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Depression among patients undergoing maintenance hemodialysis at a tertiary care center in Kathmandu, Nepal

Nora Ranjitkar Manandhar,[1] Rabi Shakya,[2] Bimal Pandey,[1] Pratik Wagley[3]

[1]Asst. Prof., [3]Lecturer, Internal Medicine, [2]Prof., Psychiatry, Patan Academy of Health Sciences, Lalitpur, Nepal

Correspondence
Dr. Nora Ranjitkar Manandhar
Department of Internal Medicine, Patan Academy of Health Sciences, Lalitpur, Nepal
Email:
noraranjitkar@pahs.edu.np

Abstract

Introductions: Patients with chronic kidney disease have a high burden of somatic symptoms which may be due to depression. This study analyses occurrence of depression in patients with chronic kidney disease (CKD) undergoing hemodialysis (HD) at a tertiary care center in Kathmandu, Nepal.

Methods: This is a retrospective study done at Patan Hospital, a tertiary care teaching hospital of Patan Academy of Health sciences, Lalitpur, Nepal. Translated in Nepali language and validated Beck Depression Inventory (BDI) was used. A cut-off of 16/17 was used to define depression.

Results: Altogether 56 patients were included, mean age 54.375±17.87 years, time on HD 25.06±21.58 months, BDI score 19.18±10.16. The prevalence of depression was 51.8%. There was no significant differences of BDI score and rate of depression in genders, housing status, education level, alcohol intake, presence of co-morbidity and shift of HD. However, there was a significant association of BDI score and the employment status, *p*=0.026 and the affordability of erythropoiesis stimulating agent, *p*=0.033.

Conclusions: Depression was common in patients undergoing hemodialysis treatment and the rate of depression was significantly lower in the patients who were employed and used of erythropoiesis stimulating agent.

Keywords: chronic kidney disease, depression, hemodialysis

Introductions

The chronic kidney disease (CKD) patients undergoing hemodialysis (HD) have to adjust to the roles in the family, work place, sexual function, time management and mobility which affect them physically as well as psychologically.[1] Stressors like poly-pharmacy, dietary constraints, fear of death, dependency upon treatment may affect quality of life and feeling of loss of control.[1]

Patients with depression have significantly higher Beck Depression Inventory (BDI) score.[1,2] A unit standard deviation increase in depression score was associated with 18-32% increase in mortality rate.[3,4] Depression affects self-care of the CKD patients that affects compliance to the medications and diet.[5]

The point prevalence of depression, using self-administered questionnaires, among in 2855 patients undergoing HD ranged from 1.4-94.4%, average 39.3%.[7] The prevalence of depression ranged from 46.6% to 83.5% from studies done in India and 83.1% from Pakistan.[8,9,12]

Data is scarce locally. Aim of this study is to analyse the prevalence of depression among the patients undergoing HD at a tertiary care center in Kathmandu, Nepal.

Methods

This was a retrospective cross-sectional descriptive study of the patients on maintenance HD at Patan Hospital. The study was conducted on the month of August 2018 after ethical clearance from the Institutional Review Committee of Patan Academy of Health Sciences. Prevalence of depression was analysed using BDI from a self-scoring questionnaire translated in Nepalese language. The differences of BDI score with the variables like the age, between genders, marital status, residence status (permanent/ temporary), current employment status, education level, smoking status, alcohol consumption, presence of comorbid diseases other than chronic kidney disease, shift of dialysis, number of dialysis per week performed and use of blood transfusion or erythropoiesis stimulating agent (ESA).

All patients above the age of 18 years who had been dialysing for more than three months were included in this study. Those who had underlying psychiatric illness and dialysed temporarily for acute kidney failure were excluded. The questionnaire was given to the patients at the HD unit at Patan Hospital. The literate patients would fill the questionnaire themselves. The questions were read aloud to the illiterate patients and the choices of answers (best response), as told by the patients, were filled by the author or the team.

Self-rating BDI with 21 questions were used to assess depression. Each question was scored from zero to three; with a maximum score of 63 and minimum of zero. The validated Nepalese Version of BDI was used.[6] With the reported rate of depression around 50% among the HD patients from India, the Cochran's formula was used to calculate sample size of 384.[8,9] As the total number of patients undergoing HD for end stage renal failure was 57, using the formula for the finite population correction, the final sample size was 50.

Statistical analyses were performed by IBM-SPSS-20 software. Independent sample t test was used to calculate whether the groups performed differently while measuring the dependent variable in scale. Levine test was performed to calculate the equality of variances for a variable in two or more groups. For p value is less than 0.05 or the ration of N/n less than 1.5, a non-parametric Kruskal Wallis H test (also called Kruskal Wallis one-way ANOVA test) was used. The p value less than 0.05 was considered significant. Pearson Chi Square test or Fisher's Exact test was used to calculate the significance of differences between the non-parametric dependent variable with the independent variables. The p value less than 0.05 was considered significant. Pearson correlation test was used to correlate the two continuous variables and p <0.05 was

considered significant. Continuous variables were calculated in means and standard deviations.

Results

A total of 57 charts were studied. One patient was excluded as she was not able to read or write and had a severe hearing impairment making it difficult to communicate with her. Thus, 56 patients were included in our study. Mean age of the patients was 54.3±17.9 years, HD time 25.1±21.6 months. There were 32 (57.1%) male, (Table 1). Clinical depression was observed in 29 (51.8%) and in 27 (48.2%) it was not. Mean BDI score was 19.2±10.2.

There was no significant statistical difference in the rates of depression in different age groups, genders, marital status, type of residence, education level, employment, smoking status, drinking habit, presence or absence comorbidity, diabetes, hypothyroidism and time on HD. There was a statistical significance in the depression rates

in patients receiving ESA and those receiving blood transfusion, p = 0.013, (Table 2).

The rate of depression was not found to be significantly lower in the patients who were currently employed. However, the mean BDI score of the currently employed patients 12.3± 6.80 was significantly lower than those who were not employed 20.5±10.2, p = 0.026. The difference was not significant between genders, rented or own house, drinking habits, presence or absence of comorbidities like diabetes, and hypothyroidism, (Table 3). There were no statistically significant differences in the variances measured with Kruskal Wallis H test, in marital status, smoking status, education level, number of HD per week and shifts of dialysis schedule, (Table 4).

There was a positive correlation between the age and the BDI score but statistically not significant, p = 0.203. There was a negative correlation between the time on HD and the severity of clinical depression but statistically not significant, p = 0.47.

Table 1. Characteristics of the patients (n=56) undergoing maintenance hemodialysis at a tertiary care hospital in Kathmandu, Nepal			
Characteristic	**Number (%)**	**Characteristic**	**Number (%)**
Males	32 (57.1%)	Non-smoker	33 (58.92%)
Females	24 (42.9%)	Ex-smoker	22 (39.28%)
Marital Status		Current smoker	1(1.7%)
Married	44 (78.6%)	Teetotaller	41 (73.2%)
Married but separated	3 (5.4%)	Abstain from alcohol	15 (26.8%)
Unmarried	3 (5.4%)	Presence of comorbidity	45 (80.4%)
Widowed	6 (10.7%)	Absence of comorbidity	11 (19.6%)
Own house	38 (67.9%)	Presence of diabetes	15 (26.8%)
Rented home	18 (32.1%)	Absence of diabetes	41 (73.21%)
Education		Presence of hypothyroidism	4 (7.1%).
Illiterate	16 (28.6%)	Absence of hypothyroidism	52 (92.85%)
Literate	6 (10.7%)	Once weekly HD	2 (3.6%)
Primary level	13 (23.2%)	Twice weekly HD	38 (67.85%)
Lower secondary	6 (10.7%)	Thrice weekly HD	16 (28.57%)
High secondary	6 (10.7%)	Morning shift	27 (48.2%)
Higher secondary	5 (8.9%)	Mid-day shift	27 (48.2%)
College or university	4 (7.1%)	Evening shift	2 (3.6%)
Currently employed	9 (16.1%)	Blood transfusion	45 (80.4%)
Not employed	47 (83.9%)	Erythropoiesis stimulating agent	11 (19.6%)

Table 2. Differences between variables on presence or absence of depression using a Pearson X^2 test or Fisher's exact test

Variable	Not Depressed (%)	Depressed (%)	Total	p
Male	15 (46.9%)	17 (53.1%)	32	0.817
Female	12 (50%)	12 (50%)	24	
Married	23 (52.3%)	21 (47.7%)	44	0.244
Single	4 (33.3%)	8 (66.7%)	12	
Residence own home	19 (50%)	19 (50%)	38	0.698
Residence rented	8 (44.4%)	10 (55.6%)	18	
Currently employed	7 (77.8%)	2 (22.2%)	9	0.057
Not employed	20 (42.6%)	27 (57.4%)	47	
Non-smoker	19 (57.6%)	14 (42.4%)	33	0.189
Ex-smoker	8 (36.4%)	14 (63.6%)	22	
Current smoker	0 (0%)	1 (100%)	1	
Teetotaller	20 (48.8%)	21 (51.2%)	41	0.889
Abstained alcohol	7 (46.7%)	8 (53.3%)	15	
Comorbidity present	24 (53.3%)	21 (46.7%)	45	0.181
Comorbidity absent	3 (27.3%)	8 (72.7%)	11	
Diabetes present	8 (53.3%)	7 (46.7%)	15	0.642
Diabetes absent	19 (46.3%)	22 (53.7%)	41	
Hypothyroidism present	1 (25%)	3 (75%)	4	0.612
Hypothyroidism absent	26 (50%)	26 (50%)	52	
Once a week HD	1 (50%)	1 (50%)	2	0.983
Twice a week HD	18 (47.4%)	20 (52.6%)	38	
Thrice a week HD	8 (50%)	8 (50%)	16	
Blood transfusion	18 (40%)	27 (60%)	45	0.013
ESA use	9 (81.8%)	2 (18.2%)	11	

Table 3. Results of independent t-test comparing the difference in variables with the BDI score

Variable	Mean Score	Std. Deviation	Df	p Value
Male	19.5625	10.50633	54	0.747
Female	18.6667	9.87164		
Own house	19.2632	10.85204	54	0.929
Rented house	19	8.7984		
Current employment	12.3333	6.80074	54	0.026
Not employed	20.4894	10.21693		
Teetotaller	18.4639	10.36363	54	0.389
Quit drinking	21.1333	9.63525		
Comorbidity present	18.2	9.70145	54	0.146
None	23.1818	11.4614		
Diabetes	19.53333	8.80638	54	0.876
No diabetes	19.0488	10.70736		
Hypothyroidism	22	10.29563	54	0.569
No thyroid disorder	18.9615	10.21525		
ESA use	13.3636	7.74949	54	0.033
Transfusion	20.6	10.23674		

Table 4. Results of Kruskal Wallis H test

Levels of Independent Variables	X2	Df	p value
Married, Unmarried, Widowed, Separated	2.012	3	0.57
Non-Somker, Ex-Smoker, Current Smoker	2.786	2	0.248
Illeterate, Literate, Primary, Lower, Mid, High, Higher Secondary, College	4.659	6	0.583
Once, Twice, Thrice a week HD	0.419	2	0.811
Morning, Mid-Day, Evening shift HD	0.028	2	0.986

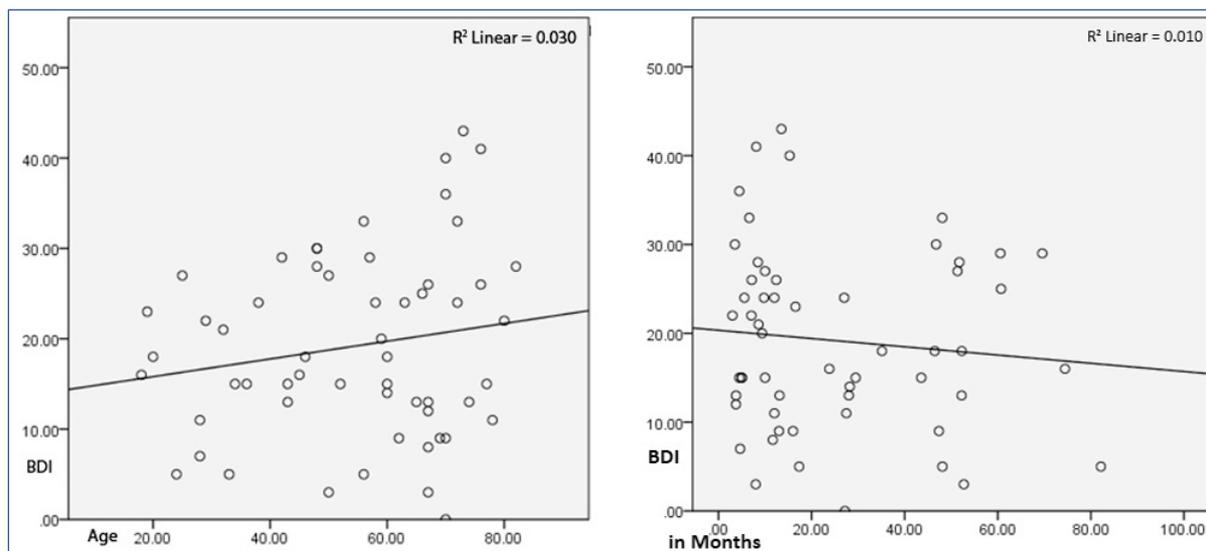**Figure 1. Scatter diagram showing the relation: between the BDI score and age, p = 0.47 not significant; BDI score and duration of HD in months, p = 0.203, not significant**

Discussions

Depression was common (51.8%) in the end-stage renal failure patients dialyzing in our center, similar to other studies. The rates of depression in dialyzed patients was 47.8%, 46.6%, 50%, and 46% in Delhi, Lucknow, Lebanon, and Brazil respectively.[8,9,10,11] The rates of depression was higher in South India, Pakistan, and Egypt, at 83.5%, 83.1%, and 76% respectively.[12-14] In a nation-wide USA study, Choices for Healthy Outcomes in Caring for ESRD (CHOICE) for screening depressive symptoms (CHOICE study), the prevalence of depression at baseline was 24%.[15] In the study performed at North and East Hertfordshire, UK, the rate of depression among patients undergoing HD was 17.5%.[16] In a meta-analysis, the point prevalence of depression was 1.4-94.4%, average 39.3% in 2855 participants.[7] These results shows the depression rates are higher in the mid income to low income countries in comparison to the high income countries.

There was a positive correlation between age and the BDI score but this was not statistically significant. The rates of clinical depression were also not to be statistically different in different age groups in our study. Similar findings were seen in the other studies where the depression was not associated with age.[8,10,12,14-16] However, in the study conducted

in Brazil, elderly patients were found to have significantly higher rates of depression.[11]

The mean BDI score for the males (19.56±10.50) was not significantly different than those of the females (18.66±9.87) and similarly the depression rates were also not different than in other studies from South Asia and other countries.[7-16]

Even though, the rates of depressions seemed to be higher among the single patients than those who were married, the differences were not statistically significant. Likewise, the differences in BDI scores were not significantly different in the groups. Similar, trends were also observed in the South Indian, Lebanese, Egyptian, the CHOICE study and an English study.[10,12,14-16]

In our study, there was no statistical difference in the BDI scores of the patients with different educational back grounds. The South Indian study found statistically significant difference in the level of education and depression. Depression was present in 63.6% of those who had less than a high school education and 33.3% in those with more than a high school level.[12] However, similar to ours, the study conducted in Lebanon and Egypt did not find association with the education.[10,14] But in the CHOICE study, patients with less than a high

school level of education had significantly higher rates of depressive symptoms.[15]

In our study, the mean BDI score of the currently employed patients (12.33±6.80) was significantly lower than those who were not employed (20.48±10.21). Similarly, in South India and Delhi, depression rate was associated with the lower socioeconomic status.[12,8] However, in the Egyptian and other, the number of patients being employed was higher than in our study, and these studies did not show the association between clinical depression and the current employment status.[14,16]

In our study, the mean BDI score of the group containing teetotallers (18.46±10.36) was not significantly different than the abstained group (21.13±9.63). The rates of depression among the two groups were also not significant. The mean BDI scores were not significantly different in the non-smokers, ex-smokers and the current smokers. But, in the CHOICE study, the relation between never, past and current smokers was significant for depressive illness.[15]

In our study, the mean BDI scores did not differ significantly between the patients with (19.53±8.80) and without diabetes (19.04±10.70). Similarly, there was no difference between the means of the patients with (22.00±10.299) and without hypothyroidism (18.96±10.28) and the presence or absence of a comorbidity other than CKD. Similar results were observed in the CHOICE study, where the presence of comorbidities, like diabetes, history of CVD and congestive heart failure were not associated with the depressive symptoms.[15] Likewise, in the Egyptian and other, there was no association between depression and the presence of co-morbidity.[14,16] However, in the Lebanese study, there was a strong correlation between the presence of comorbidity and depression.[10]

The symptoms of depression overlap significantly with those of uremia.[17] In our study, there was not a significant differences in the BDI scores and the rates of depression among the patients undergoing once, twice or thrice a week HD. However, in the study conducted in Egypt, where all the patients underwent thrice a week HD, depression was strongly associated with the post dialysis urea level.[14]

We could not find association of depression and the shift of dialysis in our study, unlike the study from Brazil, reporting higher rate (21.9%) in the morning shift (mostly residing in the rural area) than in the evening shift (4.2%).[11]

In our study, the means of the BDI score in the group using an ESA (13.36±7.74) was significantly lower than those patients who are dependent on blood transfusion (20.60±10.23), p = 0.033. Likewise, the rate of depression was also significantly lower in the patients receiving ESA, p = 0.013. In Nepal, due to out of pocket payment, ESA was administered to those patients who could afford it, thus, indirectly correlating it with the economic status of the patient. Counter intuitively, the higher rate of depression might be falsely attributed by the symptoms of anaemia. However, in the developed and middle-income countries, ESA use was not associated with the lowered rates of depressive symptoms.[15,14]

The rate of depression was higher in the patients who were dialyzed for less than one year. Similarly, the BDI score tended to correlate negatively with the time on HD, though the results were not statistically significant. This may signify that the depression being not just an adjustment problem but a persistent one.[6] However, in the study cohorts from India, the rate of depression was found to be significantly higher in those who had been dialyzed for more than five year period than less than that.[12] Similarly, the rate of depression was more in those who had been dialyzed for more than one year.[8] Similar to ours, the study from Egypt and UK reports no association between the time on dialysis and depression rates.[14,16] In the CHOICE study, however, the patients who were enrolled within thirty days of initiation of HD, and were

more likely to have depressive symptoms than those enrolled later. The authors in the same study found that the depressive symptoms persisted or increased in 66% of the patients who had a baseline depressions.[15] Other studies showed that the rate of depression was inversely related with the time on dialysis, reflecting the successful adjustment to the stressors of ESRD, but this may reflect the consequence of survival bias as the mortality rate is increased for the patients having a higher BDI score.[3,4]

Limitations of the study was that it was a retrospective study and a self-rating BDI scale which had been validated for screening depression in the general population and not in the patients with compound depression like the CKD. The study would have been stronger if we were able to include larger sample of patients as calculated by the Cochran's formula. Patients with CKD had a high burden of somatic symptoms that are similar to the symptoms of depression. So, this methodology may misinterpret somatic symptoms that may not be due to major depression, thus falsely increasing the prevalence of depression. The study did not incorporate the lab values and the medications the patients were receiving. The study would have been stronger if the BDI score was co-related with the quality of family relation (with different family members rather than grouping into married, unmarried groups), and whether treat to target values were or were not met for blood pressure, diabetes, dyslipidemia, anemia, secondary hyper-parathyroidism, adequacy of HD, dry weight, nutritional status of the patients. It would have been better if the lab values had been included. The anxiety level was not studied, and may also influence the outcome.

Thus, depression in dialysis patients is not only a condition due to the maladjustment to the new modality of treatment but a persistent disease, hence it should be screened from time to time and appropriate treatment be initiated. As the patients with current employment have a lower rate of depression, the government should give them the vocational training and relocate them to the jobs that does not demand undue physical effort, yet provide some economic independence.

Conclusions

The depression was prevalent in the patients undergoing hemodialysis (HD). The Beck Depression Inventory (BDI) scores were significantly lower in the currently employed patients, and erythropoiesis stimulating agent (ESA) users.

Acknowledgements

References

1. Kimmel PL. Psychosocial factors in dialysis patients. Kidney Int. 2001;59(4):1599-1613. DOI: 10.1046/j.1523-1755.2001.0590041599.x
2. Hedayati SS, Bosworth HB, Kuchibhatla M, et al. The predictive value of self-report scales compared with physician diagnosis of depression in hemodialysis patients. Kidney Int. 2006;69(9):1662. DOI: 10.1038/sj.ki.5000308
3. Cukor D, Coplan J, Brown C, et al. Depression and anxiety in urban hemodialysis patients. Clin J Am Soc Nephrol. 2007;2(3):484-90. DOI: 10.2215/CJN.00040107
4. Kimmel PL, Peterson RA, Weihs KL, et al. Multiple measurements of depression predict mortality in a longitudinal study of chronic hemodialysis outpatients. Kidney Int. 2000;57(5):2093-8. DOI: 10.1046/j.1523-1755.2000.00059.x
5. Mavanur M, Sanders M, Unruh M. Sleep disordered breathing in patients with chronic kidney disease. Indian J Med Res. 2010;131:277-84. PDF.
6. Kohrt BA, Kunj RD, Koirala NR, et al. Validation of a Nepali version of the Beck Depression Inventory. Nep J Pscy. 2002;2(4):123-30.
7. Palmer S, Vecchio M, Craig JC, et al. Prevalence of depression in chronic kidney disease: systematic review and meta-analysis

of observational studies. Kidney Int. 2013;84(1):179-91. DOI: 10.1038/ki.2013.77

8. Macaron G, Fahed M, Matar D, et al. Anxiety, depression and suicidal ideation in Lebanese patients undergoing hemodialysis. Community Mental Health Journal. 2014;50(2):235-8. DOI: 10.1007/s10597-013-9669-4

9. Rai M, Rustagi T, Rustagi S, Kohli R. Depression, insomnia and sleep apnea in patients on maintenance hemodialysis. Indian J Nephrol. 2011;21(4):223-9. DOI: 10.4103/0971-4065.83028 PMID: 22022080

10. Patel ML, Sachan R, Nischal A, Surendra. Anxiety and depression – a suicidal risk in patients with chronic renal failure on hemodialysis. International Journal of Scientific and Research Publications. 2012;2(3):1-6. PDF

11. Teles F, De Azevedo VF, De Miranda CT, et al. Depression in hemodialysis patients: the role of dialysis shift. Clinics. 2014;69(3):198-202. DOI: 10.6061/clinics/2014(03)10 PMCID: PMC3935125 PDF

12. Nelson V, Gopalakrishnan S, Rakesh PS, Simon S. Depression among dialysis patients attending a tertiary care hospital in Kerala, Southern India. The Journal of Nephrology Social Work. 2016;40(2):34-7. Web link

13. Anees M, Barki H, Masood M, Mumtaz A, Kausar T. Depression in hemodialysis patients. Pak J Med Sci. 2008;24(4):560-5. PDF

14. Donia AF, Zaki NF, Elassy M, Elbahaey W. Study of depression and quality of life among hemodialysis patients: an Egyptian experience. Int Urol Nephrol. 2015;47(11):1855-62. DOI: 10.1007/s11255-015-1091-0

15. Boulware LE, Yongmei L, Fink NE, et al. Temporal relation among depression symptoms, carsiovascular disease events, and mortality in end-stage renal disease: contribution of reverse causality. Clin J Am Soc Nephrol. 2006;1(3):496-504. DOI: 10.2215/CJN.00030505

16. Chilcot J, Wellsted D, Farrington K. Screening for depression while patients dialyze: an evaluation. Nephrol Dial Transplant. 2008;23(8):2653-9. DOI: 10.1093/ndt/gfn105

17. Kimmel PL, Peterson RA. Depression in patients with end-stage renal disease treated with dialysis: has the time to treat arrived? Clin J Am Soc Nephrol. 2006;1(3):349-52. DOI: 10.2215/CJN.00890306