ANXIETY AND DEPRESSION IN RENAL TRANSPLANT RECIPIENTS

Konstantina Tsalamata, Antonia Kalogianni, Georgios Panoutsopoulos, Petros Kolovos, Sophia Zyga, Niki Pavlatou, Maria Polikandrioti

MSc in Applied Clinical Nursing, Department of Nursing, University of West Attica, Athens, Greece

Abstract

Introduction: End-stage kidney disease is a rapidly growing health problem worldwide. Kidney transplantation is the optimal modality, which entails many benefits in patients' lives. Anxiety and depression minimize the beneficial effects of transplantation and adversely affect the clinical outcome. The **aim** of this study was to explore anxiety and depression in renal transplant recipients. **Material and method:** In the present study were enrolled 150 renal transplant recipients. Data were collected by the completion ofThe Hospital Anxiety And Depression Scale which included patients' characteristics. **Results:** Of the 150 participants, 56.7% were men and 53% were over 50 years old. The majority of the sample was retired (46%), married (65.3%) and of high school education (50.7%). In terms of clinical characteristics, 40.7% were recipients of deceased donors while 24.7% had some other disease. The results of the present study revealed that 12.7% and 3.3% of participants had anxiety and depression, respectively. Anxiety was experienced by women, those with comorbidity, those who were moderately informed about their state of health, who described themselves as anxious and who reported anxiety about graft rejection, p=0.007, p=0.049, p=0.045, p=0.001, p=0.052, respectively. Depression was experienced by women and those of primary education, p=0.052 and p=0.055, respectively. **Conclusions:** Demographic, clinical and other self reported characteristics were associated with anxiety and depression. Early diagnosis of this comorbidity may contribute to provision of individualized care by health professionals.

Keywords: Anxiety, depression, kidney failure, kidney transplant

Corresponding author: *Tsalamata Konstantina e-mail :* *Konstantinatsalamata@gmail.com*

ΆΓΧΟΣ-ΚΑΤΑΘΛΙΨΗ ΣΕ ΛΗΠΤΕΣ ΝΕΦΡΙΚΟΥ ΜΟΣΧΕΥΜΑΤΟΣ

Κωνσταντίνα Τσαλαμάτα, Αντωνία Καλογιάννη, Γεώργιος Πανουτσόπουλος, Πέτρος Κολοβός, Σοφία Ζυγά, Νίκη Παυλάτου, Μαρία Πολυκανδριώτη

Περίληψη

Η νεφρική νόσος τελικού σταδίου είναι ένα ταχέως αναπτυσσόμενο πρόβλημα υγείας, παγκοσμίως. Η μεταμόσχευση νεφρού είναι η βέλτιστη θεραπεία, που συνεπάγεται πολλά οφέλη στη ζωή των ασθενών. Το άγχος και η κατάθλιψη ελαχιστοποιούν τα ευεργετικά αποτελέσματα της μεταμόσχευσης και ασκούν δυσμενή επίδραση στην κλινική έκβαση. **Σκοπός** αυτής της μελέτης ήταν η διερεύνηση του άγχους και της κατάθλιψης ασθενών ύστερα από μεταμόσχευση νεφρού. **Υλικό και μέθοδος**: Στην παρούσα μελέτη συμμετείχαν 150 λήπτες νεφρικού μοσχεύματος. Τα δεδομένα συλλέχθηκαν με τη συμπλήρωση της κλίμακας The Hospital Anxiety And Depression Scale (HADs) στην οποία συμπεριελήφθησαν τα χαρακτηριστικά των ασθενών. **Αποτελέσματα**: Από τους 150 συμμετέχοντες, το 56.7% ήταν άνδρες και το 53% ήταν ηλικίας άνω των 50 ετών. Η πλειοψηφία του δείγματος ήταν συνταξιούχοι (46%), έγγαμοι (65.3%) και απόφοιτοι γυμνασίου (50.7%). Όσον αφορά στα κλινικά χαρακτηριστικά, το 40.7% ήταν λήπτες από αποθανόντα δότη και στο 24.7% συνυπήρχε άλλη νόσος. Τα αποτελέσματα έδειξαν άγχος και κατάθλιψη στο 12.7% και στο 3.3% του δείγματος, αντίστοιχα. Άγχος βίωναν οι γυναίκες, όσοι είχαν συννοσηρότητα, όσοι ήταν μέτρια ενημερωμένοι για την κατάσταση της υγείας τους, όσοι χαρακτήρισαν τον εαυτό ως αγχώδη και όσοι είχαν άγχος για την απόρριψη μοσχεύματος, p=0.007, p=0.049, p=0.045, p=0.001, p=0.052, αντίστοιχα. Κατάθλιψη βίωναν οι γυναίκες και όσοι ήταν απόφοιτοι πρωτοβάθμιας εκπαίδευσης, p=0.052, p=0.055, αντίστοιχα. **Συμπεράσματα:** Δημογραφικοί, κλινικοί και άλλοι αυτο-αναφερόμενοι παράγοντες σχετίζονται με το άγχος και την κατάθλιψη. Η έγκαιρη διάγνωση αυτής της συννοσηρότητας θα συμβάλλει στην παροχή εξατομικευμένης φροντίδας από τους επαγγελματίες υγείας.

Υπεύθυνος Αλληλογραφίας: *Τσαλαματά Κωνσταντίνα e-mail: Konstantinatsalamata@gmail.com*

INTRODUCTION

During recent years, chronic kidney failure is expanding at an alarming rate, globally. Kidney transplantation is the only treatment that promotes survival in patients with end-stage renal disease.[1] Ten years after kidney transplantation, survival rates vary from 43% to 74%.[2]

Success of transplantation is not always ensured especially when patients develop psychiatric disturbance, such as anxiety and depression.[1] One-fifth of kidney transplant patients are at high risk for developing depression. Compared to general population, depression is high among renal recipients ranging between 22% to 41% but lower compared to wait-listed patients.[1,3] Also, anxiety is lower among transplant recipients when correlated to hemodialysis patients.[4] Discrepancies of psychiatric prevalence among renal transplant recipients are attributed to small sample size or differences in methodology such as inclusion criteria or diagnostic and assessment tools.[1]

Though, transplantation improves daily functioning and offers several advantages in terms of improved clinical outcomes or quality of life compared to dialysis modalities, depressive symptoms are still present in approximately 25% of patients.[5] Risk factors for depression after transplantation include gender, marital status, income, comorbidity, malnutrition, inflammation, and immunosuppressive therapy. Patients' culture is an equally important factor associated with depression since it reflects their perceptions or expressions about symptoms.[5-9] Depression is associated with nonadherence to therapy, irrespective of time of depression, whether it was pre or post transplantation.[6]

Psychological state should be carefully considered since depression adversely affects patients' clinical outcomes, increases the risk of graft failure, and all-cause mortality.[1,5-10] Therefore, transplant guidelines need to include considerations about screening and treating psychiatric comorbidities in post transplant patients.

To the best of our knowledge little is Known about anxiety/depression in renal transplant recipients in Greece.

The aim of this cross sectional was to explore anxiety and depression in renal transplant recipients in Greece.

MATERIAL AND METHOD

Design and period of the study

In the present study were enrolled 150 renal transplant recipients (85 men and 65 women) visiting for scheduled follow-up the outpatient clinic of a public hospital in Athens. The method used was a convenience sampling. The research was conducted between December 2020-February 2021.

Sample: inclusion and exclusion criteria

Criteria for inclusion in the study were: a) renal transplantation, b) ability to write and read the Greek language fluently and c) adequate scheduled follow-up. Patients excluded were those who did not understand the scale sequence, were speech, hearing or mentally impaired or did not wish to participate in the study.

Data collection and procedure

Data were collected by completion of The Hospital Anxiety And Depression Scale (HADs) which also included patients' characteristics. More specifically were recorded: gender, age, marital status, educational level, profession, and number of children. In addition, were collected the following clinical characteristics: comorbidity, the donor of the implant, administration of cortisone, and the value of urea and creatinine at the day of measurement. In terms of patients' perceptions, they were asked if follow up helped to reduce stress and whether they were anxious about the need for lifelong medication, the routine check-up, and the possibility of graft rejection. In addition, the degree of patients' and families' information about health was recorded.

Patients that agreed to participate in the study were invited to a private room to guarantee their privacy. The

process of filling out the questionnaires lasted between 15 and 20 min and took place after patients had completed their follow-up in the outpatient clinic.

Measurement of Anxiety-Depression (HADs)

For the evaluation of depression and anxiety, it was used «The Hospital Anxiety And Depression Scale (HADs)» which was proposed in 1983 by Zigmond AS and Snaith RP.[11] The scale consists of 14 questions that evaluate how patients felt during the previous week. Patients were able to answer every question in a 4-point Likert scale from 0-3. Seven out of 14 questions evaluate the level of depression and the rest the anxiety level. Higher scores indicate higher levels of anxiety and depression, respectively. In addition, for both scores the following cut-off value has been proposed and widely used in the literature as following: score 0-8 does not indicate anxiety or depression and score> 8 indicates anxiety / depression.[12]

Ethical considerations: Written, informed consent for participation were obtained from all patients after explanation of the purpose of the study. Participation was on a voluntary basis and anonymity was preserved. Furthermore, all participants were informed of their rights to refuse or to discontinue their participation, according to the ethical standards of the Helsinki Declaration of 1983.

Statistical Analysis

Categorical data are presented with absolute and relative (%) frequencies, while continuous ones with median and interquartile range since normality did not hold (checked with Kolmogorov-Smirnov normality test and graphically with histograms). The X2 test of independence was used to assess the association between anxiety/depression levels and patient characteristics, as well as the non-parametric Mann-Whitney test.

In addition, multiple logistic regression was performed to assess the impact of patient's characteristics (independent factors) on their anxiety/depression. Results are presented as Odds Ratio (OR) and 95% confidence interval (95% CI). The observed significance level of 5% was considered statistically significant. All statistical analyzes were performed with version 25 of the SPSS statistical program (SPSSInc, Chicago, Il, USA).

RESULTS

Descriptive results

From Table 1, it is observed that 56.7% of participants were men, 52.7% were over 50 years old, 65.3% was married, 50.7% had high school education, 46% had retired and 27.3% had one child.

In terms of clinical characteristics, table 2 shows that 24.7% suffered from other disease, 40.7% received the graft from a deceased donor, the majority received cortisone (89.3%) and in the day of HADs measurement, the mean blood level of creatinine and urea was 1.9mg/dl and 62.9 mg/dl, respectively.

According to patients' reports, 86.7% were very informed about their health state and in 81.3% family was very informed. Moreover, 54% of participants considered themselves anxious, 65.3% believed that follow-up reduces stress, 46% and 35.3% reported no anxiety about lifelong medication and routine checkup, respectively while 37.3% declared very anxious about graft rejection (Table 3).

Table 1: Sample distribution according to demographic characteristics (n=150)

	N(%)
Gender	
Male	85(56.7%)
Female	65(43.3%)
Age (years)	
<30	11(7.3%)
30-40	28(18.7%)
41-50	32(21.3%)
51-60	45(30.0%)
61-70	28(18.7%)
71-80	6(4.0%)
Family status	
Married	98(65.3%)
Single	40(26.7%)
Divorced	7(4.7%)
Widowed	3(2.0%)
Living together	2(1.3%)
Education Level	
Primary	17(11.3%)
High School	76(50.7%)
University	38(25.3%)
MSc/Phd	19(12.7%)
Profession	
Unemployed	14(9.3%)
Civil Servant	15(10.0%)
Employee	14(9.3%)
Freelancer	18(12.0%)
Household	12(8.0%)
Pensioner	69(46.0%)
Other	8(5.3%)
Number of children	
None	53(35.3%)
One	41(27.3%)
Two	42(28.0%)
More than 2	14(9.3%)

Table 2: Sample distribution according to clinical characteristics (n=150)

	N(%)	
Other Disease		
Yes	37(24.7%)	
No	113(75.3%)	
Donor from		
Mother	41(27.3%)	
Father	11(7.3%)	
Sibling	12(8.0%)	
Husband/Wife	13(8.7%)	
Relative	12(8.0%)	
Deceased Donor	61(40.7%)	
Receiving Cortisone		
Yes	134(89.3%)	
No	16(10.7%)	
	Mean (SD)	Median (IQR)
Creatinine	1.9(.3)	1.6(1.2-2)
Urea	62.9(38.9)	58(41-80)

SD: Standard Deviation, IQR: Interquartile range

Table 3: Sample distribution according to self-reported characteristics (n=150)

	N(%)
Informed for health state	
Very	130(86.7%)
Enough	19(12.7%)
A little	0(0.0%)
Not at all	1(0.7%)
Family informed for health state	
Very	122(81.3%)
Enough	23(15.3%)
A little	4(2.7%)
Not at all	1(0.7%)
Consider yourself anxious	
Yes	81(54.0%)
No	69(46.0%)
Do you think that follow-up reduces stress	
Very	98(65.3%)
Enough	32(21.3%)
A little	11(7.3%)
Not at all	9(6.0%)
Are you anxious about lifelong medication?	
Very	11(7.3%)
Enough	35(23.3%)
A little	35(23.3%)
Not at all	69(46.0%)
Are you anxious about lifelong routine checkup?	
Very	26(17.3%)
Enough	28(18.7%)
A little	43(28.7%)
Not at all	53(35.3%)
Are you anxious about graft rejection?	
Very	56(37.3%)
Enough	41(27.3%)
A little	31(20.7%)
Not at all	22(14.7%)

Anxiety / Depression Levels

Table 4 presents results regarding patient's anxiety/depression. Only 12.7% experienced anxiety and 3.3% depression with median scores both 10.

Table 4: Levels of anxiety/depression (n=150)

	N(%)	Median (IQR)
Anxiety		
No (HADS score 0-8)	131(87.3%)	4(3-6)
Yes (HADS score >8)	19(12.7%)	10(9-13)
Depression		
No (HADS score 0-8)	145(96.7%)	2(1-4)
Yes (HADS score >8)	5(3.3%)	10(10-11)

Association between patient's characteristics and anxiety/depression

Tables 5 and 6 present the association between patient's characteristics with anxiety and depression, respectively. A statistically significant association was observed between patients' anxiety and gender (p=0.007), whether they suffered from other disease (p=0.049), how well informed patients were about their problem (p=0.045), whether they considered themselves anxious (p=0.001) and the stress of graft rejection (p=0.052) (Table 5). More specifically, women had a higher rate of anxiety (21.5%) than men (5.9%).

Those who suffered from other disease also had a higher rate of anxiety (21.6%) than those who do not (9.7%). Similarly, those who were enough informed about their problem had a higher rate of anxiety (21.7%) than those who were very informed (11.5%). In addition, those who considered themselves anxious and those who were very anxious about graft rejection graft had higher anxiety rates, 21% and 19.6%, respectively.

Table 5: Association between patients' characteristics and anxiety

	Anxiety		
	HADS score 0-8 N (%)	HADS score >8 N (%)	p
General			0.004
Male	80(94.1%)	5(5.9%)	
Female	51(78.5%)	14(21.5%)	
Age (years)			0.253
≤40	31(79.5%)	8(20.5%)	
41-50	29(90.6%)	3(9.4%)	
51-60	42(93.3%)	3(6.7%)	
>60	29(85.3%)	5(14.7%)	
Family status			0.786
Married / Living together	86(86.0%)	14(14.0%)	
Single	36(90.0%)	4(10.0%)	
Divorced / Widowed	9(90.0%)	1(10.0%)	
Education Level			0.344
Primary	13(76.5%)	4(23.5%)	
High School	68(89.5%)	8(10.5%)	
University / MSc/Phd	50(87.7%)	7(12.3%)	
Profession			0.108
Unemployed/ Household	20(76.9%)	6(23.1%)	
Employee	44(93.6%)	3(6.4%)	
Pensioner	61(88.4%)	8(11.6%)	
Number of children			0.917
None	46(86.8%)	7(13.2%)	
One	36(87.8%)	5(12.2%)	
Two	36(85.7%)	6(14.3%)	
More than 2	13(92.9%)	1(7.1%)	
Other Disease			0.049
No	102(90.3%)	11(9.7%)	
Yes	29(78.4%)	8(21.6%)	
Donor			0.809
Mother / Father / Sibling	57(89.1%)	7(10.9%)	
Husband/Wife/ Relative	22(88.0%)	3(12.0%)	
Deceased Donor	52(85.2%)	9(14.8%)	
Receiving Cortisone			0.439
No	13(81.3%)	3(18.8%)	
Yes	118(88.1%)	16(11.9%)	
Informed for health state			0.045
Very	115(88.5%)	15(11.5%)	

Enough	15(78.9%)	4(21.1%)	
Family informed for health state			0.181
Very	108(88.5%)	14(11.5%)	
Enough	18(78.3%)	5(21.7%)	
Consider yourself anxious			0.001
No	67(97.1%)	2(2.9%)	
Yes	64(79.0%)	17(21.0%)	
Do you think that follow-up reduces stress			0.561
Very	87(88.8%)	11(11.2%)	
Enough	28(87.5%)	4(12.5%)	
A little / Not at all	16(80.0%)	4(20.0%)	
Are you anxious about lifelong medication?			0.386
Very	9(81.8%)	2(18.2%)	
Enough	28(80.0%)	7(20.0%)	
A little	31(88.6%)	4(11.4%)	
Not at all	63(91.3%)	6(8.7%)	
Are you anxious about lifelong routine checkup?			0.364
Very	20(76.9%)	6(23.1%)	
Enough	25(89.3%)	3(10.7%)	
A little	38(88.4%)	5(11.6%)	
Not at all	48(90.6%)	5(9.4%)	
Are you anxious about graft rejection?			0.052
Very	45(80.4%)	11(19.6%)	
Enough	36(87.8%)	5(12.2%)	
A little	29(93.5%)	2(6.5%)	
Not at all	21(95.5%)	1(4.5%)	
	Median (IQR)	Median (IQR)	
Creatinine	1.6(1.2-2.0)	1.8(1.3-2.3)	0.112
Urea	57(39-80)	70(47-88)	0.239

A statistically significant association was observed between patients' depression and gender (p=0.052) and level of education (p=0.055) (Table 6). More specifically, women had a higher rate of depression (6.2%) than men (1.2%). Patients with primary school education also had a higher rate of depression (11.8%) than those with high school or higher education (1.3% and 3.5% respectively).

Table 6: Association between patients' characteristics and depression

	Depression		
	HADS score 0-8 N(%)	HADS score >8 N(%)	P
Gender			0.052
Male	84(98.8%)	1(1.2%)	
Female	61(93.8%)	4(6.2%)	
Age (years)			0.566
≤40	38(97.4%)	1(2.6%)	
41-50	32(100.0%)	0(0.0%)	
51-60	43(95.6%)	2(4.4%)	
>60	32(94.1%)	2(5.9%)	
Family status			0.274
Married / Living together	95(95.0%)	5(5.0%)	
Single	40(100.0%)	0(0.0%)	
Divorced / Widowed	10(100.0%)	0(0.0%)	

Education Level			0.055
Primary	15(88.2%)	2(11.8%)	
High School	75(98.7%)	1(1.3%)	
University / MSc/Phd	55(96.5%)	2(3.5%)	
Profession			0.559
Unemployed/ Household	26(100.0%)	0(0.0%)	
Employee	45(95.7%)	2(4.3%)	
Pensioner	66(95.7%)	3(4.3%)	
Number of children			0.065
None	52(98.1%)	1(1.9%)	
One	41(100.0%)	0(0.0%)	
Two	38(90.5%)	4(9.5%)	
More than 2	14(100.0%)	0(0.0%)	
Other Disease			0.419
No	110(97.3%)	3(2.7%)	
Yes	35(94.6%)	2(5.4%)	
Donor			0.178
Mother / Father / Sibling	63(98.4%)	1(1.6%)	
Husband/Wife/ Relative	25(100.0%)	0(0.0%)	
Deceased Donor	57(93.4%)	4(6.6%)	
Receiving Cortisone			0.492
No	15(93.8%)	1(6.3%)	
Yes	130(97.0%)	4(3.0%)	
Informed for health state			0.621
Very	126(96.9%)	4(3.1%)	
Enough	18(94.7%)	1(5.3%)	
Family informed for health state			0.133
Very	119(97.5%)	3(2.5%)	
Enough	21(91.3%)	2(8.7%)	
Consider yourself anxious			0.235
No	68(98.6%)	1(1.4%)	
Yes	77(95.1%)	4(4.9%)	
Do you think that follow-up reduces stress			0.485
Very	94(95.9%)	4(4.1%)	
Enough	32(100.0%)	0(0.0%)	
A little / Not at all	19(95.0%)	1(5.0%)	
Are you anxious about lifelong medication?			0.748
Very	10(90.9%)	1(9.1%)	
Enough	34(97.1%)	1(2.9%)	
A little	34(97.1%)	1(2.9%)	
Not at all	67(97.1%)	2(2.9%)	
Are you anxious about lifelong routine checkup?			0.446
Very	24(92.3%)	2(7.7%)	
Enough	28(100.0%)	0(0.0%)	
A little	42(97.7%)	1(2.3%)	
Not at all	51(96.2%)	2(3.8%)	
Are you anxious about graft rejection ?			0.164
Very	52(92.9%)	4(7.1%)	
Enough	41(100.0%)	0(0.0%)	
A little	31(100.0%)	0(0.0%)	
Not at all	21(95.5%)	1(4.5%)	
	Median (IQR)	Median (IQR)	
Creatinine	1.6(1.2-2.0)	1.8(1.2-2.2)	0.520
Urea	58(41-80)	81(56-127)	0.170

Impact of patient's characteristics on anxiety/depression

Multiple logistic regression was performed with dependent variables anxiety and depression in order to estimate the impact of patient's, adjusting for possible confounders. Table 7 reveals that women were 3.9 times more likely than men to experience anxiety (OR=3.93 [95% CI: 1.22-12.71], p=0.022). Patients who considered themselves anxious were 6.7 times more likely than those who did not consider themselves anxious (OR=6.66 [95% CI: 1.36-32.67], p=0.019).

Table 7: Impact of patient's characteristics on anxiety.

	Anxiety OR (95% CI)	P
Gender		
Male	Ref.Cat.	
Female	3.93(1.22-12.71)	0.022
Other Disease		
No	Ref.Cat.	
Yes	2.24(0.69-7.30)	0.180
Informed for state of health		
Very	Ref.Cat.	
Enough	2.22(0.55-9.01)	0.263
Consider yourself anxious		
No	Ref.Cat.	
Yes	6.66(1.36-32.67)	0.019
Are you anxious about graft rejection		
Very	Ref.Cat.	
Enough	0.67(0.18-2.43)	0.539
A little	0.29(0.05-1.66)	0.164
Not at all	0.35(0.04-3.40)	0.364

CI: Confidence interval, Ref.Cat.: reference Category

Regarding depression, patients with high school education were 91% less likely to develop depression than patients with primary education (OR=0.09 [95% CI: 0.01-1.06], p=0.055 borderline statistical significance).

Table 8: Impact of patient's characteristics on depression.

	Depression OR (95% CI)	P
Gender		
Male	Ref.Cat.	
Female	6.26(0.66-59.43)	0.110
Education Level		
Primary	Ref.Cat.	
High School	0.09(0.01-1.06)	0.055
University / MSc/Phd	0.26(0.03-2.12)	0.209

CI: Confidence interval, Ref.Cat.: reference Category

DISCUSSION

According to the results of the present study, 12.7% had anxiety and 3.3% depression. Szeifert et al.,[3] who explored 1.067 kidney transplant recipients showed that 33% experienced depression. A cross-sectional study conducted by Anvar-Abnavi et al.,[13] among 109 male and 91 female renal transplant patients (mean age 39.64 years) showed that, depression and anxiety, in 75% and 50% of the sample, respectively. Dobbels et al.,[14] demonstrated depression in 3.360 transplant recipients with incidences 5.05%, 7.29%, and 9.10% at 1, 2, and 3 years post transplantation, respectively. A prior study by Arapaslan et al.,[15] who explored 40 patients after renal transplantation (mean age 35.42±10.09 years) showed major depression in 25% of participants. Tsunoda et al.,[16] who explored 116 kidney recipients (mean age 50.2±11.87, male/female ratio 63/53) showed that depression was accounting for 41.4%.

Needless to say, the necessity is not to cite percentages but to prompt early recognition by psychiatric awareness. The benefits of renal transplantation include better quality of life, reduction of medical expenses, living away from dialysis and prolongation of life. Psychiatric disturbance limits these benefits since it results in behavioral problems and/or in pathophysiological abnormalities, which contribute to poor health outcomes and low quality of life.[17-22]

Anxiety and depression need evaluation through all phases of transplantation procedure. On the one hand, pre-transplantation period is crucial to explore depression or anxiety by applying psychiatric protocols to identify transplant candidates requiring mental support.[5] On the other hand, at each scheduled follow-up after transplantation, patients need systematic assessment of anxiety/depression including new stressors (medication side effects, guilt feelings toward donors).[22] Pre-transplant depression was negatively correlated with post-transplant adherence to therapy but positively correlated with post-transplant depression.[23]

The present results showed that women experienced anxiety. In chronic illness women experience anxiety when they feel unable to fulfill prior responsibilities.[24] Contrariwise, Lopes et al.,[22] showed that male recipients and their donors experienced cognitive anxiety in the pre and post transplant period while female recipients presented with more severe depression. Also present results illustrated that comorbidity was associated with anxiety but Szeifert et al.,[3] showed comorbidity to be associated with depression among 1.067 kidney transplant recipients.

Participants being enough informed about their health state experienced anxiety. It is widely accepted that information is a key-element in disease management that alleviates anxiety and reinforce patients' co-ordination in the therapeutic regimen.[25] Klewitz et al.,[26] demonstrated that 57.1% of kidney patients were dissatisfied with provided information regarding drowsiness due to immunosuppressive medication. Possibly, some health professionals show hesitation to discuss medication side effects in details for fear of disadvantageous treatment consequences.[26] Daytime sleepiness is associated with failure to adhere to immunosuppressive medication by 13%. Daytime sleepiness is defined as "difficulty in maintaining a desired level of wakefulness", and is a common phenomenon after transplantation which increases anxiety levels and decreases quality of life.[27]

Anxiety was experienced by participants who described themselves as anxious and those who reported anxiety about graft rejection. Anxiety influences decision-making, leading to a more detailed analysis of the task. Anxious subjects are generally prone to treating environmental demands more like dangers than positive challenges.[2] This finding might assist clinicians in choosing targeted treatment strategies in these patients.

In terms of depression, results revealed to be associated with participants' primary education level. Patients of low education level or health literacy are prone to hide their limitations due to shame, thus experiencing

low social support when it comes to medical information. Information provision approach differs according to patients' coping styles and the respond to disease.[26]

Also, depression was associated with female gender. Women are more likely to hold the burden of family environments or fear for fertility issues. In the vulnerable population of renal recipients, women express more depressive affect, anxiety, and personality disorder.[28] Similarly, Dobbels et al.,[14] showed that female gender was associated with depression plus white race, diabetes mellitus as primary cause of kidney disease, years on dialysis before transplantation (more than 3), obesity, donor age of 65 years or older and the more recent transplantation.

According to descriptive results, deceased donor was accounting for 40.7% of transplantation cases while in the study conducted by Lopes et al.,[22] all donors were family members of the recipient: predominantly siblings, followed by the mother, father and daughter. Due to organs shortage, living donors have become more prominent in transplantation settings, thus reducing the wait time in lists.[18] More than 27.000 living-donor kidney transplantations take place annually across developed and developing countries.[29]

In the literature is cited that psychosocial functioning among recipients from deceased and living donors may differ. For example, recipients from living donors feel guilty towards them since this decision may endanger their health but they enjoy better quality of life and societal participation within first years after transplantation compared to those of deceased donors.[30,31] Notably, in the present study no association was found between living or deceased donors and levels of anxiety and depression.

CONCLUSIONS

Results showed that women, participants with comorbidity, those being enough informed, those who considered themselves anxious or were very anxious about

graft rejection, experienced anxiety. Depression was associated with female gender and primary level of education.

Early identification of risk factors associated with anxiety and depression in transplant recipients will enable the development of appropriate protocols for screening transplant candidates.

In clinical practice, applying a self-report scale following kidney transplantation may be a simple way to detect anxiety and depression and potentially influence clinical outcomes among recipients.

In post-transplant patients, understanding of factors associated with depression and/or anxiety could provide the foundation necessary for identification of patients for whom mental health care is critical, and for studies exploring interventions to minimize the impact of depression and anxiety.

Study Limitations

Some limitations of the study must be acknowledged. First, convenience sampling is one of the limitations because this method is not representative of all patients in Greece. Furthermore, there was no follow-up measurement on the same patients which might permit evaluation of possible changes in all dimensions (anxiety, depression).

The sample size was relatively small although many significant associations were observed. Self-report questionnaires are not considered precise to make a diagnosis of anxiety/depression but they are only additive to psychiatric evaluation.

The strength of the present study was the use of HADs scale, a self-report measure, to assess anxiety/depression. HADs scale has been widely used to evaluate the presence and severity of depression in clinical and research settings. The use of widespread instruments permit comparisons among kidney populations across the world.

All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards

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