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Psychiatric Problems, Quality of Life, and Compliance in Patients Treated with Haemodialysis and Renal Transplantation

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SUMMARY:

Objective: The major goal of this study was to compare the results of psychiatric morbidity and quality of life evaluations in haemodialysis patients and renal transplantation recipients. Additionally, it aimed to discuss risk factors for psychiatric morbidity, quality of life, and medical compliance of these patients in the light of a review of the literature.

Methods and Materials: In this study, the following assessment instruments were used: Hospital Anxiety and Depression Scale (HADS); Short Form-36 (SF-36); Rotter's Internal-External Locus of Control Scale; Scale for Compliance of Renal Transplantation Recipients; Questionnaire for Sociodemographic and Health Information. These instruments were employed to gather data from 34 patients treated with haemodialysis and 30 renal transplantation recipients for a minimum of 5 years.

Results: It was reported that insufficient or no information had been given to 26.6% percent of renal transplantation recipients by their doctors before transplantation. According to 46.6% of the patients' relatives, the level of patients' treatment compliance behavior was good (in the methods section there was no mention of data collection from patient relatives). Lower education levels of the patients was predictive of high scores above the cut-off point of the depression subscale of HADS; patient group (renal transplantation recipients), lower depression-anxiety levels, higher scores for internal locus of control, and marital status (married versus unmarried) predicted better quality of life.

Conclusion: Findings of this study suggest that more sophisticated psychosocial interventions that focus on haemodialysis and renal transplantation patient quality of life, mental health, and treatment compliance are necessary.

Key Words: Haemodialysis, renal transplantation, psychiatric morbidity, quality of life, compliance

INTRODUCTION

Psychiatric problems, quality of life, and compliance in end-stage renal failure patients

It was reported that the incidence of some psychiatric disorders such as depression and anxiety increased in patients who were being treated with haemodialysis due to end-stage renal failure (ESRF), which led to 1.5-3 times more hospitalizations than ESRF patients without any psychiatric disorder (Kimmel et al. 1998). According to a study of 5,356 haemodialysis patients in 253 treatment centers in the USA and Europe, depression was found 20% of the patients according to medical records (Lopes et al. 2002). It was found that depression was more prevalent in females, young people, and Caucasians; less prevalent in married, employed and student patients; as the duration of haemodialysis increased, the rate of accompanying physical disorders in patients with depression were found higher than in patients without depression. In a 4-year follow-up study on haemodialysis patients, the incidence of psychiatric disorders was found to be 11% (Fukunishi et al. 2002), while in another study in which 20 haemodialysis patients were compared both to 20 patients who were hospitalized in orthopedics clinics and with 20 healthy controls using structured diagnostic tools, the rate of psychiatric disorder diagnosis, according to DSM-III-R, was found to be significantly higher (55%) in the haemodialysis patients (Aghanwa and Morakinyo 1997). In the latter it was also found that the most common diagnoses were major depression episode (35%) and generalized anxiety disorder (20%), and the only sociodemographic

variable related to psychiatric morbidity was the level of education; lower education levels corresponded to higher risks of psychiatric disorder.

Although it has been reported that accompanying psychiatric disorders negatively affect the clinical course and the rate of morbidity and mortality in ESRF (Kimmel et al. 2000), this has not been confirmed by recent studies (Revuelta et al. 2004; Kimmel and Peterson 2005). Studies examining the quality of life of ESRF patients revealed that this variable strongly and independently predicts mortality and hospitalization (Knight et al. 2003, Lowrie et al. 2003). In a study of 82 patients who were receiving haemodialysis for an average of 6 years (Covic et al. 2004), it was detected that each 1-point improvement in the physical and psychiatric parts of the Short Form-36 (Ware et al. 1993) led to a 2% decrease in the mortality and hospitalization rates. On the other hand, it was also found that as a result of having knowledge of the chronic course of the disease individual control over the disease increased and emotional reaction levels decreased. In a study of 49 patients from 5 different treatment centers in which the perceived level of control of the patients was evaluated by a 6-item form and their compliance to treatment was evaluated by their weight gain between haemodialysis sessions (Cvengros et al. 2004), it was shown that a decrease in the perception of control led to a decrease in compliance with treatment.

The results of studies in Turkey indicate that psychiatric disorders, mostly depressive disorder and generalized anxiety disorder, are common in ESRF patients, although these results vary depending on the research methods and diagnosis techniques (Sağduyu and Erten 1998, Sağduyu and Özel 2000, Soykan et al. 2004, Taşkapan 2005). A study of 40 haemodialysis patients in Turkey in which the patients were given mental health screening questionnaires (The Hamilton Depression Rating Scale, Hamilton Anxiety Rating Scale and Primary Care Evaluation of Mental Disorders, The Mini Mental State Examination and Short Form-36) revealed that there is no relationship between psychological disorders and sociodemographic variables, treatment duration and serum levels of albumin, potassium, and phosphor; moreover, the patients who had psychological disorders also had low quality of life scores and interdialytic weight gain (Taşkapan et al. 2005). In another Turkish study (Akman et al. 2004), 88 renal transplant patients were given Beck Depression Inventory and the rate and severity of depression was found to be lower in married patients, and the severity of depression was observed to decrease as time passed following organ rejection.

Psychiatric problems, quality of life, and compliance in renal transplantation patients

It has been reported that psychiatric morbidity is high in renal transplantation patients (Cameron et al. 2000, Matas et al. 2002). Despite a report that anxiety complaints continued for a long time in more than half of the cases (Sensky 1989), there is an other paper stating that anxiety is seen in 2/3 of all patients, however it is short-lived and usually related to concerns about rejection during the early postoperative period (Baines et al. 2002).

Another commonly reported psychological disorder in patients is depression (Schlebusch et al. 1989, Sensky 1989), and an increase in depression score leads to a decrease in treatment compliance (Kiley et al. 1993), an increase in the risk of organ rejection (Surman 1989), and deterioration in quality of life (Cameron et al. 2000, Matas et al. 2002).

The results of studies on psychological morbidity and related sociodemographic-health variables, which were performed on renal transplantation patients in Turkey, can be summarized as follows: in a study of 40 patients who had renal transplantation an average of 5 years before being queried (Arapaslan et al. 2004), the constructed diagnostic tools revealed any psychological disorder and major depression in 50% and 25% of the patients respectively, according to DSM-IV diagnostic criteria. No difference was detected regarding sociodemographic variables, ESRF, and post-operative duration between the groups that had and did not have psychological disorder; in a study by Akman et al. (2004) of 88 patients that were given Beck Depression Inventory, the depression rates in transplanted patients (who received their transplant an average of 38 months before being given the questionnaire), haemodialysis patients who had chronic rejection, and patients who were on the waiting list for renal transplantation were 22.2%, 61.3%, and 40%, respectively.

In retrospect, it can been seen that various results have been obtained in a limited number of

Table 1. The Sociodemographic and Health Features of the Study Patients.

	Number	%	p
Gender			
Haemodialysis patients			
Female	13	38.2	0.140
Male	21	61.8	
Transplantation patients			
Female	17	56.7	
Male	13	43.3	
Marital status			
Haemodialysis patients			
Married	21	61.8	0.885
Other	13	38.2	
Transplantation patients			
Married	18	60.0	
Other	12	40.0	
Occupation			
Haemodialysis patients			
Yes	24	73.5	0.424
No	10	26.5	
Transplantation patients			
Yes	19	63.3	
No	11	36.7	
Income level			
Haemodialysis patients			
Under 200 YTL	9	17.6	0.71
200-500 YTL	12	35.2	
Over 500 YTL	13	47.2	
Transplantation patients			
Under 200 YTL	8	26.6	
200-500 YTL	8	26.6	
Over 500 YTL	14	46.8	
Other chronic physical diseases			
Haemodialysis patients	12	35.3	0.092
Transplantation patients	5	16.7	
Sexual problem			
Haemodialysis patients	5	55.6	-
Transplantation patients	24	80.0	

studies regarding the psychological morbidity, quality of life, treatment compliance, and related demographic-health variables in ESRF and transplanted patients. The aims of this study were to overcome the methodological problems of the reviewed studies and to pave the way for future studies comparing psychological morbidity and quality of life levels, as well as determining the factors contributing to psychological morbidity, quality of life, and treatment compliance in this

Table 2. Preoperative Information-Expectation Features of the Renal Transplantation Patients and Evaluation of the Scale for Compliance of Renal Transplantation Recipients.

	Number	%
Preoperative information		
No	3	10.0
Yes, insufficient	6	16.6
Yes, sufficient	21	73.4
Reason for transplantation request		
Relief from haemodialysis	12	40,0
Being more healthy and vigorous	8	26.6
To be able to work, go back to work	3	10.0
Other	7	23,4
SCRTR (number and ratio of patients who have good- better-perfect compliance to treatment)*		
To dietary restriction		
According to patient	20	66.0
According to patient's relative	17	56.6
To medical treatment		
According to patient	28	93.3
According to patient's relative	21	70.0
To appointments with doctor		
According to patient	28	93.3
According to patient's relative	22	73.3
To medical advise		
According to patient	23	76.6
According to patient's relative	14	46.6
General evaluation**		
According to patient	26	86.6

* 15 partners (30%), 6 parents (20%), and 9 other relatives evaluated the patient's compliance to treatment

** There is no relative who completed the general evaluation section.

patient group.

METHOD

Sample Group

Study participants included 64 patients who had haemodialysis for 5 years or more and patients who had renal transplantation that were recruited between September 2002 and September 2003. The first 35 patients were selected from the records of the haemodialysis unit of a university hospital dating from 1997 and earlier. They were asked to complete the research scales on the days that they came to hospital for haemodialysis. Similarly, the first 35 patients who had renal transplantation before 1997 were selected from hospital records; the research scales were sent to them via mail, and their relatives were asked to fill them out and send

Table 3. The Ratio of Patients From Both Study Groups That Were Over the Threshold According to the Hospital Anxiety and Depression Scale (HAD).

	Depression, number of cases over the threshold	%	Anxiety, number of cases over the threshold	%
Haemodiylis patients	14	41.2	4	11.8
Transplantation patients	11	36.2	6	20.0
	0.712[a]		0.82[b]	

a: chi-square= 0.136, b: chi-square= 0.365.

them back. Thirty-four out of 35 patients in the haemodialysis group and 30 of the 35 patients and their relatives in the transplantation group agreed to participate in the study and completed the research forms.

Tools

Sociodemographic and Health Data Form (SHDF), Scale for Compliance of Renal Transplantation Recipients (SCRTR), Hospital Anxiety and Depression Scale (HAD) (Aydemir et al. 1997, Zigmond and Snaith 1983), Short Form-36 (SF-36, Koçyiğit et al. 1999, Ware et al. 1993), and Rotter's Internal-External Locus of Control Scale (RIELCS, Dağ 1991, Rotter 1966) were used in the study.

SHDF is a 16-item, multiple-choice questionnaire, which was constructed for this study and aims to determine patient sociodemographic, physical health, and renal transplantation information-expectation levels.

RTCES is a 5-item questionnaire in which a transplantation patient and his/her relative rate patient compliance to diet, medications, appointments, and compliance to medical recommendations and compliance in general as bad/moderate/good/very good/perfect/no idea.

HAD is a self-evaluation scale, which was developed to determine the risk of and level of anxiety and depression in patients with physical disorders; seven questions each about anxiety and depression are answered using a 4-point Likert scale.

SF-36 is a Likert-type self-evaluation scale designed to evaluate quality of life. It has 36 items that evaluate 8 dimensions (physical function, social function, role constraints dependent on physical problems, role constraints dependent on emotional problems, mental health, energy/vitality, pain, and general health perception). For each dimension, scores of related items are coded according to responses; 0 corresponds to the worst, and 100 points corresponds to the best quality of life

RIELCS is a self-evaluation scale with 29 questions, each with two possible answer choices, which aims to determine to what extent the confirmatory expectations of patients following their attitudes are effected by themselves (internal control) and by external forces (external control) like luck, fate, etc. The score range is 0-23, and higher scores represent belief in an external locus of control.

Statistical evaluation

SPSS-PC statistics program was used for the statistical evaluation of this study. In comparing the groups, chi-square test for the categorical variables, and t-test and covariance analysis for continuous variables were used. For determination of the variables, which predicted the level of general compliance, mental health, and quality of life, logistic and multiple regression analyses were performed.

RESULTS

The sociodemographic and health features of the sample group

In the haemodialysis group of 34-patients, the average age and years of school attended were 45.7±1-4.6 years and 8.9±4.4 years respectively, while they were 35.8±10.4 years and 8.3±4.8 years, respectively, in the renal transplantation group of 30 patients. The averages for the dura-

Table 4. Scores for Short Form-36 (SF-36) and Rotter's Internal-External Locus of Control Scale (RIELCS).

	Haemodialysis patients ave. ± sd		Transplantation patients p ave ± sd		
SF-36: physical health*					
Being physically functional	20.8	7.2	26.2	3.3	0.013[a]
Physical role	5.7	1.9	6.6	1.6	0.033[b]
Physical pain	6.9	2.7	8.8	2.2	0.002[c]
General health	15.4	5.5	19.2	5.2	0.001[d]
Total	47.4	15.2	60.7	10.4	0.001[e]
SF-36: psychological health *					
Vitality	12.7	5.0	15.7	4.3	0.001[f]
Social functioning	6.0	2.7	7.9	1.9	0.008[g]
Emotional role	4.9	1.3	4.9	1.2	0.181
Mental health	16.0	7.1	19.6	4.2	0.006[h]
Total	36.6	15.9	47.9	9.9	0.010[ı]
RİELCS**	44.5	8.4	42.2	6.9	0.877

* Covariates for the covariance analysis: sociodemographic features, duration of renal failure, other chronic diseases, HAD depression and anxiety subscale scores, and RIECSS score.
** Covariates for the covariance analysis: sociodemographic features, duration of renal failure, other chronic diseases, and HAD depression and Anxiety subscale scores.
a: F = 2.770, df =12; b: F = 2.339, df = 12; c: F = 4,059, df = 12; d: F = 7.241, df = 12; e: F =5.217, df =12; f: F=5.369, df=12; g: F=3.100, df=12; h: F=3.198, df=12; ı: F=2.950, df=12

tions of renal failure and dialysis in the haemodialysis group were 13.1±5.2 years and 9.5±3.9 years, respectively, while they were 12.4±5.3 years and 8.9±4.0 years, respectively in the renal transplantation group. It was detected that the patients had transplantation operations an average of 7.3±3.2 years before the study began. Other sociodemographic and health features of the sample group are provided in Table 1. When the responses of the questions about chronic physical diseases were analyzed, it was found that hypertension, anemia, heart failure, gastritis, and rheumatism were present in the study population. There was a statistically significant difference between the average ages of the two groups (t=1.561, p=0.004); no significant difference was found between the groups in terms of other sociodemographic and health variables. Statistical analysis could not be performed on the question about sexual problems since only 9 dialysis patients (26.5%) replied to the question.

Evaluations of preoperative information, expectation, and SCRTR in renal transplantation patients: The variables which predicted the general compliance level

Information, expectation, and SCRTR evaluation results of 30 patients who underwent renal transplantation are shown in Table 2.

In order to examine the factors related to and predictive of general compliance, chi-square, t-test, and logistic regression analyses including sociodemographic and preoperative information features, durations for the diagnosis of renal failure and time of renal transplantation, existence of other chronic diseases, quality of life, locus of control, and mental health score variables, were done. The only statistically significant relationship was with education; the average total years of education of the patients who evaluated their general compliance as "perfect, very good, and good" was higher than those who evaluated their compliance as "moderate or bad" (average years of education: 9.3± 4.2 years and 2.7±4.6 years; t= -2,555, p= 0.18). However, according to the results of logistic regression analysis, there was no variable that

Table 5. The Sociodemographic and Health Variables that Predicted the Quality of life According to the Short Form-36 (SF-36) Scores.

	Non-standardized Coefficients B Standard error		Standardized Coefficients Beta	T	P
SF-36 physical health total score*					
1. Patient group	16.214	3.243	0.567	4.999	0.001
2. Marital status	10.66	3 3.711	0.349	2.874	0.007
3. HAD depression score	-1,277	0.445	-0.32	-2.867	0.007
4. RİELCS score	-0.903	0.421	-0.240	-2.145	0.039
SF-36 psychological health total score*					
1. Patient group	107.107	3.345	0.429	3.619	0.001
2. HAD anxiety score	-2.020	0.424	-0.564	-4.758	0.001

*Independent variables for multiple regression analysis: sociodemographic features, duration of renal failure, patient group (haemodialysis or transplantation), other chronic diseases, HAD depression and anxiety subscale scores, and RIELCS score.

significantly affected the level of general compliance.

The ratio of patients who were over the threshold in the depression and anxiety subscales and the variables that predicted the level of mental health

The ratio of patients who were over the threshold of the HAD depression subscale was 41.2% (14/34 patients) in the haemodialysis group and 36.7% (11/30 patients) in the transplantation group; the ratio of the patients who were over the threshold of the anxiety subscale was 11.8% (4/34 patients) in the haemodialysis group and 20% (6/30 patients) in the transplantation group. There was no statistically significant difference between the two groups in terms of being over the threshold; results are provided in Table 3.

In terms of being over the threshold in the HAD depression subscale, among variables such as sociodemographic features, patient group (haemodialysis or transplantation), other chronic diseases, and RIELCS scores, the only significant predictor was the duration of education. It was found that fewer years of education predicted passage through the threshold of the depression subscale (B=-0,1214, SE=0,0625, df=1, R=-0.1484, Exp B=0,88578, p=0,0522). No significant predictive variable was detected for the threshold of the anxiety subscale.

SF-36 and RIELCS scores: Variables that predicted the quality of life according to SF-36 scores

The average total score that was taken from the items of SF-36, which evaluates physical health, was 47.4±15.2 in the haemodialysis group and 60.7±10.4 in the transplantation group; the difference between them was statistically significant (F=-5.217 df=12, p=0.001). The average total score that was taken from the items of SF-36, which evaluates psychological health, was 36.6±15.9 in the haemodialysis group and 47.9±9.9 in the transplantation group; the difference between them was statistically significant (F=2.950, df=12, p=0.010). The average score according to RIELCS was 44.5±8.4 in the haemodialysis group and 42.2±-6.9 in the transplantation group; the difference between them was not statistically significant.

The sociodemographic and health variables of SF-36 that predicted the physical health total score are the patient group, marital status, HAD depression score, and RIELCS score. It was found that being in the transplantation group, unmarried, lower depression score, and increased belief in the internal locus of control led to better quality of life. The variables that predicted the mental health total score were the patient group and HAD anxiety score. It was detected that being in the transplantation group and a lower anxiety score was predictive of a higher quality of life score.

DISCUSSION

It was reported that approximately 50% of ESRF patients have sexual function disorders (erectile dysfunction in men and stimulation and orgasm disorders in women), comorbid depression increases the rate of sexual function disorders, and that the duration of dialysis has no effect on sexual functions (Soykan et al. 2005). Psychological problems, drug side effects, a decrease in both penile vascularity and cavernous muscular response to neurotransmitters, and endocrinological factors are considered in the etiology of sexual function disorders (Aulakh et al. 2003, Raiz et al. 2003). It was detected that after renal transplantation, particularly in patients who are less than 40 years old, erectile dysfunction could continue in 20-50% of the patients (Lasa-ponara et al. 2004) despite improvements in sexual functioning (Tsujimura et al. 2002, Aulakh et al. 2003). In our study, 80% of the patients who had transplantation an average of 7.3 years before the study began complained about sexual functioning, which is consistent with the results of the studies reporting the fact that sexual function disorders usually continue after the transplantation (actually your study results exceed the cited 20-50%). A comparison of the haemodialysis group could not be done because of the small number of patients who answered the questions about sexual functioning. On the other hand, more than 1/3 of the haemodialysis group and 1/6 of the transplantation group reported that they have accompanying chronic physical disorders. Apart from patient declarations, studies with samples that are highly representative, and supported by objective examinations and laboratory findings will be helpful in evaluating the effects of ESRF and transplantation on sexual functioning in terms of psychosocial and physical dimensions.

Considering both the time that haemodialysis takes away from a patient's professional and social life and the constraints produced by the fluctuations in the level of toxic substances within a patient's blood biochemistry, transplantation preference is the expected option in more than 3/4 of all patients with the aims of " being free from haemodialysis, and being more vigorous or able to work".

In both study groups, the ratio of the patients who were over the HAD depression subscale threshold was 40%, while it was between 12% (haemodialysis) and 20% (transplantation) on the HAD anxiety subscale, and there was no significant difference between the groups. Although there has been no clear data in the literature regarding the frequency of psychological disorders in ESRF patients, the frequency of depression was reported to be between 5% and 30%, depending on the procedure of diagnosis, interview scale, and sampling selection (Tossani et al. 2005, Kimmel and Peterson 2005). Results of the studies performed with constructed diagnostic tools had lower ratios than those obtained from mental health screening questionnaires; for instance the ratio of depressive episodes and generalized anxiety disorder according to ICD-10 in haemodialysis patients was reported as 13% and 7%, respectively (Sağduyu and Özel 2000). In some other studies, again performed with constructed diagnostic tools, the rate of major depression episodes and generalized anxiety disorder according to DSM-IV in haemodialysis patients was 35% and 20%, respectively (Akhanwa and Morakinyo 1997), while the rate of mental disorders and major depression according to DSM-IV in transplantation patients was 50% and 25%, respectively (Arapaslan et al. 2004). HAD, which was used for psychological evaluation in this study, was developed to detect the risk of and level of anxiety and depression in patients with physical disease. Although it was not a constructed diagnostic tool, excluding the physical symptoms such as anorexia, sleep disorders, and fatigue, which are seen in chronic physical diseases, evaluation of psychology with its emotional and cognitive components decreased the probability of false positive diagnosis of mental disorder. However, prospective studies, which use constructed diagnostic tools and reliable diagnostic systems to minimize methodological problems, and which comprise both the pre- and post-operative follow-up periods are needed.

The only effective variable in terms of passing the threshold in the HAD depression subscale was less formal education. This finding, which is consistent with the literature (Aghanwa and Morakinyo 1997), may reflect the recognition of the chronic course of the disease and the positive changes in the psychological adaptation process, both in haemodialysis and transplantation patients. There was no variable predicting anxiety disorder; results of the previous studies concluding that

shorter disease period, sociodemographic features such as being male, married, aged, and working, as well as fewer accompanying diseases decreasing the depression rate were not confirmed (Lopes et al. 2002). On the other hand, another interesting finding of the present study was the absence of statistical significance between the haemodialysis and transplantation patient groups in terms of psychiatric morbidity. However, since the scales that were used in this study highlight "higher probability of mental disorder" rather than "absolute mental disorder" it would be more appropriate to interpret the results cautiously and to conduct additional studies on the subject.

The results obtained from the items of SF-36 related to physical and mental health revealed that the quality of life of transplantation patients was better than that of the haemodialysis patients, both physically and psychologically. This result is consistent with the literature in that the quality of life evidently increases after transplantation, particularly in young, male haemodialysis patients who have less comorbid physical disease (Franke et al. 2003, Johnson et al. 1998, Jofre et al. 1998). When these results are evaluated together with those of other studies that have concluded that lower cognition of quality of life in haemodialysis patients increases the rate of morbidity and mortality, the importance of organ donation becomes clear. It was determined that being in the transplantation group and unmarried, a lower depression score, and a higher score of internal locus of control led to better quality of physical life for the patients in the transplantation group, while a lower anxiety score predicted a better quality of psychological life. The positive effects of increased perception of internal control and being unmarried on the quality of life, free from other variables, is an interesting finding worthy of additional study. On the other hand, it was seen that as psychological morbidity decreased, the quality of life increased in both study groups, as it is the case found in studies with healthy groups.

According to the evaluation of the patients and their relatives (half of them were spouses) of the level of treatment compliance, the following results were found: compliance to drugs and appointments (perfect, very good, and good) 70-93%; compliance to dietary restrictions 60%; compliance to physician's recommendations 77% (patient) and 47% (relative). The rates of compliance, which were close to and over 2/3, particularly in the evaluations of the patients, and the "perfect, very good, and good" ratings of the patients about their general compliance levels may seem optimistic. Taking into consideration the results of studies examining the role of patient treatment compliance on the success of the postoperative period (Jindel et al. 2003, Rapisarda and Tarantino 2004), and regarding the fact that the ratings of the relatives in our study were worse than those of the patients, new studies that evaluate treatment compliance with more objective criteria such as reliable patient records, blood biochemistry, and weight control will be helpful.

Although it was found that there was a significant relationship between the legnth of formal education and sociodemographic, health, and being informed about the illness variables, higher average years of education, was related to greater general patient compliance; the regression analysis results yielded no statistically significant predictive variable. This result did not confirm the previous studies, which concluded that psychological problems (depression, anxiety, substance usage, hostility, lack of coping abilities, and avoidant personality features), some demographic features (being young, female, and unmarried), and insufficient information and social support negatively affect the compliance to therapy (Jindel et al. 2003, Rapisarda and Tarantino 2004). This may have been due to the lack of objective criteria for evaluation of compliance. On the other hand, more than ¼ of the study patients declared that they were insufficiently informed or not informed at all before the transplantation operation. These high ratios of not being sufficiently informed were dependent upon patient declarations, however, considering the data in the literature showing that insufficient or false preoperative information negatively affects the postoperative compliance to therapy, it is obvious that there is a need to perform new studies using more detailed and reliable procedures and for the development of psychosocial support programs in order to increase the preoperative information and treatment compliance.

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