of the HD centres.[12] Hence it has a negative impact on patients survival. So this study intends to raise awareness on appropriate diagnosis and therapy of these disturbances such that it may decrease the incidence of depression and improve their quality of life. It is important to gain attention on these neurologic and psychiatric issues in HD patient and provide them effective management. 45 hemodialysis patients were opted to assess the risk for both OSA and RLS. 18 patients out of 45 HD patients had a significant risk of both OSA and RLS, and these individuals were compared to those who had depression. These 18 patients presented with BDI score of ≥15, indicates the presence of depression level.

The symptoms of RLS typically occurs during inactivity (dialysis session) and often interfere with sleep.[13][14] So both OSA and RLS impairs patients sleep, which has negative impact on physical and mental health, which may contribute to cause depression among them. In the study done by Deniz Tuncel et. al. the frequency of RLS was found in ten (12%) in hemodialysis patients and Beck Depression Inventory scores were more than 10% in the 85% of hemodialysis patients with significant value p=0.007.[15] This investigation showed that depression was not gender-specific. Therefore the current study concludes that OSA and RLS was significantly associated with each other (n=18, p=0.010) and these disorders are related to depression.

LIMITATIONS AND FUTURE DIRECTIONS:

The present study was limited by its small, single-center sample size, which may restrict the generalizability of the findings. Important clinical and dialysis-related confounders such as anemia, dialysis adequacy, electrolyte imbalances, comorbidities, and medication use were not controlled for, which could influence the observed associations. Moreover, standardized quality-of-life instruments such as the KDQOL-36 or SF-36 were not employed to assess the broader psychosocial impact. Future multicenter studies with larger cohorts and inclusion of these additional parameters are recommended to validate and expand upon these findings.

CONCLUSION

The current study suggests to raise awareness among patients and healthcare providers about the high prevalence and influence of sleep disorders in hemodialysis patients, such as obstructive sleep apnoea and restless legs syndrome. Adherence to current diagnostic criteria and routine screening techniques can help in early detection and treatment of these illnesses. This comprehensive strategy may help to reduce depression rates, increase treatment adherence, and enhance patients' overall quality of life and clinical outcomes.

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REFERENCES

1. *Unruh ML, et al. Sleep quality and clinical correlates in patients on maintenance dialysis. Clin J Am Soc Nephrol. 2006;1(4):729–736.*
2. *Lin HH, Chen HM, Hsieh MY, et al. Association of obstructive sleep apnea and restless legs syndrome with depression in patients undergoing hemodialysis. J Clin Sleep Med. 2018;14 (3):419–424.*
3. *Elias RM, et al. Obstructive sleep apnea in patients with chronic kidney disease. Nephrol Dial Transplant. 2018;33(11):1765–1770.*
4. *Siddiqui S, et al. Restless legs syndrome in hemodialysis patients: a review. Sleep Breath. 2015;19(1):3–11.*
5. *Hedayati SS, et al. Prevalence and correlates of depression in chronic kidney disease. Kidney Int. 2006;70(5):867–876.*
6. *Iliescu EA, et al. Quality of sleep and health-related quality of life in hemodialysis patients.*

   Nephrol Dial Transplant. 2003;18(1):126–132.
7. *Rafie S, Jafari M, Azizi M, Bahadoram M, Jafari S. Restless legs syndrome in hemodialysis patients. Saudi J Kidney Dis Transpl. 2016 Mar;27(2):326-30. doi: 10.4103/1319-2442.178553. PMID: 26997386.*
8. *Chung F, Yegneswaran B, Liao P, Chung SA, Vairavanathan S, Islam S, Khajehdehi A, Shapiro CM. STOP questionnaire: a tool to screen patients for obstructive sleep apnea. Anesthesiology. 2008 May;108(5):812-21. doi: 10.1097/ALN.0b013e31816d83e4. PMID: 18431116.*
9. *Hedayati, S.S. et al. The predictive value of self-report scales compared with physician diagnosis of depression in hemodialysis patients Kidney International, Volume 69, Issue 9, 1662 – 1668*
10. *Stasiak CE, Bazan KS, Kuss RS, Schuinski AF, Baroni G. Prevalence of anxiety and depression and its comorbidities in patients with chronic kidney disease on hemodialysis and peritoneal dialysis. J Bras Nefrol. 2014 Jul-Sep;36(3):325-31. English, Portuguese. doi: 10.5935/0101- 2800.20140047. PMID: 25317615.*
11. *Salib M, Memon A N, Gowda A S, et al. (August 26, 2020) Dialysis Patients With Restless Leg Syndrome:Can We Relieve Their Suffering?. Cureus 12(8): e10053. DOI 10.7759/cureus.10053*
12. *Tuncel D, Orhan FO, Sayarlioglu H, Isık IO, Utku U, Dinc A. Restless legs syndrome in hemodialysis patients: association with depression and quality of life. Sleep Breath. 2011;15(3):311-315. doi:10.1007/s11325-010-0382-z*
13. *Stasiak CES, et at. Prevalence of anxiety and depression and its comorbidities in patients with chronic kidney disease on hemodialysis and peritoneal dia;ysois.J Bras Nefrol. 2014;15(3)*

14. *Salib M, Memon A N, Gowda A S, et al. (August 26, 2020) Dialysis Patients With Restless Leg Syndrome:Can We Relieve Their Suffering?. Cureus 12(8): e10053. DOI 10.7759/cureus.10053*
15. *Turk AC, Ozkurt S, Turgal E, Sahin F: The association between the prevalence of restless legs syndrome, fatigue, and sleep quality in patients undergoing hemodialysis. Saudi Med J. 2018, 39:792-798. 10.15537/smj.2018.8.22*