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Assessment of Depression and Anxiety in Renal Transplant Patients: A Cross Sectional Observation Study

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Abstract

Background: Depression and anxiety are most common psychological disorders in patients with Renal Transplant (RT) with poorer health outcomes. This article aims to investigate the prevalence and evaluate the magnitude and direction of association between depression and anxiety.

Materials and methods: We evaluated 97 RT patients in a hospital based cross sectional observation study at department of Nephrology, IPGMER, Kolkata. Symptoms of anxiety and depression were assessed using the HADS and HAM-A.

Results: Among RT patients 22 (22.68%) had depression symptoms and 35 (36.08%) were suffering from anxiety. The odds of developing depression and anxiety with poor social support were 4.249 times (OR = 4.249; 95% CI: 1.213–14.884) and 2.743 times (OR = 2.743; 95% CI: 0.886–8.495) higher among RT patients. Presence of DM was associated with higher prevalence of developing depression (OR = 1.388; 95% CI: 0.336–5.711) and anxiety (OR = 1.414; 95% CI: 0.393–5.088). Patients from nuclear family had significantly higher prevalence of developing anxiety. Significant association had been found between anxiety and depression (p-value<0.01).

Conclusion: Presence of anxiety had high prevalence of developing depression and co-morbid conditions affected the psychological conditions among RT patients. Social support has played a vital role in psychological health.

Introduction

In patients with End-Stage Renal Disease (ESRD), renal transplantation is the best method of replacement therapy, even from a psychological point of view. Renal Transplantation (RT) as an effective mode of treatment of end stage renal disease has gained popularity across the world. India has been no different. Compared to Hemodialysis (HD), RT provides a much better overall outcome [1]. With technological advances and availability of effective therapy for immune-suppression, the life expectancy after RT has gone up. That gives us the opportunity to assess the outcome of these patients more holistically, taking morbidity, capacity of work, general life-style into account over and above life expectancy and renal function estimates. Formerly, transplant outcomes were measured mainly from the perspective of the clinicians, focusing on survival,

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creatinine values, degree of hypertension and so forth. Now, the subjective experiences of the patients are increasingly recognized as an important outcome measure [2]. Quality of life (QOL) and psychosocial well-being usually improve after a renal transplant and remain stable for a minimum of several years [3]. Psychological factors, prominent through their presence as co-morbidities, are the other sources of concern. Depression, [4,5] anxiety [6] and alteration of the body image [7] have often been observed as co-morbid conditions in patients of RT. These conditions might adversely affect the adherence and thereby undermine effective immune-suppression. Besides that, these conditions also may signify the broader picture of outcome where psychological well-being, satisfaction, capacity to work are considered among others.

In hemodialysis patients, depression is very common. This finding is acceptable since depression follows loss, and this group of patients loses their independence, health and energy. After transplantation, some of these limitations are reduced. Transplantation is associated not only with better quality of life and survival, but also reduced medical expenses and mental disorders [8]. On the other hand, transplantation has its own problems some of which (*e.g.*, side effects of drugs such as corticosteroids, fear of rejection, sense of foreign organ) may lead to mental disorders [9]. Anxiety and depression are the most common psychological disorders in kidney transplant recipients [10] that may affect the disease process and graft survival [11]. Depression and anxiety may continue after transplant. Anxiety and depression have been associated with noncompliance with medication use and personal care, compromised quality of life, and difficulty in integrating the newly acquired graft into their sense of self [12]. Di Matteo, et al, in a meta-analysis reported that depressed patients were threefold more likely to be non-adherence to the medical regimen than patients without depression [13]. Penkower, et al, also suggested that psychological stress such as anxiety and anger may lead to non-adherence to drugs in adolescent renal transplant recipients [14]. Many studies have found the prevalence of depression in transplanted patients varies from 20% to 75% [15-17].

There is controversy concerning whether renal transplant subjects show less severe symptoms of anxiety or depression: Some studies have shown improvements in anxiety or depression after transplantation whereas some studies defied. Some accounts report a reduction in anxiety and depression after renal transplantation, suggesting an improvement in social functioning and psychological symptoms [18,19]; other studies draw opposite conclusions, suggesting that transplant patients show greater levels of anxiety [20,21]. In addition, some experimental studies have reported no significant differences in the level of depression and anxiety among renal transplant recipients if compared to hemodialysis patients [22-24].

Screening for anxiety and depression in kidney transplant recipients is therefore essential. Appropriate treatment of these prevalent psychiatric co-morbidities may improve various aspects of patient well-being, including quality of life, sleep, marital relations, and sexual relationship.

Renal transplantation usually results in improved quality of life (QOL) in many aspects with assistance from special behavioral adaptation and psychological adjustment. Patients' uncertainty about their future health and finances are the two leading stressors in the post-transplant period [25]. Side effects of medications and physical problems also cause psychological strain after transplantation [26-27]. Data from the few studies on this issue suggest that transplantation does not necessarily alleviate depression and anxiety; in fact, it may even amplify them [27-28]. Re-starting dialysis after a graft rejection may again be a crisis point in the "disease cycle."

These show the importance and necessity of finding the scientific and practical ways in order to deal properly with psychological problems, especially depression in dialysis and renal transplant patients, and management of the disease. However, most of the studies evaluating patients in the terminal stage of the disease and research assessing patients under pre-dialysis treatment are scarce. In this study, we selected renal transplant recipients. Symptoms of anxiety and depression assessed using the Hospital Anxiety and Depression Scale (HADS), Beck's Depression Inventory (BDI) and Hamilton Anxiety Rating Scale (HAM-A).

Materials and Methods

This is a hospital based cross sectional study conducted among renal transplant patients attending MRU ward, Nephrology OPD and Transplantation Clinic of department of Nephrology, at SSKM Hospital & IPGMER, Kolkata for the period of February, 2015 to December, 2016. Ethical clearance was taken from the Institutes Ethical committee before conducting the study. A sample of 97 Renal Transplant (RT) patients was included in the study. Consecutive and purposive sampling was adopted to include subjects into the study. All patients according to inclusive and exclusive criteria were included for interview, subsequent analysis and interpretation. RT patients who gave written informed consent with stable clinical condition and an interval of more than 3 months from transplantation were included in the study. Person who did not give consent, suffering from any concomitant disease or infection, or have past or concomitant history of psychiatric illness, or have history of any psychiatric medication intake, or patients not willing to be included in the study were excluded from the study.

All the information including socio-demographic and medical were collected preparing a detailed questionnaire. Demographic information including age, gender, marital status, level of education, employment status, household income, familial background (rural/urban), and family system (i.e. joint or nuclear) were collected for each patient. Medical information collected included basic clinical information about duration of dialysis, etiology of renal failure, time since transplant, current medication (immunosuppressant group and steroid), blood report of renal functions (serum creatinine), report of blood sugar and measure of blood pressure. Medical information related to renal function and transplantation and co-morbid conditions were gathered from medical records/files. Symptoms of anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS), Beck's Depression Inventory and Hamilton Anxiety Rating Scale (HAM-A).

Results

Ninety seven (97) RT patients were selected for the study. Patients were assessed for presence of depression, and anxiety. Among RT patients 22 (22.68%) patients had depression symptoms and 35 (36.08%) were suffering from anxiety. Among the selected patients 78 (80%) RT patients were male and the rest were female. Fifty two of them (53.6%) lived in a nuclear family and only 45 (46.4%) lived in a joint family. Also, fifty two (53.6%) of the total sample were living with spouses and out of the total sample 45 (46.4%) were living single. Almost 63% of renal transplant recipients had some type of co-morbid problem. Among

them, 9.27% were suffering from 3 or more problems.

There is no significant difference in education level, family monthly income, duration of ESRD before transplant and duration of dialysis before transplant (p-values>0.01) between patients with depression and without depression **(Table 1)**. Females had 1.72 times more prevalence to develop depression though the association was not significant. Moreover, marital status, religion, family type and residence did not have any significant association with depression (p-values>0.01). However, social support and presence of anxiety had significant association with depression. Patients with poor social support had a prevalence of 5.42 times (95% CI: 1.86, 15.81) of developing depression. Presence of anxiety elevated the odds of developing depression 4.50 times (95% CI: 1.65, 12.29). Presence of hypertension (HTN) also elevated the odds of developing depression more than twice (OR = 2.23, 95% CI: (0.84, 5.94) through the association was not significant. Diabetes Mellitus (DM) and raised creatinine did not have any association with developing depression (p-values>0.01).

Among RT patients 39.74% among males & 21.05% among females had anxiety. No statistically significant difference has been found between groups in respect of age, education level, family monthly income, duration of ESRD, dialysis and duration after transplant **(Table 2)**. Moreover, no significant association had been measured of gender, marital status, religion, family type, residence with anxiety. Statistically significant association has been found of social support with anxiety. Poor social support had more than twice odds of developing anxiety. Co-morbid conditions like HTN and DM had no association with anxiety. Raised creatinine had odds of almost thrice of developing anxiety though the association was not significant.

The risk factors of developing depression and anxiety were identified using the preliminary analysis. The variables that were found to be associated with depression and anxiety were further considered for bivariate binary logistic analysis to find the association between depression and anxiety. Age, gender, perceived social support, type of family, duration of ESRD, duration of dialysis, duration of renal transplant, presence of HTN, DM and creatinine level were considered as possible co-variates. The results of bivariate binary logistic analysis of depression and anxiety are reported in **Table 3**. Estimated coefficients and Odds Ratios (OR) together with their corresponding standard errors (SEs) and 95% CIs are presented. The results indicate that social support had more than 4 times higher prevalence of developing depression (OR = 4.249; 95% CI: 1.213–14.884) among RT patients. Presence of DM was associated with higher prevalence of developing depression (OR = 1.388; 95% CI: 0.336–5.711) and anxiety (OR = 1.414; 95% CI: 0.393–5.088). The odds of developing anxiety among females RT patients were almost 4 times higher (OR = 4.035; 95% CI: 0.885–18.388). Patients from nuclear family had significantly higher prevalence of developing anxiety (OR = 1.895; 95% CI: 0.664–8.495). The odds of developing anxiety among RT patients with poor social support were 2.743 times higher (OR = 2.743; 95% CI: 0.886–8.495). Raised creatinin level was highly associated with 3 times higher prevalence of developing anxiety (OR = 3.008; 95% CI: 0.945–9.572). Significant association had been found between anxiety and depression (p-value<0.01) and presence of anxiety among RT patients had an almost 5 times higher prevalence of developing depression.

Table 1: Comparison between Renal Transplant recipients with and without depression in term of Socio-demographic and clinical variables.

Variables	Renal transplant recipients with depression (N=22)	Renal transplant recipients without depression (N=75)	OR with 95% CI	p-value
Age	34.67 ± 10.22	34.74± 8.81		0.973
Education level	11.17±4.50	11.14± 3.48		0.973
Family monthly income (INR)	15681.82± 17200.184	17800.00± 29302.246		0.748
Duration of ESRD before transplant	35.08± 34.54	25.62±- 21.80		0.118
Duration of dialysis before transplant	13.63± 9.34	10.99± 9.17		0.227
Post-transplant duration	37.96± 34.46	41.32± 34.90		0.683
Gender				
Male	19	59	1	0.409
Female	3	16	1.72 (0.45,6.54)	
Marital status				
Single	12	33	1	0.383
Living with spouse	10	42	1.53 (0.59,3.97)	
Religion				
Hindu	18	63	1	0.81
Muslim	4	12	0.86 (0.25,2.98)	
Family type				
Nuclear	11	41	1.21 (0.47,3.12)	0.701
Joint	11	34	1	
Residence				
Rural	11	44	1.42 (0.55,3.68)	0.472

Urban	11	31	1	
Social support				
Good	13	64	1	0.003
Poor	10	10	5.42 (1.86,15.81)	
Presence of anxiety				
Absent	8	54	1	0.002
Present	14	21	4.50 (1.65,12.29)	
HTN				
Absent	14	33	1	0.105
Present	8	42	2.23 (0.84,5.94)	
DM				
Absent	14	54	1	0.451
Present	8	21	0.68 (0.25,1.86)	
Raised creatinine				
Absent	16	51	1	0.903
Present	8	24	0.94 (0.35,2.50)	

Table 2: Comparison between Renal Transplant recipients with and without anxiety in term of socio-demographic and clinical variables.

Variables	Renal transplant recipients with anxiety (N=35)	Renal transplant recipients without anxiety (N=62)	OR with 95% CI	p-value
Age	36.29±10.06	33.84±8.49		0.206
Education level	12.37±3.60	10.45±3.64		0.014
Family monthly income (INR)	21814.29±4282.67	14282.26±10318.84		0.189
Duration of ESRD before transplant	28.26±26.50	27.79±25.40		0.932
Duration of dialysis before transplant	12.60±11.22	11.10±7.95		0.444
Post-transplant duration	43.23±36.05	38.94±34.014		0.56
Gender				
Male	31(37.34)	47(62.66)	1	0.184
Female	4(21.06)	15(78.94)	2.47 (0.75,8.15)	
Marital status				
Single	17(37.78)	28(62.22)	1	0.833
Living with spouse	18(34.62)	34(65.38)	0.87 (0.38,2.00)	
Religion				
Hindu	27(33.34)	54(66.66)	1	0.257
Muslim	8(50)	8(50)	2.00 (0.68,5.91)	
Family type				
Nuclear	22(42.31)	30(57.69)	1	0.206
Joint	13(28.89)	32(71.11)	1.81 (0.77,4.21)	
Residence				
Rural	20(36.37)	35(63.63)	1.03 (0.45,2.37)	1
Urban	15(35.72)	27(64.28)	1	
Social support				
Good	25(32.47)	52(67.53)	1	0.192
Poor	10(50)	10(50)	2.08 (0.77,5.64)	
Presence of depression				
Absent	21(28)	54(72)	1	0.002
Present	14(63.64)	8(36.36)	4.50 (1.65,12.29)	
HTN				
Absent	19	28	1	0.388

Present	16	34	1.44 (0.63,3.31)	
DM				
Absent	23	45	1	0.478
Present	12	17	0.72 (0.30,1.77)	
Raised creatinine				
Absent	28	37	1	0.036
Present	7	25	2.70 (1.02,7.14)	

Table 3: Bivariate Binary Logistic Regression of Depression and Anxiety.

Parameter	Estimate	SE	OR	95% CI	
Regression of Depression					
Constant	-2.44	1.52			
Age	-0.004	0.034	0.996	(0.931,	1.065)
Gender	-0.157	0.807	0.854	(0.176,	4.157)
Family type	-0.36	0.62	0.698	(0.207,	2.355)
Perceived Social support	1.447	0.64	4.249	(1.213,	14.884)
Duration of ESRD	-0.009	0.016	0.991	(0.961,	1.022)
Duration of Dialysis	0.059	0.039	1.06	(0.982,	1.145)
Duration renal transplant	0.016	0.009	1.015	(0.997,	1.034)
HTN	-0.092	0.613	0.912	(0.274,	3.032)
Creatinine	-0.532	0.757	0.588	(0.133,	2.592)
DM	0.328	0.723	1.388	(0.336,	5.731)
Regression of Anxiety					
Constant	-3.61	1.38			
Age	0.032	0.029	1.032	(0.975,	1.093)
Gender	1.395	0.774	4.035	(0.885,	18.388)
Family type	0.64	0.535	1.895	(0.664,	5.409)
Perceived Social support	1.009	0.577	2.743	(0.886,	8.495)
Duration of ESRD	-0.014	0.014	0.986	(0.959,	1.013)
Duration of Dialysis	0.008	0.033	1.008	(0.944,	1.076)
Duration renal transplant	0.003	0.008	1.003	(0.988,	1.018)
HTN	-0.296	0.53	0.743	(0.263,	2.101)
Creatinine	1.101	0.591	3.008	(0.945,	9.572)
DM	0.347	0.653	1.414	(0.393,	5.088)
Correlation between depression and anxiety					
correlation	0.308		4.738	(1.723,	13.269)

Discussion

One of the most understudied yet important concerns in the overall health of RT patients is psychosocial issues. Many studies revealed the high prevalence of depression, anxiety with physical and emotional symptoms, among patients receiving maintenance dialysis [29]. The literature suggested that renal transplantation recipients are at risk of developing particular psychiatric disorders during the post transplantation period, namely, depression, anxiety, and adjustment disorders. Existing literature suggests that a successful renal transplant is associated with improvement in depression [30]. Therefore, there is a need to investigate the occurrence and prevalence of depression and anxiety in renal transplant recipients, particularly in developing countries where there are limited resources for both physical and mental health care.

The present study analyzed the occurrence of depression and anxiety in Renal Transplant Recipients (RTR) and found some positive findings. The assessment of depression is complicated by the considerable overlap of depressive and uremic symptoms [31]. However, the Beck Depression Inventory (BDI), a measure of depressive symptomatology, has been shown to be a valid measure of depressive affect in HD populations [32]. A BDI cut-off score of 14 to 16 appears to best approximate a psychiatric diagnosis of major depressive disorder in HD patients [32]. Most studies used the Beck Depression Inventory screening tool to screen for depression. BDI consists of 21 questions which measure the intensity and severity of depressive symptoms. It has been found in this study that 22 (22.68%) renal transplant recipients out of total patients studied were suffering from clinical depression. The overall prevalence of depression was similar to the previous studies which range from 22% to 41% [33]. The study also found the contribution of demographic factors in influencing the occurrence of depression among renal transplant recipients. Age has been reported as a significant predictor of depression among transplant recipients [34]. However, in our study age is not associated with depression or anxiety among RT patients. Gender has been found as a predictor of depression where most studies associate females to increased levels of depression [35]. Regarding gender as a contributory factor in causation of depression Jofré et al. [4] attributed it to low self-esteem among females that added to their depression. In some studies the prevalence of anxious symptoms was lower in men [35]. Penkower, et al. [36] have shown that the distribution of depressive and anxiety symptoms among boys and girls were similar. This study finding showed that female recipients reported higher depression and anxiety levels and prevalence are more in them as compared to male recipients which are in consistency with previous findings. However, no significant correlation was found in statistical tests of significance. Marital stability, satisfaction, and perceptions of hostility have been associated with differential health outcomes in the general population [37]. Our findings in this study showed RTRs who are single reported elevated levels of depression as compared to those who are in a relationship. These findings are in consistency with previous research reflecting that marital status is a significant predictor of depression. No significant statistical correlation was found in this study in RTRs in relation to education level reached by the patients, duration of CKD, duration of dialysis, duration of dialysis before transplantation or native kidney disease leading to ESRD as predictor of depression.

Socioeconomic status including financial affordability has been found as a significant predictor of psychological well-being among transplant recipients [38]. Financial difficulties have been found to increase depression among renal transplant recipients. Studies found that depressed recipients did not have regular incomes [39]. Our findings showed no significant effect of monthly family incomes on developing depression and anxiety among RT patients.

No significant statistical correlation was found in this study in relating type of family, religion, type of residence (rural/urban), as predictor of depression in post transplantation group.

Depression post-transplant has been associated with co-morbid conditions, found to be significant and independent predictors of depression among renal transplant recipients [34]. This study also found demographic factors such as perceived social support as significant predictors of depression and anxiety after renal transplant. Poor social support was significantly associated with developing depression and anxiety. Relation of co-morbid medical conditions and their association with depression and anxiety was studied in this study. The result revealed that those who were suffering from multiple co-morbid conditions were more depressed. Prevalence of depression was almost 1.5 times more in patients suffering from co-morbid medical illness like diabetes mellitus. DM and raised level of creatinine value were found to be associated with anxiety and prevalence of anxiety increased with presence of DM (OR = 1.414; 95% CI: 0.393–5.088) and raised level of creatinine value (OR = 3.008; 95% CI: 0.945–9.572). Literature has shown that in transplant recipients, the severity of psychological problems was higher among those with a history of graft rejection. In our study statistical significance was found between raised creatinine and anxiety. Co-morbid (so-called "compound") depression has been associated with more profound physiological abnormalities and treatment resistance [40].

Based on the report that suggested that co-morbid anxiety and depression are prevalent in RTRs [41] we tried to measure the association between anxiety and depression. Prevalence of anxiety was found to be high. Those suffering from anxiety were found more depressed (40%) as compared to those who were not suffering from anxiety in whom only 12.9% were seen to be suffering from clinical depression. Our study found combined depression and anxiety was associated with each other in a statistically significant number of patients (p-value<0.01). Alavi et al. [42] in their cross-sectional study of 100 RT patients had shown 51.6% of the RT patients had anxiety using Symptom Checklist-90 subscales of depression and anxiety. Whereas 24 out of 88 (27.27%) patients had anxiety in another study [43] in Iran where the assessments were made using HADS and cases were defined when the scores exceeded 11. An even higher prevalence (anxiety in about 50% of patients) has also been reported from Turkey [44]. These differences in prevalence across studies might reflect the inherent differences of the study groups as prevalence of anxiety is known to vary widely across nations. In our current study the presence of anxiety among RT patients had an almost 5 times higher prevalence of developing depression.

Among studies comparing mental health status during chronic hemodialysis and after transplantation, some have shown an improvement in anxiety [45] or depression after renal transplantation [46,47] and some have not [48-50]. In our study we compared the HADS-As, HADS-Ds, BDI score and HAM-A scale among transplant recipient group and all the parameters showed significant change.

Conclusion

This study found significant prevalence of depression and anxiety in renal transplant recipients. We have also found significant association of many socio demographic, and psychiatric co-morbidity with depression and anxiety among RT patients. Clinical co-morbid conditions were associated with depression and anxiety among RT patients. This study also found a significant positive association between depression and anxiety among RT patients. Therefore, boosting mental health and avoiding anxiety can improve the quality of psychological life among RT patients.

Key points

- Depression and anxiety symptoms occurred more frequently among RT patients of this study and their association of occurrence was positive and significant.
- Presence of anxiety among RT patients had high prevalence of developing depression.
- Presence of co-morbid conditions affected the psychological conditions of a RT patient.
- Social support had played a vital role in psychological health among RT patients.
- Females had significantly higher prevalence of developing anxiety.
- Patients from nuclear family had significantly higher prevalence of developing anxiety.

Conflict of interest

The authors declare no conflict of interest, as this research was undertaken solely for scientific purposes.

References

1. Yeh TL, Huang CL, Yang YK, Lee YD, Chen CC, et al. The adjustment to illness in patients with generalized anxiety disorder is poorer than that in patients with end-stage renal disease. J Psychosom Res. 2004 ; 57: 165-170.
2. Acquadro C, Berzon R, Dubois D, Leidy NK, Marquis P, et al. Incorporating the patient's perspective into drug development and communication: An ad hoc task force report of the Patient-Reported Outcomes (PRO) Harmonization Group meeting at the Food and Drug Administration.Value Health. 2003; 6: 522-531
3. Jofré R, López-Gómez JM, Moreno F, Sanz-Guajardo D, Valderrábano F. Changes in quality of life after renal transplantation. Am J Kidney Dis. 1998; 32: 93-100.
4. Akman B, Ozdemir FN, Sezer S, Miçozkadioglu H, Haberal M. Depression levels before and after renal transplantation. Transplant Proc. 2004; 36: 111-113.
5. Dobbels F, Skeans MA, Snyder JJ, Tuomari AV, Maclean JR, Kasiske BL. Depressive disorder in renal transplantation: An analysis of Medicare claims. Am J Kidney Dis. 2008; 51: 819-828.
6. Arapaslan B, Soykan A, Soykan C, Kumbasar H. Cross-sectional assessment of psychiatric disorders in renal transplantation patients in Turkey: A preliminary study. Transplant Proc. 2004; 36: 1419-1421.
7. Overbeck I, Bartels M, Decker O, Harms J, Hauss J, Fangmann J. Changes in quality of life after renal transplantation. Transplant Proc. 2005; 37: 1618-1621.
8. Griva K, Ziegelmann JP, Thompson D, Jayasena D, Davenport A, et al. Quality of life and emotional responses in cadaver and living related renal transplant recipients. Nephrol Dial Transplant. 2002; 17: 2204-2211.
9. Pawar A, Rathod J, Chaudhury S, Saxena SK, Saldanha D, et al. Cognitive and emotional effects of renal transplantation. Indian J Psychiatry. 2006; 48: 21-26.

10. DiMartini A, Crone C, Fireman M, Dew MA. Psychiatric aspects of organ transplantation in critical care. Crit Care Clin. 2008; 24: 949-969.

11. Masudi Alavi N, Sharifi Kh, Ali Akbarzadeh Z. Anxiety and depression in patients under renal replacement therapy in Kashan between 1385-86. Faslnameh Elmi Pazhooheshi Feiz. 1387; 4: 46-51.

12. Baines LS, Joseph JT, Jindal RM. Prospective randomized study of individual and group psychotherapy versus controls in recipients of renal transplants. Kidney International. 2004; 4: 1937-1942.

13. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med. 2000; 160: 2101-2107.

14. Penkower L, Dew MA, Ellis D, et al. Psychological distress and adherence to the medical regimen among adolescent renal transplant recipients. Am J Transplant. 2003; 3: 1418-1425.

15. Weng LC, Dai Y, Huang HL, Chiang YJ. Effects of selfefficacy, self-care behaviours on depressive symptom of Taiwanese kidney transplant recipients. J Clin Nursing. 2008; 17: 1786-1794.

16. Novac M, Molnar MZ, Szeifert L, Kovacs AZ, Vamos EP, et al. Depressive symptoms and mortality in patients after kidney transplantation: a prospective prevalent cohort study. Psychosom Med. 2010 ; 72: 527-534.

17. Shah VS, Ananth A, Sohal GK, Bertges-Yost W, Eshelman A, et al. Quality of life and psychosocial factors in renal transplant recipients. Transplant Proc. 2006; 38: 1283-1285.

18. Karaminia R, Tavallaii SA, Lorgard-Dezfuli-Nejad M, Moghani Lankarani M, Hadavand Mirzaie H, et al. Anxiety and depression: a comparison between renal transplant recipients and hemodialysis patients. Transplant Proc. 2007; 39: 1082.

19. Haq I, Zainulabdin F, Naqvi A, Rizvi AH, Ahmed SH. Psychosocial aspects of dialysis and renal transplant. J Pak Med Assoc. 1991; 41: 99.

20. Perez San Gregorio MA, Martìn Rodrìguez A, Pèrez Bernal J. Psychological differences of patients and relatives according to post-transplantation anxiety. Span J Psychol. 2008; 11: 250-258.

21. Glass CA, Fielding DM, Evans C, Ashcroft JB. Factors related to sexual functioning in male patients undergoing hemodialysis and with kidney transplants. Arch Sex Behav. 1987; 16: 189-207.

22. Overbeck I, Bartels M, Decker O, Harms J, Hauss J, et al. Changes in quality of life after renal transplantation. Transplant Proc. 2005; 37: 1618-1621.

23. Kalman TP, Wilson PG, Kalman CM. Psychiatric morbidity in long-term renal transplant recipients and patients undergoing hemodialysis. A comparative study. JAMA. 2008; 250: 55-58.

24. Petrie K. Psychological well-being and psychiatric disturbance in dialysis and renal transplant patients. Br J Med Psychol. 1989; 62: 91-96.

25. Achille MA, Ouellette A, Fournier S, Marie-Josée H, Catherine G, Michel Pâquet. Impact of transplant related stressors and feelings of indebtedness on psychosocial adjustment following kidney transplantation. J Clin Psychol Med Settings. 2004; 11: 63-73.

26. Heck G, Schweitzer J, Seidel-Wiesel M. Psychological effects of living related kidney transplantation- risks and chances. Clin Transplant. 2004; 18: 716-721.

27. Frazier PA, Davis-Ali SH, Dahl KE. Stressors, social support, and adjustment in kidney transplant patients and their spouses. Soc Work Health Care. 1995; 21: 93-108.

28. Akman B, Özdemir FN, Sezer S, Miçozkadioglu H, Haberal M. Depression levels before and after transplantation. Transplant Proc. 2004; 36: 111-113.

29. Johnson JP, McCauley CR, Copley JB. The quality of life of hemodialysis and transplant patients. Kidney Int. 1982; 22: 286-291.

30. Pawar A, Rathod J, Chaudhury S, Saxena SK, Saldanha D, et al. Cognitive and emotional effects of renal transplantation. Indian J Psychiatry. 2006; 48: 21-26.

31. Smith MD, Hong BA, Robson AM. Diagnosis of depression in patients with end-stage renal disease. Comparative analysis. Am J Med. 1985; 9: 160-166.

32. Craven JL, Rodin GM, Littlefield C. The Beck Depression Inventory as a screening device for major depression in renal dialysis patients. Int J Psychiatry Med. 1988; 18: 365-374.

33. Tsunoda T, Yamashita R, Kojima Y, Takahara S. Risk factors for depression after kidney transplantation.J. of transplant proceed. 2010; 42: 1679-1681.

34. Szeifert L, Molnar MZ, Ambrus C, Koczy AB, Kovacs AZ, Vamos EP, et al. Symptoms of depression in kidney transplant recipients: a cross-sectional study. American Journal of Kidney Diseases. 2010; 55: 132-140.

35. Mehr ZP, Hami M, Eshgh ZM. Anxiety and Depression: A Comparison between Living and Cadaveric Renal Transplant Recipients. Int J Organ Transplant Medicine. 2011; 2: 178-183.

36. Penkower L, Dew MA, Ellis D, Sereika SM, Kitutu JMM, et al. Psychological distress and adherence to the medical regimen among adolescent renal transplant recipients. Am J Transplant. 2003; 3: 1418-1425.

37. Kimmel PL, Peterson RA, Weihs KL, Shidler NR, Simmens SJ, et al. Marital conflict, gender and survival in urban hemodialysis patients. JASN. 2000; 11: 1518-1525.

38. Goldfarb-Rumyantzev AS, Koford JK, Braid BC, Chelamcharla M, Habib AN, et al. Role of socioeconomic status in kidney transplant outcome. Clinical Journal American Society Nephrology. 2006; 1: 313-322.

39. Tsunoda T, Yamashita R, Kojima Y, Takahara S. Risk factors for depression after kidney transplantation. Transplant proc. 2010; 42: 1679-1681.

40. Pollack MH. Comorbid anxiety and depression. J Clin Psychiatry. 2005; 8: 22-29.

41. Novak M, Molnar MZ, Szeifert L, Zsofia Kovacs A, Vamos EP, et al. 2010. Depressive symptoms and mortality in patients after kidney transplantation: a prospective prevalent cohort study. Psychosomatic Medicine. 2010; 72: 527-534.

42. Alavi NM, Aliakbarzadeh Z, Sharifi K. Depression, anxiety, activities of daily living, and quality of life scores in patients undergoing renal replacement therapies. Transplant Proc. 2009; 41: 3693-3696.

43. Noohi S, Khaghani-Zadeh M, Javadipour M, Assari S, Najafi M, Ebrahiminia M, et al. Anxiety and depression are correlated with higher morbidity after kidney transplantation. Transplant Proc. 2007; 39: 1074-1078.

44. Arapaslan B, Soykan A, Soykan C, Kumbasar H. Cross-sectional assessment of psychiatric disorders in renal transplantation patients in Turkey: A preliminary study. Transplant Proc. 2004; 36: 1419-1421.

45. Haq I, Zainulabdin F, Naqvi A, Rizvi AH, Ahmed SH, et al. Psychosocial aspects of dialysis and renal transplant. J Pak Med Assoc. 1991; 41: 99-100.

46. Akman B, Ozdemir FN, Sezer S, Miçozkadioglu H, Haberal M, et al. Depression levels before and after renal transplantation. Transplant Proc. 2004; 36: 111-113.

47. Glass CA, Fielding DM, Evans C, Ashcroft JB. Factors related to sexual functioning in male patients undergoing hemodialysis and with kidney transplants. Arch Sex Behav. 1987; 16: 189-207.

48. Overbeck I, Bartels M, Decker O, Harms J, Hauss J, et al. Changes in quality of life after renal transplantation. Transplant Proc. 2005; 37: 1618-1621.

49. Kalman TP, Wilson PG, Kalman CM. Psychiatric morbidity in long-term renal transplant recipients and patients undergoing hemodialysis. A comparative study. JAMA. 1983; 250: 55-58.

50. Petrie K. Pschological well-being and psychiatric in disturbace in dialysis and renal transplant patients. Br J Med Psychol. 1989; 62: 91-96.