

**COMPARISON OF EMOTIONAL DISTRESS IN RENAL DISEASE PATIENTS UNDERGOING HEMODIALYSIS AND KIDNEY TRANSPLANT RECIPIENTS IN CYPRUS**Konstantinos Argyropoulos<sup>1</sup>, Panagiota Faidonos<sup>2</sup>, Antri Aresti<sup>2</sup> and Eleni Jelastopulu\*<sup>1,2</sup><sup>1</sup>Department of Public Health, Medical School, University of Patras, Patras, Greece.<sup>2</sup>Postgraduate Program Health Management, Frederick University, Nicosia, Cyprus.**\*Corresponding Author: Dr. Eleni Jelastopulu**

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**ABSTRACT**

**Purpose:** The purpose of the present study was to estimate differences referring in the presence of anxiety and depression in two groups of renal disease patients and to investigate associations with sociodemographic variables. **Method:** A sample of 230 patients were recruited, consisting of 130 patients undergoing hemodialysis (HD) and 100 patients with successful kidney transplantation (KT). The instrument used to assess the anxiety and depression levels was the in Greek translated and validated Hospital Anxiety and Depression Scale (HADS). **Results:** Patients with HD scored overall higher on the HADS compared to patients with KT (13.52 vs 10.30). No statistically significant differences were found in the mean value of anxiety ( $t=1.16$ ,  $p=0.249$ ) between both groups. Regarding depression and the overall score, we observed statistically significant differences in the mean values for depression ( $t=3.86$ ,  $p<0.001$ ) and for the overall HADS score ( $t=3.12$ ,  $p=0.002$ ) between the patients undergoing hemodialysis compared to patients with KT. In KT recipients older ages, lower educational level, being divorced or widowed and being retired scored significantly higher, whereas in HT patients only educational level and marital status play a significant role. **Conclusions:** In the present study, the overall HADS score as well as the single component scores of anxiety and depression were higher in patients with HD, indicating thus the higher psychological discomfort in these patients.

**KEYWORDS:** Hemodialysis, kidney transplantation, anxiety, depression.**INTRODUCTION**

Populations facing chronic illnesses have been reported to be at a significant risk for developing psychiatric disorders.<sup>[1,2]</sup> Emotional distress has been found to be prevalent in patients affected by Chronic kidney disease (CKD),<sup>[1,2,3]</sup> either on long-term dialysis or following kidney transplantation (KT), with the majority of patients suffering from anxiety and depression.<sup>[4]</sup> It has been observed that psychological disorders can increase the severity of the preexisting disease and influence patient compliance.<sup>[1,5]</sup> Furthermore, moderate to severe anxiety influences the quality of the patient's life, treatment adherence, medical outcome and the ability of patient to cope with the illness.<sup>[6-8]</sup> Several studies have estimated anxiety and depression levels among CKD patients, especially comparing kidney transplant recipients with patients undergoing hemodialysis (HD).<sup>[9-12]</sup>

The best treatment for CKD patients is considered KT, apart from somatic benefits, patients also experience improvement on health-related quality of life.<sup>[13]</sup> There is a controversy concerning kidney transplant recipient's mental health condition, since some studies support that

patients develop emotional distress and higher levels of anxiety<sup>[14,15]</sup> and some others that patients show less severe symptoms or no differences comparing with general population.<sup>[16,17]</sup> In addition, studies have reported no significant differences in the level of depression and anxiety among renal transplant subjects if compared to patients undergoing hemodialysis.<sup>[18-20]</sup> In KT, mean prevalence rates of depressive symptoms were estimated 25%.<sup>[21,22]</sup>

On the other hand, patients undergoing hemodialysis are exposed to considerable increased levels of stress, due to significant drug exposures and lengthy therapeutic procedures,<sup>[10,18,19]</sup> with the prevalence of anxiety ranging from 30 to 45%<sup>[23-25]</sup> in comparison to rates up to 10% in the general population.<sup>[26]</sup>

Depression among patients on dialysis is significant common, with an estimated prevalence rate between 15% and 40%.<sup>[20,27,28]</sup> These rates are considerably increased in comparison to 6.9% in general population and even cancer patients (mean prevalence rates up to 17%).<sup>[26,29,30]</sup> HD patients have been reported to

experience more depressive symptoms than patients undergoing peritoneal dialysis (PD) since HD subjects experience significant restrictions in independent living.<sup>[12,31]</sup>

The purpose of the present study was to estimate differences referring in the presence of emotional distress in two groups of renal disease patients. Moreover, to investigate the relationship of sociodemographic variables to mental health.

## METHODS

A cross-sectional study conducted in the General Hospital of Limassol in Cyprus, from October to December 2015. A sample of 230 patients were recruited, consisting of 130 patients undergoing hemodialysis (HD) and 100 patients with successful kidney transplantation (KT), at least one year prior to this study.

The instrument used to assess the emotional distress was the in Greek version of the Hospital Anxiety and Depression Scale (HADS) by Mihopoulos *et al.*,<sup>[32]</sup> which was found to have high internal consistency (Cronbach's  $\alpha = 0.884$ ) and reliability (test retest Intraclass Correlation Coefficient 0,944). In a review of over 700 studies, HADS was found to have good psychometric properties and to perform well in assessing anxiety and depressive symptoms in health settings.<sup>[33]</sup> In the present study, high internal consistency (Cronbach's  $\alpha = 0.870$ ) for the overall HADS score, anxiety (HADS-A) (Cronbach's  $\alpha = 0.777$ ) and depression (HADS-D) (Cronbach's  $\alpha = 0.866$ ) was observed.

HADS was first developed by Zigmond and Snaith in 1983<sup>[34]</sup> and has been commonly used in many countries to determine the levels of depression and anxiety that a patient is experiencing in the last two weeks in general hospitals. HADS is a brief questionnaire, a 14- item scale, seven of the items relate to anxiety (HADS-A) and seven relate to depression (HADS-D). Each item on the

questionnaire is scored from 0 to 3 which means that score range between 0 and 21 for either anxiety or depression. For anxiety HADS-A has a specificity of 0.78 and a sensitivity of 0.9 and for depression HADS-D has a specificity of 0.79 and a sensitivity of 0.83. According to the developers of the scale a score of between 8 and 10 identifies possible cases (borderline depression or anxiety) and a score of 11 or more the probable presence of a clinically meaningful anxiety or depressive condition.

Furthermore, an anonymous questionnaire was administered to collect basic demographic and socioeconomic data including questions regarding age and gender, educational parameters, occupational, family status and years undergoing hemodialysis or renal transplantation.

The chi-square test was applied at 5% level of significance to determine associated factors for anxiety and depression respectively. Statistical analyses were performed using the SPSS v. 19.0.

Participants were informed about the aims and procedures of the study and provided written informed consent for participation. All of the responders were ensured of confidentiality and participation was completely voluntary, with no economic or other motivation. All subjects had been informed of their rights to refuse or discontinue participation in the study according to the ethical standards of the Helsinki Declaration in 1983. Ethical approval for the study was obtained from the National Ethics Committee of Cyprus, and further permissions were given from the Commissioner for Personal Data Protection and the Health Ministry of Cyprus.

## RESULTS

Full descriptive data of the sample are presented in Table 1.

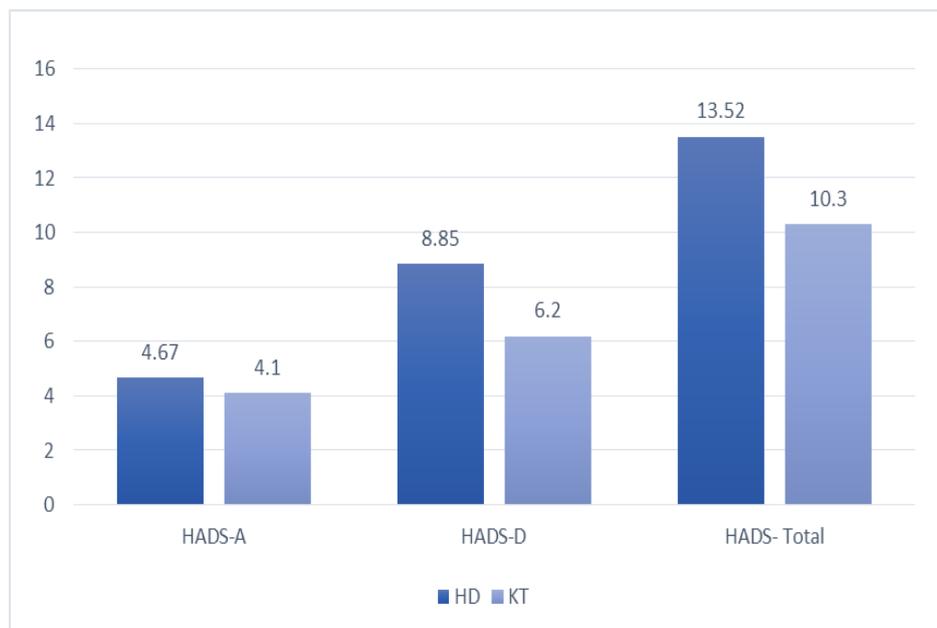
**Table 1: Descriptive Sociodemographic characteristics of the sample (N = 130).**

	HD		KT		Total	
	No	In%	No	In%	No	In%
<b>Gender</b>						
Male	80	61.5	60	60.0	140	60.9
Female	50	38.5	40	40.0	90	39.1
<b>Age in years</b>						
20-30	0	0.0	1	1.0	1	0.4
30-40	3	2.3	19	19.0	22	9.6
40-50	6	4.6	10	10.0	16	7.0
50-60	17	13.1	21	21.0	38	16.5
60-70	25	19.2	35	35.0	60	26.1
>70	79	60.8	14	14.0	93	40.4
<b>Educational Level</b>						
Low	75	57.7	32	32.0	107	46.5
Medium	37	28.5	45	45.0	82	35.7
High	18	13.8	23	23.0	41	17.8

Marital Status						
Married	90	69.2	72	72.0	162	70.4
Single	10	7.7	16	16.0	26	11.3
Divorced	5	3.8	5	5.0	10	4.3
Widowed	25	19.2	7	7.0	32	13.9
Occupation						
Employee	10	7.7	32	32.0	42	18.3
Unemployed	2	1.5	13	13.0	15	6.5
Retired	104	80.0	50	50.0	154	67.0
Invalidity pension	14	10.8	5	5.0	19	8.3
<b>Total</b>	130	100.0	100	100.0	230	100.0

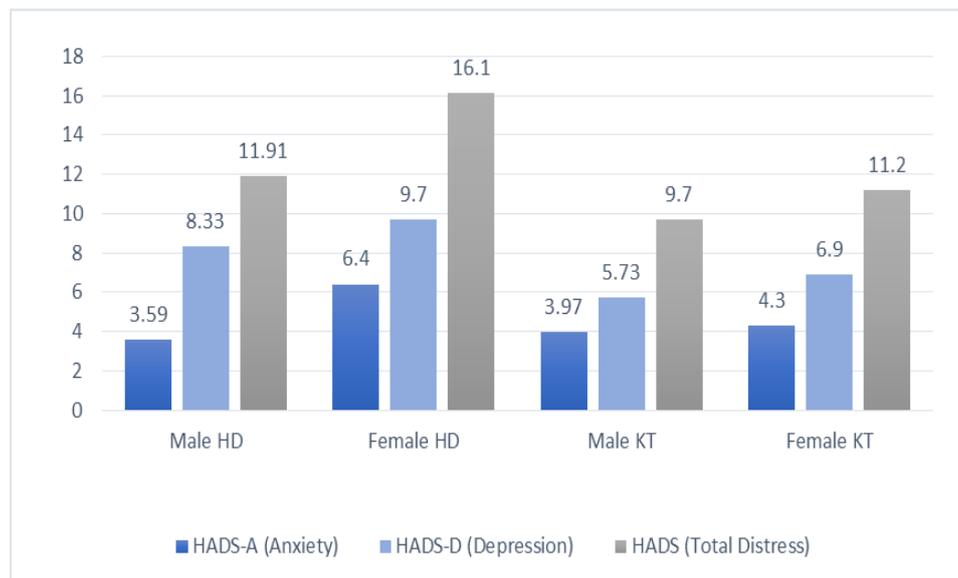
Patients with HD scored overall higher on the HADS compared to patients with KT (13.52 vs 10.30) (Figure 1). Both patient groups showed higher mean scores in depression (HD: 8.85; KT: 6.20), whereas lower scores were observed in the anxiety component (HD 4.67; KT 4.10) (Figure 1). No statistically significant differences were found in the mean value of anxiety ( $t=1.16$ ,

$p=0.249$ ) between both groups. Regarding depression and the overall score, we observed statistically significant differences in the mean values for depression ( $t=3.86$ ,  $p < 0.001$ ) and for the overall HADS score ( $t=3.12$ ,  $p=0.002$ ) between the patients undergoing hemodialysis compared to patients with KT (Figure 1).



**Figure 1: Comparison of HADS scores in patients with Hemodialysis (HD) and in patients with kidney transplantation (KT).**

Investigating gender differences, female patients scored higher in all dimensions and in both groups compared to males (HD: HADS 16.10 vs 11.91, Anxiety 6.40 vs 3.58, Depression 9.70 vs 8.33; KT: HADS 11.20 vs 9.70, Anxiety 4.30 vs 3.97, Depression 6.90 vs 5.73), being statistically significant only in the group of HD patients (Figure 2).



**Figure 2: Comparison of HADS by gender and type of therapy**

In depressed patients with KT older ages, lower educational level, being divorced or widowed and being retired scored significantly higher, whereas in HD

patients only educational level and marital status play a significant role (Table 2, Table3).

**Table 2: Association between sociodemographic profile and emotional status in patients with hemodialysis.**

HD	Anxiety n (%)	p-value	Depression n (%)	p-value
<b>Variables</b>				
<b>Gender</b>		<b>0.001</b>		0.189
Female	36.0		54.0	
Male	11.3		42.6	
<b>Age in years</b>		0.664		0.067
20-30	0.0		0.0	
30-40	0.0		33.3	
40-50	16.7		16.7	
50-60	11.8		11.8	
60-70	32.0		32.0	
>70	20.8		55.7	
<b>Educational Level</b>		0.978		<b>0.001</b>
Low	24.0		60.0	
Medium	16.2		32.4	
High	16.7		22.2	
<b>Marital Status</b>		0.451		<b>0.002</b>
Married	20.0		37.8	
Single	10.0		50.0	
Divorced	40.0		40.0	
Widowed	24.0		80.0	
<b>Occupation</b>		0.374		0.101
Employee	0.0		20.0	
Unemployed	50.0		100.0	
Retired	22.1		51.92	
Invalidity pension	21.4		21.43	

**Table 3: Association between sociodemographic profile and emotional status in patients with kidney transplantation.**

KT Variables	Anxiety n (%)	p-value	Depression n (%)	p-value
<b>Gender</b>		0.621		0.220
Female	12.5		40.0	
Male	13.3		35.0	
<b>Age in years</b>		0.046		<b>0.000</b>
20-30	0.0		0.0	
30-40	0.0		10.5	
40-50	0.0		20.0	
50-60	9.5		47.7	
60-70	14.3		37.1	
>70	9.9		71.5	
<b>Educational Level</b>		<b>0.000</b>		<b>0.000</b>
Low	21.9		71.9	
Medium	13.6		28.9	
High	0.0		4.3	
<b>Marital Status</b>		<b>0.019</b>		<b>0.004</b>
Married	12.5		40.6	
Single	6.3		12.5	
Divorced	0.0		20.0	
Widowed	42.9		71.4	
<b>Occupation</b>		<b>0.003</b>		<b>0.000</b>
Employee	6.2		15.6	
Unemployed	0.0		15.4	
Retired	20.9		54.0	
Invalidity pension	20.0		60.0	

## DISCUSSION

The main focus of the present study was to examine in two groups of chronic renal disease patients differences referring to depression and anxiety. According to our results, the overall HADS score was higher in HD than KT recipients, indicating thus the higher psychological discomfort in these patients. These findings are in line with other studies supporting that KT patients present lower levels of emotional distress.<sup>[2,18,35]</sup> On the other hand, in a case-control study in 2006, in the same setting of renal disease patients it was noticed that HADS-A score was significantly lower among KT recipients compared with HD patients but there was no significant difference between the two groups in the score for depression. The authors declare that depressive symptoms did not seem to improve after renal transplantation.<sup>[16]</sup>

Moreover, we didn't observe statistically significant differences in the mean value of anxiety between patients undergoing hemodialysis and KT recipients. A study that it was conducted in Iran ended up at the same conclusion whereas hemodialysis patients were significantly more depressed and anxious than renal transplant patients, but there was not any statistically significant difference between the two groups in the anxiety.<sup>[35]</sup>

The findings of the present study support a strong relation between specific sociodemographic factors and depression in renal disease patients such as gender, age,

marital status and educational level. In terms of the risk by demographic characteristics, results from literature have been inconsistent and show high variability either for patients undergoing hemodialysis or KT recipients. In details, one study report that depression among dialysis patients increased with age and lower educational levels.<sup>[36]</sup> Moreover, in a cross-sectional study of 400 consecutive patients, women on chronic hemodialysis were at increased risk of depression<sup>[37]</sup> but on a study in southeast of Iran although mean depression score was higher in female patients than in male, no statistically significant difference was observed.<sup>[38]</sup> A study was conducted in Turkey in 2007 and supported that quality of life of CKD patients was negatively correlated with some demographics characteristics, such as male gender, low education level and older age with middle income.<sup>[39]</sup> In addition, in renal transplant recipients in Panama a study in 2013 estimated that higher age and lower level of education was significantly associated with the HADS depression score but no correlation was found between depression and gender, marital status, duration of dialysis treatment or number of comorbid conditions.<sup>[40]</sup> The above-mentioned variations in CKD patients in different studies around the world might be accounted for by differences in sample sizes, population groups and assessment tools.<sup>[41]</sup>

## CONCLUSIONS

These results provide useful indications that patients undergoing HD are at higher risk of developing

depression and anxiety in comparison to KT recipients. Moreover, specific sociodemographic variables may affect renal disease patient's mental health condition, which emphasizes the importance of family and high educational level.

In overall, our results provide evidence which can be useful to health professionals and health services offered to patients with CKD. Several interventions can be developed to support female, older, less educated, living alone, depressed and anxious renal diseases patients in an effort to improve their mental health condition and quality of life.

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#### Conflict of interest

None.

#### REFERENCES

1. Watnick S, Kirwin P, Mahnensmith R, Concato J. The prevalence and treatment of depression among patients starting dialysis. *Am J Kidney Dis.*, 2003; 41: 105-110.
2. Jadouille V, Hoyois P, Jadoul M: Anxiety and depression in chronic hemodialysis: some somatopsychic determinants. *Clin Nephrol*, 2005; 63: 113-118.
3. Hedayati S. S, Minhajuddin A. T, Afshar M, Toto R. D. et al. Association between major depressive episodes in patients with chronic kidney disease and initiation of dialysis, hospitalization, or death. *JAMA*, 2010; 303: 1946-1953.
4. Livesley WJ. Symptoms of anxiety and depression in patients undergoing chronic hemodialysis. *J Psychosom Res.*, 1982; 26: 581-584.
5. Lopes AA, Albert JM, Young EW, Satayathum S, Pisoni RL, Andreucci VE, Mapes DL, Mason NA, Fukuhara S, Wikström B, Saito A, Port FK. Screening for depression in hemodialysis patients: associations with diagnosis, treatment, and outcomes in the DOPPS. *Kidney Int.*, 2004; 66: 2047-2053.
6. Feroze U, Martin D, Kalantar-Zadeh K, Kim JC, Reina-Patton A, Kopple JD. Anxiety and depression in maintenance dialysis patients: preliminary data of a cross-sectional study and brief literature review. *J Ren Nutr*, 2012; 22: 207-210.
7. Cukor D, Coplan J, Brown C, Friedman S, Cromwell-Smith A, Peterson RA, Kimmel PL. Depression and anxiety in urban hemodialysis patients. *Clin J Am Soc Nephrol*, 2007; 2: 484-490.
8. Cukor D, Coplan J, Brown C, Peterson RA, Kimmel PL. Course of depression and anxiety diagnosis in patients treated with hemodialysis: a 16-month follow-up. *Clin J Am Soc Nephrol*, 2008; 3: 1752.
9. 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.
10. Rapisarda F, Tarantino A, de Vecchi A, et al. Dialysis and kidney transplantation: similarities and differences in the psychological aspects of noncompliance. *Transplant Proc.*, 2006; 38: 1006.
11. Virzi A, Signorelli MS, Veroux M, et al. Depression and quality of life in living related renal transplantation. *Transplant Proc.*, 2007; 39: 1791.
12. Tomazou Ch, Charalambous G, Jelastopulu E. Quality of Life in Patients with Chronic Kidney Disease: A Cross-sectional Study Comparing Patients on Hemodialysis, Peritoneal Dialysis and with Kidney Transplantation. *BJMMR*, 2015; 8(6): 516-525.
13. Revicki DA, Osoba D, Fairclough D, Barofsky I, Berzon R, Leidy NK, et al. Recommendations on health-related quality of life research to support labeling and promotional claims in the United States. *Qual Life Res.*, 2000; 9(8): 887-900.
14. Perez San Gregorio MA, Martin Rodriguez A, Pérez Bernal J: Psychological differences of patients and relatives according to post-transplantation anxiety. *Span J Psychol*, 2008; 11: 250.
15. Cameron JI, Whiteside C, Katz J, et al: Differences in quality of life across renal replacement therapies: a meta-analytic comparison. *Am J Kidney Dis.*, 2000; 35: 629.
16. Karaminia R, Tavallai SA, Lorgard-Dezfuli-Nejad M, et al: Anxiety and depression: a comparison between renal transplant recipients and hemodialysis patients. *Transplant Proc.*, 2007; 39: 1082.
17. Haq I, Zainulabdin F, Naqvi A, et al: Psychosocial aspects of dialysis and renal transplant. *J Pak Med Assoc.*, 1991; 41: 99.
18. Overbeck I, Bartels M, Decker O, et al: Changes in quality of life after renal transplantation. *Transplant Proc.*, 2005; 37: 1618.
19. Akman B, Ozdemir FN, Sezer S, et al: Depression levels before and after renal transplantation. *Transplant Proc.*, 2004; 36: 111.
20. Petrie K: Psychological well-being and psychiatric disturbance in dialysis and renal transplant patients. *Br J Med Psychol*, 1989; 62: 91.
21. Chilcot J, Spencer BW, Maple H, Mamode N. Depression and kidney transplantation. *Transplantation*, 2014; 97(7): 717-21.
22. Kovacs AZ, Molnar MZ, Szeifert L, Ambrus C, Molnar-Varga M, Szentkiralyi A, et al. Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between kidney transplant recipients and waitlisted patients on maintenance dialysis. *Nephrol Dial Transplanta*, 2011; 26(3): 1058-65.
23. Molnar-Varga M, Molnar MZ, Szeifert L, Kovacs AZ, Kelemen A, Becze A, et al. Health-related quality of life and clinical outcomes in kidney

- transplant recipients. *Am J Kidney Dis.*, 2011; 58(3): 444–52.
24. Palmer S, Vecchio M, Craig JC, Tonelli M, Johnson DW, Nicolucci A, et al. Prevalence of depression in chronic kidney disease: systematic review and meta-analysis of observational studies. *Kidney Int.*, 2013; 84(1): 179–91.
  25. Muller H, Gwinner W, Haltenhof H, Kornhuber J, Maler JM. Psychological risk factors of kidney trans-plant patients. *Kidney Int.*, 2010; 77(9): 833.
  26. Bromet E, Andrade LH, Hwang I, Sampson NA, Alonso J, de Girolamo G, et al. Cross-national epidemi-ology of DSM-IV major depressive episode. *BMC Med*, 2011; 9: 90.
  27. Ricardo A. C, Fischer M. J, Peck A, et al. Depressive symptoms and chronic kidney disease: Results from the National Health and Nutrition Examination Survey (NHANES) 2005-2006. *Int Urol Nephrol*, 2010; 42: 1063-1068.
  28. Zalai D, Szeifert L, Novak M. Psychological distress and depression in patients with chronic kidney disease. *Semin Dial.*, 2012; 25(4): 428–38.
  29. Bossola M, Ciciarelli C, Di Stasio E, Conte GL, Antocicco M, Rosa F, et al. Symptoms of depression and anxiety over time in chronic hemodialysis patients. *J Nephrol*, 2012; 25(5): 689–98.
  30. Krebber AM, Buffart LM, Kleijn G, Riepma IC, de Bree R, Leemans CR, et al. Prevalence of depression in cancer patients: a meta-analysis of diagnostic interviews and self-report instruments. *Psychooncology*, 2014; 23(2): 121–30.
  31. Ginieri-Coccosis M, Theofilou P, Synodinou C, Tomaras V, and Soldatos C. “Quality of life, mental health and health beliefs in hemodialysis and peritoneal dialysis patients: investigating differences in early and later years of current treatment. *BMC Nephrol*, 2008; 9(1): 14.
  32. Michopoulos I, Douzenis A, Kalkavoura C, Christodoulou C, Michalopoulou P, Kalemi G, Fineti K, Patapis P, Protopapas K, Lykouras L. Hospital Anxiety and Depression Scale (HADS): validation in a Greek general hospital sample. *Annals Gen Psych*, 2008; 7: 4.
  33. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale — an updated literature review. *J Psychosom Res.*, 2002; 52: 69–77.
  34. Zigmond S, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*, 1983; 67: 361–370.
  35. Mollahadi M, Tayyebi A, Ebadi A, Daneshmandi M. Comparison of anxiety, depression and stress among hemodialysis and kidney transplantation patients. *Iranian J Critic Care Nurs*, 2010; 2(4): 153-156.
  36. Keskin G & Engin E. The evaluation of depression, suicidal ideation and coping strategies in haemodialysis patients with renal failure. *J Clin Nurs*, 2011; 20(19-20): 2721-32.
  37. Araujo S.M, De Bruin V.M, Daher E.D, Almeida G.H, Medeiros C.A. & De Bruin P.F. (2011). Risk factors for depressive symptoms in a large population on chronic hemodialysis. *Int Urol Nephrol*, 2012; 44(4): 1229-35.
  38. Anjomshoa F, Esmaeili-Abdar M, Rafiei H et al. Depression among hemodialysis patient: a cross-sectional study in southeast of Iran. *Int J Epidem Resear*, 2014; 1(1): 24-28.
  39. Sayin A, Mutluay R, Sindel S. Quality of Life in Hemodialysis, Peritoneal Dialysis, and Transplantation Patients. *Transplant Proc.*, 2007; 39(10): 3047-3053.
  40. Vásquez V, Navarro N, Valdés RA, Britton GB. Factors associated to depression in renal transplant recipients in Panama. *Indian J Psychiatry*, 2013; 55: 273-8.
  41. Watnick S, Wang, P.L, Demadura, T. & Ganzini L. (2005). Validation of 2 depression screening tools in dialysis patients. *Am J Kidney Dis.*, 2005; 46: 919-924.