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Depression Among Dialysis Dependent end-Stage Renal Disease Patients: A Study from Tertiary Care Hospital in Bahawalpur

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ABSTRACT

Objective: To determine the frequency of depression among dialysis dependent end-stage renal disease patients, associated factors and effect on patients' compliance and clinical performance parameters.

Study Design: Cross-sectional study

Place and Duration of Study: Department of Nephrology, Bahawal Victoria Hospital, Bahawalpur Pakistan, from Apr 2017 to Mar 2018.

Methodology: End-stage renal disease patients above 16 years of age who were on maintenance haemodialysis for more than 6 months were requested to complete the questionnaire of Urdu version of Patient Health Questionnaire 9. The information about missed treatments, shortened sessions, fluid overload and monthly laboratory data was obtained from medical records. Patient Health Questionnaire 9 score was calculated for all the patients and categorized as mild (5), moderate (10), moderately severe (15) and severe (20) depression.

Results: There were 146 dialysis dependent end-stage renal disease patients (95 males, 51 females) with mean age of 45.1±14.3 years. Duration of dialysis dependence was significantly higher among females (p=0.022). Out of 146 patients, 116 had depression and 27(18.5%) had severe depression. Patients with depression were younger (p=0.037) and lack of social support was significantly associated with depression (p=0.018). Severe depression was significantly more frequent among females (p=0.041). Serum albumin was significantly low among patients with depression (p=0.044).

Conclusion: Depression is common among haemodialysis dependent end-stage renal disease patients. It is common among young patients and those who lack social support and it is associated with hypoalbuminemia.

Keywords: Albumin, Compliance, Dialysis, Depression, Renal, treatment.

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INTRODUCTION

Haemodialysis is one of the types of renal replacement therapy for end stage renal disease (ESRD) that replaces some metabolic and non-endocrine functions of the kidney. Initiation of hemodialysis causes tremendous psychological stress for the ESRD patients and their caregivers (family members).[1] Patients with chronic medical conditions (diabetes mellitus, heart diseases) have higher prevalence of depression which leads to increased symptom burden, non-compliance to treatment, increased expenditures/costs, and ultimately poor quality of life and high mortality. Patients on maintenance haemodialysis have higher incidence of depression than not only healthy people but also those with other chronic medical conditions. Nearly 1/3rd of patients on maintenance haemodialysis have symptoms of depression.[2] The data from tertiary care hospital in Karachi showed that more than 70% maintenance dialysis patients had moderate to severe depression.[3]

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The relationship between ESRD and depression is a two-way phenomenon as prolonged or chronic illness can lead to depression or depression worsen the severity of illness.[4] Depression among dialysis dependent patients is more frequent among males, white ethnicity, unemployed, less educated/illiterate, living alone, socially deprived and those having heightened illness perception.[5] Patients on maintenance haemodialysis with depression are prone to non-compliance and likely to miss their dialysis session and consequently have hypoalbuminemia and hyperphosphatemia.[6,7]

Patient Health Questionnaire 9 (PHQ-9) is a short and easy to administer tool which has been validated among haemodialysis population for screening of depression. It has been found as valid as Beck Depression Inventory (BDI) against Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (gold standard measure for depression).[8] Urdu translation of PHQ-9 has been applied in primary care and coronary artery disease patients but has not been applied or validated among ESRD patients on dialysis.[9,10]

We conducted this study to find the frequency and contributing factors of depression and its impact on clinical parameters and compliance among ESRD patients on maintenance hemodialysis at our institution.

METHODOLOGY

This cross-sectional study conducted at Haemodialysis unit (Kidney Center), Bahawal Victoria Hospital Bahawalpur (Pakistan) to find the frequency of depression, contributing factors and its impact on compliance and clinical performance parameters among ESRD patients on maintenance haemodialysis. Approval was granted to this work by the Ethical Review Board of Quaid-e-Azam Medical College Bahawalpur vide its letter No. 593/DME/QAMC Bahawalpur. Sample size was calculated using online Raosoft sample size calculator,[11] that is available at: http://www.raosoft.com/samplesize.html. We had 230 adult dialysis dependent patients. Assuming 33% population proportion having depression, confidence level of 95% and margin of error 5% the sample size was found 138.

Inclusion Criteria: Adult ESRD patients, above 16 years of age, on maintenance haemodialysis for at least six months who consented were included in the study.

Exclusion Criteria: Patients who did not give consent, those acutely sick or already diagnosed psychiatric problems were excluded from the study.

The patients were requested to complete the questionnaire of PHQ-9 Urdu translation,[12] that is available online and was downloaded and printed from: http://www.multiculturalmentalhealth.ca/wp-content/uploads/listin2013/11/PHQ-9-Urdu.pdf. The patients were assisted in completing the PHQ-9 who requested help or could not read the questionnaire. The information about missed treatment sessions, fluid overload and periodic/monthly laboratory results including serum albumin, serum urea, serum creatinine, serum potassium, serum phosphate, serum calcium, haemoglobin level were obtained from the patient's file and electronic record. PHQ-9 score was calculated and categorized as mild (score of 5-9), moderate (score of 10-14), moderately severe (score of 15-19) and severe depression (score of 20-27).

Data was analysed by IBM SPSS statistics version 17.0. Quantitative variables (continuous variables) such as age and dialysis vintage were expressed as mean and standard deviation (Mean±SD) and analysed with t test. Qualitative data such as PHQ-9 score category, gender, monthly income slab, smoking and addiction history were expressed as frequency or percentages and analysis done with Chi Square test. The level of significance was set as $p \leq 0.05$ in all the statistical analyses.

RESULTS

Higher among female patients than males and it was statistically significant (26±9.5 vs 22.1±10 months, p=0.022). Severity of depression based on PHQ-9 scores of the patients is shown in Table-I.

Table-I: Severity of depression based on PHQ-9 scores (n=146)

Severity of Depression	PHQ-9 Score	Males n=95	Females n=51	Total n=146	*p*-value
Minimal depressio Mild	0-4	22(23)	8(16%)	30(20.5)	0.286
Depressio Moderate	5–9	27(28)	8(16%)	35(24%)	0.085
Depressio Moderate	10–14	17(18)	11(2%)	28(19%)	0.590
Ly severe Severe	15–19	16(17)	10(2%)	26(18%)	0.677
depression	20–27	13(14)	14(2%)	27(18.5)	0.041

Overall p=0.139

Eighty percent patients had PHQ-9 In this study, one hundred forty-six dialysis dependent patients were enrolled out of which 95 patients (65%) were male and 51(35%) were females. The mean age of participants was 45.1±14.3 years (ranging from 17–80 years) and females were a bit younger than males but it was not statistically significant (43.5±13.4 vs 45.9±14.7 years, p=0.334). Dialysis vintage (time since start of dialysis) was 23.4±10.08 months and it was score ranging from mild to severe (PHQ score: 5-27). Thirty-five (24%) patients had mild depression (PHQ-9 score 5-9) while severe depression (PHQ-9 score 20-27) was noted in 27(18.5%) patients. The frequency of severe depression was more among female patients which was statistically significant (p=0.041) and mild depression was more among males but it was not statistically significant (p=0.085). However, overall there was no significant difference between the male and female patients regarding frequency of depression (p=0.139). Patients having depression were significantly younger than those without depression (p=0.0371) as shown in Table-II.

Table-II: Comparison of Patients on Dialysis Dependent end-Stage Renal Disease Patients with Depression and without Depression (n=146)

	Depression (n=116) n (%)	No depression (n=30)	*p*-value
Age (years)	39.66±16.56	46.55±13.47	0.037
Gender			
Males Females	73(63%) 43(37)	22(73) 8(27)	0.286
Dialysis vintage			
≤ 1 year 1 – 2 years > 2 years	45 (38) 34(29) 37(32)	11(37) 7(23) 12(40)	0.671
Marital status			
Single Married Divorced/widow	17(15) 98(84) 1(1)	9(30) 21(70)	0.088
Education			
Illiterate High school Undergraduate Postgraduate	49 (42) 32(28) 20(17) 15(13)	10 (33) 8(27) 5(17) 7(23)	0.533
Presence of central venous catheters	21(18)	5(16.7)	0.854
Body Mass Index	27.3±9.1	26.4±4.1	0.599
Smoking (current/past)	13(11)	3(10)	0.850
Drug abuse/ addiction history	17(15)	1(3.3)	0.093
Jobless/unemployed	101 (87)	24 (80)	0.325
Family system Joint family Nuclear family	87 (75) 29(25)	20 (67) 10(33)	0.357
Financial constraints*	94(81)	23(77)	0.593
Lack of social support	74(64)	12(40)	0.018
Transportation problems	88(76)	20(70)	0.306
Non-compliance with dialysis	14(12)	3(10)	0.896

**Monthly income less than thirty thousand Pakistani Rupees=250 US Dollars at time of study*

Patients with depression lacked social support than those who did not have depression and this difference was statistically significant (*p*=0.018). Educational level and marital status did not differ between patients with and without depression. However single (unmarried) patients had less frequency of depression (*p*=0.050). Majority 87% of the males in the study were unemployed and unable to continue their work and depend on their family or relatives for their financial support. Remaining 21 patients (15 males and 6 females) had office based jobs in governmental sectors and were able to continue their job/working after becoming dialysis dependent. The monthly income of 80% patients (or their family) was below 30,000 Pakistani Rupees (250 United States Dollars). Smoking, addiction history, family system, presence of central venous catheter, lack of transportation and body mass index did not differ between the two groups. There was no significant difference in non-compliance (missing of at least one dialysis session in a month) between the patients who had depression or not.

Hypoalbuminemia was more frequent among patients having depression than those not having depression and this difference was statistically significant (*p*=0.044). There was no significant difference in other laboratory parameters including serum phosphate (Table-III).

Table-III: Laboratory Parameters (n=146)

Parameters	Depression (116)	No Depression (30)	*p*-value
Haemoglobin	9.2±2.6	9.7±2.2	0.335
URR (%)	52±21	58±14	0.141
Serum Calcium	8.1±1.6	8.2±1.6	0.760
Serum Phosphate	4.9±3.7	4.7±2.3	0.778
Anemia (n)	53(46%)	14(47%)	0.923
Serum Albumin	3.1±0.7	3.4±0.8	0.044*
Blood transfusion requirement	7(6%)	4(13%)	0.177

**=Statistically significant*

DISCUSSION

Nearly 80% of our study participants had depression as they had PHQ-9 score above 5. Most of the patients in our study were young to middle aged (mean age 45.1±14.3 years). Males dominated over females in numbers but there was no difference in overall frequency of depression among males and females (*p*=0.286). Male predominance in ESRD is already reported from the country.[13] Female patients were younger than male patients but it was not statistically significant (*p*=0.334). Duration of haemo-dialysis (dialysis vintage) was longer among females as compared to males and this difference was statistically significant (*p*=0.0204). It is in contrast to Artan *et al*.[14] who did not find any significant difference between the two genders regarding dialysis vintage and male patients were younger than females. Nearly 80% patients had mild to severe depression (PHQ-9 score: 5-27) of which (55%) had moderate to severe depression and (18.5%) patients had severe depression. The frequency of depression was same among males and females except that severe depression was

significantly more among female patients (p=0.041). Danial *et al*.[3] reported that moderate to severe depression was noted among 70% of patients on maintenance haemodialysis patients and female patients had higher severity of depression than male patients. There is higher severity and two-times higher prevalence of depression among females as compared with males in general population and it may be because of hormonal differences.[15]

Regarding factors contributing to depression, we found that lack of social support was significantly associated with depression among our patients and this association was statistically significant (p=0.018). The other factors including level of education, smoking history, history of illicit drugs/addiction, unemployment, living in joint family vs nuclear family, problems in transportation and monthly income did not differ in the two groups. Monthly income of (80%) patients was less than 30,000 Pakistani Rupees (250 US dollars) but there was no difference between the two groups. Liu *et al* [16] reported that Taiwanese haemodialysis patients with higher education, better financial status, social support and males had less prevalence and less symptoms of depression as compared to their counterparts. Similar findings were found in a study from Rawalpindi (Pakistan) which reported that haemodialysis patients lacking social support had higher frequency of depression as compared to those who enjoyed better social support.[17] Our study showed that marital status did not affect frequency of depression except that singles had less chances of depression. This finding is supported by Saeed et al [18] who reported that depression was less common among unmarried (single) dialysis dependent patients as compared to married patients. Relationship of marital status and depression is a complex phenomenon and can be dependent on age, gender and family support.[19] Transportation problems affected the two groups equally in our study. None of our patient drive himself/herself and family members or friends helped them to reach the dialysis unit. Similarly the proportion of central venous catheters (CVCs) was same in the two groups. These catheters not only become infected or dislodged but also cause distress and lower the confidence and self-esteem of patients. Haemodialysis vascular access type usually does not directly lead to depression,[20] but there are reports of self-harm/attempted suicide by cutting off or pulling-out temporary (non-tunneled) and tunneled dialysis catheters.[21]

Low serum albumin (hypoalbuminemia) was significantly more among patients with depression as compared to those without depression (p=0.044) but there was no significant difference in other laboratory parameters. A recent meta-analysis by Gregg and colleagues,[22] has found that more severe depressive symptoms correlated with lower serum albumin levels and there is correlation between hypoalbuminemia and depression among haemodialysis patients. Dogan and colleagues reported low haemoglobin and hypoalbuminemia among haemodialysis patients who had depression.[23] Our patients with depression had hypoalbuminemia but haemoglobin levels were similar to the patients who did not have depression. Our patients were receiving erythropoietin and/or intravenous iron sucrose in the dialysis unit to maintain their haemoglobin in the range of 10-12 Gm/dl. Hypoalbuminemia contributes to increased morbidity and mortality among ESRD patients on maintenance haemodialysis especially who have depression. [6,24] Although we did not find difference in frequency of missed dialysis sessions (non-compliance) among our patients whether they had depression or not, non-compliance with dialysis prescription has been found among dialysis dependent ESRD patients.[25]

The limitation of the study is that it is a single centre study with limited number of the patients and Urdu translation of PHQ-9 score has not been validated previously in haemodialysis patients.

CONCLUSION

Depression affects up to 3/4th of ESRD patients on maintenance haemodialysis. Patients who are young and lack social support are more likely to have depression and hypoalbuminemia is more common among patients who are depressed. PHQ-9 may be used for screening and categorization of depression among ESRD patients on maintenance haemodialysis.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SIM, MKI & RK: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

SM, SUR & FUDA: Conception, study design, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. King-Wing Ma T, Kam-Tao Li P. Depression in dialysis patients. Nephrology (Carlton, Vic.) 2016; 21(8): 639-646. https:// doi: 10.1111/nep.12742.
2. Palmer S, Vecchio M, Craig JC, Tonelli M. Prevalence of depression in chronic kidney disease: Systematic review and meta-analysis of observational studies. Kidney Int 2013; 84(1): 179–191. https://doi: 10.1038/ki.2013.77
3. Danial K, Khurram A, Ahmed K, Ali Z. Prevalence of depression among the patients with end stage renal disease and their care givers, and its associated factors at a tertiary care hospital in Karachi. Ann Punjab Med Coll 2016; 10(4): 217-221. https://
4. Katon WJ. Epidemiology and treatment of depression in patients with chronic medical illness. Dialogues Clin Neurosci 2011; 13(1): 7-23. https://doi: 10.31887/DCNS.2011.13.
5. Goh ZS, Griva K. Anxiety and depression in patients with end-stage renal disease: impact and management challenges - a narrative review. Int J Nephrol Renovasc Dis 2018; 11(1): 93-102. https://doi: 10.2147/IJNRD.S126615.
6. Ibrahim S, Hossam M, Belal D. Study of non-compliance among chronic hemodialysis patients and its impact on patients' outcomes. Saudi J Kidney Dis Transpl 2015; 26(2): 243-249. https://doi: 10.4103/1319-2442.152405.
7. Lal W, Ali T, Idrees MK, Hafeez AR. Non-compliance of hemodialysis and related factors among end-stage renal disease patients. J Dow Univ Health Sci 2019; 13(3): 128-132.
8. Watnick S, Wang PL, Demadura T, Ganzini L. Validation of 2 depression screening tools in dialysis patients. Am J Kidney Dis 2005; 46(5): 919-24. https://doi: 10.1053/j.ajkd.2005.08.006.
9. Ahmad S, Hussain S, Akhtar F, Shah FS. Urdu translation and validation of PHQ-9, a reliable identification, severity and treatment outcome tool for depression. J Pak Med Assoc 2018; 68(8): 1166-1170.
10. Gholizadeh L, Ali Khan S, Vahedi F. Sensitivity and specificity of Urdu version of the PHQ-9 to screen depression in patients with coronary artery disease. Contemp Nurse 2017; 53(1): 75-81. https://doi: 10.1080/10376178. 2017.1283245.
11. Raosoft, Inc. Raosoft sample size calculator.2004 [cited on 28-09-2020]. Available from: http://www.raosoft.com/samplesi.html
12. Multicultural Mental Health Resource Centre. PHQ in different languages. 2020 [cited on 11-02-2020]. Available from: http://www.multiculturalmentalhealth.ca/wp-content/uploads/2013/11/PHQ-9-Urdu.pdf
13. Rehman IU, Idrees MK, Shoukat. Outcome of End-Stage Renal Disease Patients with Advanced Uremia and Acidemia. J Coll Physicians Surg Pak 2016; 26(1): 31-35.
14. Artan AS, Kircelli F, Ok E, Yilmaz M, Asci G, Dogan C, et al. Dialyzing women and men: does it matter? An observational study. Clin Kidney J 2016; 9(3): 486-493. https://doi:045456 10.1093/ckj/sfw013.
15. Albert PR. Why is depression more prevalent in women? J Psychiatry Neurosci 2015; 40(4): 219–221. https://doi: 10.1503/jpn.150205.
16. Liu YM, Chang HJ, Wang RH, Yang LK, Lu KC, Hou YC. Role of resilience and social support in alleviating depression in patients receiving maintenance hemodialysis. Ther Clin Risk Manag 2018; 14(1): 441–451. https://doi: 10.2147/TCRM.S152273.
17. Nisar S, Uzair A, Alamgir Khan M, Akhtar S. Association of depression with socio-demographic factors in patients undergoing hemodialysis. Pak Armed Forces Med J 2017; 67(2): 232-237. Available from: https://www.pafmj.org/index.php/PAFMJ/article/view/356
18. Saeed Z, Ahmad AM, Shakoor A, Ghafoor F, Kanwal S. Depression in patients on hemodialysis and their caregivers. Saudi J Kid dis Transpl 2012; 23(5): 946-952. https://doi: 10.4103/1319-2442.100869.
19. Bulloch AGM, Williams JVA, Lavorato DH, Patten SB. The depression and marital status relationship is modified by both age and gender. J Affect Disord. 2017; 223(1): 65-68. https://doi: 10.1016/j.jad.2017.06.007.
20. Afsar B, Elsurer R, Covic A, Kanbay M. Vascular access type, health-related quality of life, and depression in hemodialysis patients: a preliminary report. J Vasc Access 2012; 13(2): 215-220. https://doi: 10.5301/jva.5000032.
21. Edirisinghe PA, Busuttil A. Suicide by severing the arterio-venous subclavian dialysis catheter. J Clin Forensic Med 2006; 13(2): 86-88. https://doi: 10.1016/j.jcfm.2005.08.005.
22. Gregg LP, Carmody T, Le D, Martins G, Trivedi M, Hedayati SS. A systematic review and meta-analysis of depression and protein-energy wasting in kidney disease. Kidney Int Rep. 2019; 5(3): 318-830. https://doi: 10.1016/j.ekir.2019.12.009.
23. Dogan E, Erkoc R, Eryonucu B, Sayarlioglu H, Agargun MY. Relation between depression, some laboratory parameters, and quality of life in hemodialysis patients. Ren Fail 2005; 27(6): 695-699. https://doi: 10.1080/08860220500242728.
24. Teles F, Amorim de Albuquerque AL, Freitas Guedes Lins IK, Carvalho Medrado P, Falcão Pedrosa Costa A. Quality of life and depression in haemodialysis patients. Psychol Health Med 2018; 23(9): 1069-1078. https://doi: 10.1080/13548506.2018.1469779.
25. Ibrahim S, Hossam M, Belal D. Study of non-compliance among chronic hemodialysis patients and its impact on patients' outcomes. Saudi J Kidney Dis Transpl 2015; 26(2): 243-249. https://doi: 10.4103/1319-2442.152405.