

DEPRESSION AND INSOMNIA IN PATIENTS ON MAINTENANCE HEMODIALYSIS

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Abstract

Depression and sleep disorders are more frequent in patients on maintenance hemodialysis (HD) than the general population, and are associated with reduced quality of life and increased mortality risk. The purpose of this study was to assess the prevalence of depression and insomnia in patients on HD and to correlate these with the demographic and biochemical profile. A cross sectional study was conducted among 316 patients on maintenance HD for more than 3 months. There was high prevalence of depression (92.7%) and insomnia (91.1%), Depression was significantly more in patients with urban population (P=0.007), unemployed patients (P=0.007), who had less income.(P=0.018) who got dialysis >12 months (P=0.009) and who got dialysis 2 session per week (P value=0.014). Insomnia was found significantly more in female (P=0.018) and among those patients of less income group (P=0.008) and in patients who got at least two sessions of hemodialysis per week (P=0.011). Low serum hemoglobin is associated with both depression and insomnia (P<0.5), while low serum albumin concentration is found associated with depression (P<0.5).

Key words: End-stage renal disease, depression, hemodialysis, insomnia, sleep apnea.

J Dhaka Med Coll. 2015; 24(1) : 3-11.

Introduction

Hemodialysis (HD) is a life sustaining treatment for patients with ESRD. It has revolutionized the treatment of end-stage renal disease (ESRD) and allowed patients with this disease throughout the world to survive longer. There has been a progressive increase in both the incidence and prevalence of patients with ESRD throughout the world¹. Patients on HD are thought to be highly susceptible to emotional problems because of the chronic stress-related to disease burden, dietary restrictions, functional limitations, associated chronic illnesses, adverse effects of medications, changes in self-perception and

fear of death²⁻⁵. Depression is generally accepted to be the commonest psychological problem encountered in patients with ESRD¹. It consists of a constellation of symptoms including anhedonia, feelings of sadness, helplessness, hopelessness, guilt and is accompanied by changes in sleep, appetite and libido¹. Sleep is important for overall physical and mental wellbeing. Sleep disturbances can include irregularity in sleeping habits, difficulty falling asleep, early morning awakening, frequent awakening at night, sleep apnea and restless leg syndrome. Sleep disturbances among dialysis patients are found to be related to duration of dialysis therapy, high

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levels of urea and/or creatinine, pain, disability and somatic complaints such as pruritus and bone pain⁶. The prevalence of sleep problems [insomnia, restless leg syndrome (RLS), periodic limb movement during sleep (PLMS), and sleep apnea] might contribute to impaired quality of life in patients with ESRD⁷.

Methods

A cross-sectional study was done to find out the prevalence of depression and sleep problems in patients on maintenance HD for more than 3 months and correlate it with their demographic and biochemical profile. This study includes 316 outpatients on maintenance HD. The study was carried out in Hemodialysis units of Department of Nephrology, Dhaka Medical College Hospital, *Bangabandhu Sheikh Mujib Medical University*, National Institute of Kidney Disease & Urology, and Kidney Foundation Hospital, Dhaka, Bangladesh, between April 2012 and March 2013.

Those agreed to participate a written informed consent was obtained. The patients were instructed to attend the dialysis centre on the scheduled day of dialysis; blood was drawn from AV fistula before starting hemodialysis. Demographic history was taken and questionnaire of Beck Depression Inventory and Insomnia Severity Index was asked in Bangla language during the first 2 hours of hemodialysis from each subject. Patients were dialyzed with volumetric dialyzer machines, bicar-bonate buffer-based dialysate with blood flow of 250 mL/min and dialysate flow of 500 mL/min. All patients were dialyzed using 1.3m² surface area hollow fiber polysulfone mem-brane dialyzers. The height and weight of all individuals were measured after completion of dialysis by measuring scale and weighing machine. Body mass index (BMI) was calculated in kg/m². Hemoglobin, serum albumin, se-rum calcium, and serum phosphorus were mea-sured using standard methods from the blood samples of pa-tients drawn from the AV fistula before starting dialysis.

According to the Score of BECK’s DEPRESSION INVENTORY for depression:

Total Score	Levels of Depression
1-10	These ups and down considered normal
11-16	Mild mood disturbance
17-20	Borderline clinical depression
21-30	Moderate depression
31-40	Severe depression
Å40	Extreme depression

According to the Score of Insomnia Severity Indexfor Insomnia:

- 0–7 = No clinically significant insomnia
- 8–14 = Sub threshold insomnia
- 15–21 = Clinical insomnia (moderate severity)
- 22–28 = Clinical insomnia (severe).

Data were processed and analyzed using SPSS (Statistical Package for Social Science) version 16.0 for windows. Results were considered significant at P <0.05.

Results

The study group consisted of 316 patients of which 220 (69.6%) were males and 22 (30.4%) were females. As per the protocol we included only those patients who were on dialysis for more than 3 months. Of these, patients who were on HD for more than 1 year (60.4%) formed a separate group for analysis and were compared to those on HD for and less than 1 year (39.6%). 45.9% of patients were between ages 31 and 50 years, while another 22% were Å50 years. The remaining (32%) were under 30 years of age.

The prevalence of depression in our study population was 92.7%. Depression was significantly more in patients with urban living (P=0.007), unemployed (P=0.007), or having less income (P=0.018) and who got dialysis >12 months (P=0.009) and who got dialysis at least two sessions per week (P=0.014).

Insomnia was significantly more in female (P=0.018) patients among less income group (P=0.008) and more in patients who got at least two sessions of hemodialysis per week (P=0.011). Low Serum hemoglobin is significantly (P<0.5) associated with both depression and insomnia, while low serum albumin is significantly (P<0.5) associated with depression.

Table I
Association of depression and insomnia in patients and their demographic characteristics

	Depression			Insomnia		
	Present	Absent	P value	Present	Absent	P value
Age (years)			0.300			0.497
Up to 30	6(5.9)	95(94.1)		10(9.9)	91(90.1)	
31 - 50	14(9.7)	131(90.3)		10(6.9)	135(93.1)	
50+	3(4.3)	67(95.7)		8(11.4)	62(88.6)	
Sex			.349			.018
Male	18(8.2)	202(91.8)		25(11.4)	195(88.6)	
Female	5(5.2)	91(94.8)		3(3.1)	93(96.9)	
Residence			.007			.629
Rural	14(12.6)	97(87.4)		11(9.9)	100(90.1)	
Urban	9(4.4)	196(95.6)		17(8.3)	188(91.7)	
Education			.405			.362
Illiterate	6(5.7)	99(94.3)		6(5.7)	99(94.3)	
Up to Secondary	11(6.9)	148(93.1)		16(10)	143(90)	
Higher secondary and above	6(11.5)	46(88.5)		6(11.5)	46(88.5)	
Occupational status			.007			.063
Employed	12(13.7)	76(86.4)		13(14.8)	75(85.2)	
Unemployed	11(4.8)	217(95.2)		15(6.6)	213(93.4)	
Marital status			0.554			0.414
Married	21(7.9)	254(92.1)		3(5.9)	48(94.1)	
Unmarried/ Widow	2(3.9)	49(96.1)		25(9.4)	240(90.6)	
Monthly Family income (taka)			.018			.008
< 5000	6(3.5)	163(96.5)		10(5.9)	159(94.1)	
5001-15000	11(10.6)	93(89.4)		9(8.6)	95(91.4)	
>15000	6(13.9)	37(86.1)		9(20.9)	34(79.1)	

Table II
Association of depression and insomnia in patients with hemodialysis

	Depression			Insomnia		
	Present	Absent	P value	Present	Absent	P value
Duration of Hemodialysis			.009			.112
3-12	15(12)	110(88)		15(12)	110(88)	
>12	8(4.2)	183(95.8)		13(6.8)	178(93.2)	
Frequency of Hemodialysis			.014			.011
2	17(6)	265(94)		21(7.4)	261(92.6)	
3	6(17.6)	28(82.4)		7(20.6)	27(79.4)	

Table III
Association of depression and insomnia in patients and their biochemical variables

Present	Depression			Insomnia		
	Absent	P value	Present	Absent	P value	Present
Hemoglobin			.001			.000
< 10gm/dl	5(2.3)	213(97.7)		11(5)	207(95)	
>10 gm/dl	11(11.2)	87(88.8)		17(17.3)	81(82.7)	
Albumin			.001			.910
<3.5 mg/dl	7(3.6)	188(96.4)		17(8.7)	178(91.3)	
> 3.5 mg/dl	16(13.2)	105(86.8)		11(9.1)	110(90.9)	

Discussion

There is existing literature with quite a few numbers of studies assessing the prevalence of depression and sleep problems in ESRD patients on maintenance HD from other countries. Although these studies have established that such patients have a high overall prevalence of depression and sleep problems, there is paucity of such data from our country.

Compared to the population studied in the previous studies, there are significant differences in socioeconomic and cultural background of our population. In addition, higher rate of illiteracy and poor socioeconomic conditions in our population could play an important role. There is also a lack of access to medical facilities, especially access to psychiatric evaluation and care. Only few studies have looked at socioeconomic factors associated with depression, and there are no studies looking at the prevalence of depression and sleep problems among HD patients from Bangladesh.

Regarding socio demographic parameters it was observed in this current study that about half of the patients (45.9%) were in the 31-50 years age group. Male were predominant (69.6%) and most patients were married (83.9%). This reflects our social bonding. Most patients lived in urban area (64.9%). One third (33.2%) of the patients were illiterate and half (50.3%) of them had education up to SSC level. About three fourth of the patients (72.2%) were unemployed. More than half (53.5%) of the patients belongs to lower income group (monthly income up to

5000 taka). This reflects the socioeconomic condition of the study patients. As all the dialysis centre from where data were collected is run with subsidy from government and private sector, so poor people were more in our study patients.

Serum hemoglobin level of these patients showed the mean was 9.65 ± 1 mg/dl with a range of 7-12 mg/dl. Most of the patients (69%) had hemoglobin level <10 mg/dl. and lower serum albumin level <3.5mg/dl., which indicate lower nutritional status. Most patients had normal serum calcium (59.5%) serum phosphate (74.7%) level. Among these study population more than three fourth (76.3%) patients had normal BMI but a significant number (17.7%) of patient was under weight which signify nutritional inadequacy.

According to the etiology of ESRD of these study population GN is the most common cause of ESRD 55.4% followed by DM 25.9%, HTN 13.9%, and others 4.7%. Which is comparable with Harun (2002) where the causes of chronic kidney disease in Bangladesh were showed glomerulonephritis 47%, diabetes mellitus 24%, hypertension 13%, obstructive uropathy 8%, undetermined 6%.

In present study total number of patients were 316 and among them 293 (92.7%) categorized as depressive disorder by using BDI. In Bangladesh the prevalence of depression among normal population is 4.6%¹¹. Depression in chronic medical illnesses is more prevalent than normal Population¹¹. According to the BDI 35.1% have moderate depression and 30.4%

have severe depression and 26.3% have extreme depression. Only 0.9% has borderline depression. These findings are similar in nature of depression but not regarding the prevalence with other studies done before in the other part of the World. Depression is the most common psychiatric abnormality in hemodialysis (HD) patients though they found only 10% patients on MHD have Major depression²⁶. An Indian cross-sectional study was conducted among 69 patients on maintenance HD for more than 3 months. There was high prevalence of depression (47.8%), insomnia (60.9%)²⁷.

Regarding the gender variation, female had more depression 94.8% compared to male which was 91.8%. The difference was statistically not significant (P value=0.349). 95.6% respondents from urban area and 87.4% respondents from rural area had depression these difference was statistically significant (P value=0.007). Statistical analysis found that there was no significant change (p=0.405) between education and depression among the study patients. We found depression was more in patients who were illiterate and incidence decrease with higher level of education³¹. found significant relation (p = 0.003) between the educational level and depression and this finding is similar to our results.

Regarding the occupational status of the respondents depression was more among unemployed patients (95.2%) compared to employed patients which was 86.36%. The difference was statistically significant (P value=0.007). Michael et al. (2010) found significant difference between depression and employed or unemployed respondents with CKD (p =0.001). Most of our widow/unmarried respondents had depression (96.1%) but there was no significant difference between married and unmarried/widow respondents (p value 0.554). One study found a significant difference (p= 0.02) between single and married patients in MHD in the context of with or without depression³¹.

The respondents having less monthly income more prone to depression, researcher found a statistically significant difference between

monthly income and depression among the patients which is (p=.018). Among our respondents 169 having monthly income less than 5000 BDT of them 163 have depression (96.5%). A previous study found that poor financial condition having more depression among the patients with CKD, which had statically significant (p=0.007) and corresponded with the result of our present study³¹.

In present study the depression present 97.7% among the patients with Hb level <10 mg/dl. These findings demonstrate that there is a relationship (p value 0.001) among high depression score and low levels of hemoglobin.

In our study we found low albumin level (< 3.5 mg/dl) having higher rate of depression (96.4%). It is similar to previous study done by Bornivelli et al. (2008), where they found significant depression (p=0.05) among the patients with low serum albumin level.

Study revealed no significant association between serum calcium and phosphate level and depression.

Among these study population Depression was significantly more who got Hemodialysis over 12 months (95.8%) in comparison with who got 3-12 months of Hemodialysis (88%) (P value=0.009). There is also significantly more depression who got 2 session per week Hemodialysis (94%) in comparison with who got 3 session per week Hemodialysis (82.5%). (P value=0.014).

In present study the insomnia index shown that 91.1% (288) patients having insomnia, this findings are similar with previous study () where insomnia has found 30%-80% among the patients on MHD^{13,42}. An Indian cross-sectional study was conducted by among 69 patients on maintenance HD for more than 3 months. There was high prevalence of depression (47.8%) and insomnia (60.9%)⁴⁷.

Insomnia is one of the core feature of depression Already we have discussed the relation with depression and sociodemography variables. So, we also found some relation between insomnia and sociodemographic variables of our respondents.

Considering the age group we found the age group 31-50 years had higher prevalence (93.1%) of insomnia than younger and older age group but this difference was not significant (p value 0.497). ParaskeviTheofilou (2012) showed elderly patients [mean age 62.41 (13.53) years] had more insomnia and other sleep disorders. The difference between the previous study and our findings may be due to the sampling method .

Regarding the gender variation, female had more insomnia (96.9%) compared to male (88.6%).The difference was statistically significant (P value=0.018).) found similar gender difference with insomnia in the patients with CKD on MHD. 2

Insomnia was more among urban population (91.7%) compared to rural population which was 90.1%.The difference was statistically not significant (P value=0.629). Statistical analysis found that there was no significant change (p =.362) between education and insomnia among the study patients.

Regarding the occupational status , insomnias found more among the unemployed patients 93.4% compared to employed patients which was 85.2%.The difference was statistically not significant (P value=0.063).

Insomnia was more among unmarried/widow 94.1%. The difference with other group (married) was statistically not significant (P value=0.414)

The respondents having less monthly income more prone to depression, researcher found a statistically significant difference between monthly income and depression among the patients which is (p=.008). Among our respondents 169 having monthly income less than 5000 BDT of them 159 have depression (94.1%).

In present study 207(95%) patients had insomnia whose hemoglobin level was below 10 mg/dl. 98 patients having hemoglobin level more than 10 mg /dl and among them 81(82.7%) have insomnia. Here the p value is 0.000 which is significant but previous study found no significance of hemoglobin level in insomnia (Massimo, 2002).

Some previous study found serum albumin level have significant relationship with insomnia¹⁹. found that lower albumin level (avg 4.17 gm/l) have significant relationship with insomnia in patients on MHD. This findings differ with our present study result where we found that among 288 patients with insomnia regarding albumin level we found insomnia in 178(91.3%) patients of 195 respondents having lower albumin level (up to <3.5 g/l) compare to 110 (90.9%) patients of 121 respondents having albumin level e" 3.5 g/l.

Total 120 (93.8%) patients among the 128 having insomnia, those Calcium level <8.4 mg/dl. But the with Ca level more than 8.5 mg/dl having depression 168(89.4%) among 188 study patients . This difference have no statistical significance (p value= 0.178). One previous study () found higher calcium level is associated with insomnia. Our finding is not similar with that study, but we need another research with bigger sample size to give another comment on it^[19].

In present study 214(90.7%) patients have insomnia, those serum Phosphate level < 5.4 mg/dl and 74(92.5%) patients having insomnia those serum phosphate level e" 5.5 mg/dl. The p value is 0.620 (not significant). One study found that lower phosphate level in patients on MHD having significant sleep problem. This study (Mark et al., 2006) result is similar with our study.

Among these study population Insomnia was more who got Hemodialysis over 12 months (93.2%) in comparison with who got 3-12 months of Hemodialysis (88%) but not in significant level (P value=0.112). But there is significantly more Insomnia who got 2 session per week Hemodialysis (92.6%) in comparison with who got 3 session per week Hemodialysis (79.4%). (P value=0.011).

Depression and Insomnia

In present study 293 patients among 316 have borderline to extreme depression, among them 94.2% patients have insomnia. In case of patients without depression 52.1% have some form of insomnia. This findings revealed a significant association between Depression

and Insomnia ($r=0.334$, $P=0.000$. Han found more than 68% patients on MHD having insomnia and most of them having depressive symptoms¹⁵. This finding is similar with present study.) found the prevalence of sleep disturbance was 74.4% among the patients on MHD and the poor sleepers had higher BDI scores and a higher ratio of females comparing to the good sleepers³⁷.

Conclusion

Maintenance HD is associated with high prevalence of depression and insomnia. Sleep problems are associated with higher illness intrusiveness which represents illness-induced disruptions to lifestyles and activities. Depression has been linked to an increased risk of mortality, hospitalization and dialysis withdrawal in different studies. Our results, thus, advocate for incorporating a standard assessment and eventually treatment of depression and sleep disorders into the standard care provided to HD patients to improve psychological and overall well-being, quality of life, and consequently, reduce morbidity and mortality risk in this population. In addition, we believe that our finding of a high prevalence of depression in the caregivers of the patients is of interest to the clinician.

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