

## DEPRESSION IN HEMODIALYSIS PATIENTS

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### ABSTRACT

**Objective:** To measure the frequency of depression and its risk factors in patients under going hemodialysis.

**Methodology:** It is a cross-sectional prospective study conducted at Hemodialysis unit of Shalamar Hospital and Shaikh Zayed Hospital, Lahore from 1<sup>st</sup> January 2006 to 30<sup>th</sup> April 2006. All patients getting regular hemodialysis for more than three months were included. Beck's Depression Inventory- II (BDI-II; adapted in Urdu) was administered on all the patients who were able to read or understand it. Blood sample were drawn at the same time for routine hematological, biochemical parameters and viral markers (Anti HCV and HbsAg). Diagnosis was made as per Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM IV) for correlation of psychological variables with clinical, hematological and biochemical parameters.

**Results:** Eighty nine patients were enrolled which included fifty two (58.4%) were male and seventy seven (86.5%) were married. Major causes of renal failure were diabetes, hypertension and chronic glomerulonephritis. Duration of dialysis was from 03 to 49 months with mean of  $19.64 \pm 11.7$  months. Severity of depression was categorized in to mild, moderate and severe on the basis of BDI score. Majority of the patients fifty (56.1%) were moderately to severely depressed and there was no gender difference in the prevalence of depression.

**Conclusions:** Majority of patients undergoing hemodialysis were depressed. Major risk factors for depression were marital status, illiteracy, number of children, socioeconomic factors, gender, hypertension and hypoalbuminemia. Patients with anemia, hyponatremia and hyperkalemia had suicidal tendency. Patients with hepatitis C and disturbed liver function have strong correlation with psychological parameters.

**KEY WORDS:** Renal failure, Depression, Hemodialysis, Illiteracy.

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### INTRODUCTION

Depression plays a crucial role in the progression of chronic medical illnesses. People with depression feels so hopeless that they abandon the will to survive. Consequently the

person will fail to show compliance and the medical illness exacerbates due to lack of preventive measures. Moreover, loss of appetite creates nutritional deficiencies to make the things even worse. Deterioration of physical health would deepen the depression to create a vicious cycle. Chronic kidney disease is also a chronic medical illness. Independent of the cause of kidney disease physical fitness decreases with its progression till the development of end stage renal disease (ESRD). Patients on hemodialysis may manifest various psychiatric problems like affective

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disorders, dementia and personality disorders.<sup>1</sup> Amongst all psychiatric disorders depression is the most important and common in patients with ESRD. Depression in dialysis patients not only effect mortality<sup>2</sup> but increased rate of hospitalizations<sup>3</sup> and dialysis withdrawal<sup>4</sup> is also very common.

Depression is also related with quality of life and increased cardiovascular morbidity.<sup>2,5</sup> Suicidal tendencies or attempt is significantly more common among dialysis patients than general population.<sup>6</sup> The incidence of depression in dialysis patients ranges from 10% to 66%.<sup>7</sup> This wide variation is due to different criteria and methods used to diagnose depression.<sup>8</sup> In Pakistan, due to paucity of indigenous data the frequency of depression in dialysis patients is not known, so this cross-sectional study was conducted to check the frequency of depression and its risk factors in two major dialysis centers of Lahore, Pakistan.

### METHODOLOGY

This study was conducted at hemodialysis units of Shalamar and Shaikh Zayed Hospital, Lahore, from 1<sup>st</sup> January 2006 to 30<sup>th</sup> April 2006. A self administered questionnaire- Beck Depression Inventory (BDI- II) comprising of 21 items; adapted in Urdu was filled by all the patients as a screening diagnostic tool. The questionnaire was filled out only by those patients who were able to read or understand it. Patients with dementia, delirium and who were unable to understand that questionnaire were excluded from the study. A proforma consisting of relevant demographic variables (sex, education, marital status, number of children, family members, family system, any financial support, history of smoking and addiction) was also administered. A diagnostic criterion for depression was taken from Diagnostic and Statistical Manual of Mental Disorders, (DSM IV). Grading of depression was done according to severity levels: Nil (less than 9 depression scale), mild (depression scale 10-15), moderate (16 – 24 depression scale) and severe (25 and above).<sup>9</sup> At the same time pulse and blood pressure was checked and recorded. Blood sample

of each patient was drawn for hematological (Hb) and biochemical parameters (urea, creatinine, sodium, potassium, calcium, potassium, phosphorus, albumin, ALT, HbsAg, Anti Hcv).

*Statistical Analysis:* Data was analyzed on SPSS for windows (ver 12.00) and Student T test was applied to test the correlation among different variables. The multiple logistic regression model was used to determine the predictive strength of depression with nominal variables (sex, marital status, education, number of children, financial support). The overall model was tested by using Chi Square statistic.

### RESULTS

Mean age was 49 years. Majority of the patients were male fifty two(58.4%) and seventy seven(86.5%) were married. There was no history of smoking and addiction in sixty nine (77.5%) and eighty seven (97.7%) patients respectively. Ninety percent of patients had education up to 10<sup>th</sup> grade. Major cause of end stage renal disease (ESRD) was diabetic nephropathy in forty one (46.1%) and hypertensive nephropathy in twenty (22.5%) followed by chronic glomerulonephritis, nephrolithiasis and other causes. Family members were in the range of 01 to 30 with mean of seven members in each family. Mean depression scale was 19.64. Fifteen (27%) were mild, twenty three (25.8%) moderately and twenty seven (30.3%) were severely depressed. Majority of patients had anemia, hypoalbuminemia and hyperphosphatemia. It was observed that the risk factors (marital status, education, number of children, financial support,) have significant association with depression as shown in Table-I.

The value of model chi-square is 21.0563 (P- value = 0.04) with d.f = 12. This is highly significant therefore; we are 95% confident that the fitted model is appropriate.

*Logit Model for Overall Analysis:*

Depression grade = 1.06 + 2.126 × Sex ÷ 0.790 × Marital Status – 1.752 × Education + 0.364 × Number of children + 0.560 × Financial support.

Table-I: Logistic regression output

S.No	Variable	$\beta$	S.E( $\beta$ )	d.f	P-Value	Odds Ratio
1	Sex	2.126	1.0402	1	0.069	0.8925
2	Marital Status	0.790	0.200	1	0.000*	2.204
3	Education	-1.75	0.328	1	0.000*	0.2536
4	Number of children	0.364	0.294	1	0.015*	0.695
5	Financial Support	0.560	0.192	1	0.004*	0.2536
6	Constant	1.062	0.336	1	0.002*	2.892

\* Statistically significant value

## DISCUSSION

Depression is generally accepted to be the most common psychological problem in patients with ESRD.<sup>2</sup> Depression is characterized by both cognitive and somatic features. The somatic characteristic of depression is similar to symptoms of uremia like anorexia, sleep disturbance, fatigue, gastrointestinal disorders and pain.<sup>10</sup> Due to this overlap of symptoms of uremia with depression it is usually neglected, under diagnosed and remain untreated. There is substantial variation in the percentage of depression in dialysis patients (25%- 60%) in different geographical areas.<sup>12,13</sup> This wide variation is due to different criteria's used for depression and social factors affecting the patients in different geographical regions. In this study, the majority of patients sixty five (72%) were mild to severely depressed with mean scale of depression of  $19.64 \pm 11.75$ , according to Beck Depression Inventory (BDI-II). This ratio came out to be same as that of a study conducted in Turkey.<sup>11</sup> The frequency of depression in dialysis patients is 72%, which is much higher as compared to the depression in general population of Pakistan (06% to 30%),<sup>14,15</sup> patients of cancer (17.8%),<sup>6</sup> coronary artery disease (37%)<sup>17</sup> and dialysis patients of developed country (27%).<sup>18</sup>

Factors that increase the depression are lack of education, socioeconomic factors, marital status, number of children, gender, hypertension, hypoalbuminemia and hepatitis C with disturbed liver function tests. In this study, education has a very strong association (p value <0.05) with psychological parameters

of depression like insomnia, fatigue, diminished interest which is also supported by other studies in Pakistan.<sup>19</sup> Majority of patients eighty one (91.1%) had education up to 10th grade. Due to lack of education and misperceptions about the disease, they reached the dialysis centers in more miserable conditions. Socioeconomic factors play important role in depression. In Pakistan average per capita income is 430US dollars and 35% of the population falls below the poverty line. Dialysis costs about 250US dollars/month and most of the patients are either unemployed or not earning enough. In this study monthly income does not have statistically significant relationship with depression but patients who were getting any financial support from NGOs, hospital and/ or organization were less depressed as compared to those who were not. Same thing was observed by Kojma et al.,<sup>20</sup> Bokhari et al,<sup>17</sup> has found that depression is positively associated with income level below rupees five thousand per month. In this study marital status and number of children in a family had statistically significant (P- value <0.05) association with depression in these patients. Being a married person the subjects are guardian of 5-7 dependents, and sole bread winner of their family. This debilitating disease not only affects their employment status but creates extra burden due to expensive treatment. In our social setup children are the liability of the parents till marriage which increases stress on these patients. This makes the patients pensive which leads to depression.

Gender difference is also very important factor as noticed in various studies in Pakistan

in which the prevalence of depression is twice in female patients as compared to male patients.<sup>21</sup> However in this study this gender difference is not seen in renal failure patients. Major reason for this effect is that as males are dominant and usually earning hand, so when they suffer from this chronic disease they get more depressed than adult female. Male patients feel loss of independence and authority and hence, scored higher on BDI-II.<sup>22</sup> The other reason is that patients with renal failure have increased uremic toxins in their body which inhibits testosterone secretion. Testosterone has an inverse relation with depression. So, low testosterone level is directly related with depression.<sup>23</sup>

Hypertension also plays major role in morbidity and mortality of dialysis patients. Patients who were having high blood pressure (Mean Arterial Pressure 100+15.7mmhg) and tachycardia were statistically ( $p$  value<0.05) more depressed. This was also seen in a study conducted in Taiwan by Fan Pl, et al.<sup>24</sup> Usually dialysis patients don't take antihypertensive drugs on the day of dialysis so this high blood pressure may show high readings on the day of dialysis. To rule out this problem home monitoring of blood pressure can be done. As tachycardia has positive relationship with depression so if we give beta one blockers to these patients, then it will not only control blood pressure but also helps in settling depression. Albumin is very important marker of nutritional status of hemodialysis patients. In this study patients who were hypoalbuminemic (Mean  $\pm$  SD 3.76+0.60gm/dl) they were having positive correlation ( $p$  value<0.05) with all psychological parameters of depression. Betul Kalender et al<sup>25</sup> have also found same correlation in which patients with hypoalbuminemia have depression. Depression leads to loss of appetite, sleep disturbance and gastrointestinal disorders. So symptoms of uremia and depression lead to malnutrition. If we involve psychiatrist and psychologist in the management of these patients and depression is treated with antidepressants then the role of depression can be reverted back in malnutri-

tion. There is a need to study depression and malnutrition while other factors have been ruled out.

In hemodialysis there is rapid shift of electrolytes from body which can lead to hyponatremia or hypernatremia. In our study hyponatremia (Mean+SD) 136.54  $\pm$  6.0 has statistically significant relationship with suicide. The symptoms of hyponatremia include nausea, malaise, lethargy and headache. These symptoms compound the misery of depressed uremic patients which may enhance suicidal ideation. The symptoms are directly attributable to hyponatremia which primarily occur with acute and marked reductions in the plasma sodium concentration and reflect neurologic dysfunction induced by cerebral edema.<sup>26</sup>

Anemia is very much prevalent in hemodialysis patients. In this study mean hemoglobin was 9.34gm/dl which is less than recommended for renal failure patients by DOQI Guidelines. The symptoms of palpitation, sweating, dyspnoea and lethargy in anemia are important symptoms of anxiety. So, it is obvious that uremic patients have high anxiety level. From many studies it has been proven that mix anxiety and depression have higher incidence of suicidal ideation than in simple depression.<sup>27</sup>

Phosphate and calcium metabolism are disturbed in hemodialysis patients. In this study hypophosphatemia has strong and statistically significant relationship with easy fatigability which may be due to the anxiety and depression or proximal myopathy.<sup>28</sup> Hypophosphatemia leads to irritability and paresthesia. Both these symptoms are important feature of anxiety, depression and proximal myopathy.

Hepatitis C patients have strong positive correlation with depression. Depression prevalence in untreated HCV-infected patients ranges from about 24% to 50%.<sup>29</sup> In this study forty two (47.2%) patients were hepatitis C positive and they were having disturbed liver function tests. This has a statistically strong correlation with all psychological parameters

like easy fatigability, insomnia, diminished interest, suicide, irritable mood and sadness.

Findings have implications in improving the quality of dialysis patients with depression. Treatment options should entail psychological treatment. Proper information regarding nutrition, dietary habits should be provided to the patients. Information to these illiterate patients can improve psychological variables and their general physical health.

*Limitations of the study:* Depression was not measured at the start of the study. So, it can not be said that depressive phase of the patients is due to uremia or they were already depressed when they came for treatment. Psychosocial functioning of the patients was not taken into account. Somatic symptoms of depression can not be separated from the symptoms of uremia. A multicentric study should be done to check the prevalence ratio.

## CONCLUSIONS

Majority of patients undergoing hemodialysis were depressed. Major risk factors for depression were illiteracy, socioeconomic factors, marital status, number of children, financial support, gender, hypertension and hypoalbuminemia. Patients with anemia and hyponatremia have suicidal tendency. Patients with hepatitis C and disturbed liver function have strong correlation with psychological parameters.

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