

Evaluation of Anxiety, Self-Management and Compliance with Immunosuppressive Therapy in Kidney Transplant Recipients

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Objective: The aim of this study was to evaluate anxiety, self-management and treatment adherence in kidney transplant recipients.

Materials and Methods: The participants consisted of 29 people who applied to the Organ Transplant Center at Gaziantep University between April and June 2023 and were voluntary to participate in the study.

Results: Severe anxiety was observed in all participants. The self-management of kidney transplant recipients had a direct correlation with early detecting and coping with abnormalities after kidney transplantation, self-care behavior in daily life and stress management, and finally self-monitoring. Also, their self-management had a direct correlation with early detecting and coping with abnormalities after kidney transplantation in terms of adherence to immunosuppressive therapy ($p<0.001$).

Conclusion: This study revealed that all participants suffered from severe anxiety and that kidney transplant recipients on immunosuppressive therapy lacked medication adherence and self-management.

Keywords: Kidney transplantation, Anxiety, Self-management, Immunosuppressive therapy adherence

1. INTRODUCTION

Kidney transplantation refers to the process of transferring a kidney from a cadaver or living donor to a recipient with impaired renal function.¹ Kidney transplantation can be provided from living donors and cadaver donors.²

Although kidney transplantation is preferred for its advantages such as decreased mortality, enhanced quality of life, reduced risk of cardiovascular diseases, reduced overall cost, and more independence in daily life, the transplantation procedure is a psychologically demanding process.^{3,4} Anxiety is one of the most common mental disorders that appears most frequently in kidney transplant recipients during the transplantation process. Anxiety refers to the Latin word for a narrow passage involving feelings of fear, anxiety, and distress.⁵ The main characteristic is to be overly anxious and delusional (worrying about some bad possibilities about a certain matter). Although they describe their delusions as 'overly', they claim that they feel distressed and overwhelmed due to their inability to control their sadness or their reduced

functioning in social, occupational, or other important domains of functioning.⁶

On the other hand, the multifaceted and complex patient care after transplantation makes it difficult for transplant recipients to adapt. While caring for the transplant recipient, it is necessary to focus not only on renal functions but also on the clinical state overall.⁷ It may be possible for kidney transplant recipients to assume responsibility for protecting and improving their health after the transplantation with their active participation in care and self-management.⁸ When self-management is conceptually considered, it has been emphasized that it involves specific contents, such as the ability of individuals to actively participate in their care in matters related to emotional, behavioral, roles, and treatments.⁹ Individuals assume many self-management responsibilities for adherence, such as infection control, follow-up of vital signs, medication intake, symptom management, avoidance of sunlight, physical exercise, a healthy diet, attendance at check-ups, emotional management, adaptation to a new lifestyle, and cessation of use of harmful

substances such as smoking.¹⁰ Other elements covered by self-management include solving problems, making decisions, utilizing resources, collaborating with caregivers for information, planning action, and self-adaptation.^{10,11} It appears that individuals who display high levels of self-management achieve the desired outcomes, and those who adopt better self-management behaviors engage in greater physical activity and enjoy a better quality of life. Moreover, physical activity affects long-term medication adherence in kidney transplant recipients.¹²

Immunosuppressive therapy in kidney transplantation is named as induction, continuous use, maintenance therapy, and rejection therapy according to the intended use. Induction therapy involving biological agents is administered to all kidney transplant recipients.¹³ Long-term immunosuppression treatment prevents both impairment of graft function and acute rejection. Treatment can be initiated during or after the transplantation.¹⁴ It appears that there is a strong correlation between the physiologic state of the individual and non-adherence, and as the physiologic state improves, the level of adherence rises. It has also been reported that introversion and anxiety are among the factors that affect adherence.¹⁵ Self-management is correlated with medication non-adherence.¹⁶

The aim of this study is to assess anxiety, self-management, and treatment adherence in kidney transplant recipients.

2. MATERIALS AND METHODS

2.1. Design of the study

The study was conducted with descriptive cross-sectional design and using quantitative method.

2.2. Population and sample

The participants consisted of 29 people who applied to the Organ Transplant Center at Gaziantep University between April and June 2023 and were voluntary to participate in the study. The inclusion criteria were determined as follows: being over 18 years, undergoing at least one kidney transplantation, having more than six months after transplantation, and literate. The individuals who had cognitive-sensory

disabilities, were diagnosed with psychiatric disorders, were substance users, participated in any psychological counselling group, and suffered from a loss at least six months ago were excluded from the study. There weren't any foreign patients and all patients were Turkish. Fourteen of the patients were preemptive transplants. Could anxiety symptoms have led to more adverse outcomes in patients on longer dialysis. The data were collected through non-probability and convenience sampling method.

2.3. Ethical considerations

Approval was obtained from the Non-Invasive Clinical Trials Ethics Committee of Gaziantep Islamic Science and Technology University and the participants were informed in accordance with the principles of the Declaration of Helsinki (2023/200). Permission was obtained from the authors, who conducted the validity and reliability study of the assessment tools.

2.4. Data collection tools

The questionnaire consists of four sections.

Individual Information Form: The form consisted of questions about some socio-demographic characteristics and the processes of the disease.

Beck Anxiety Inventory (BAI): This is a self-report inventory developed by Beck et al., (1988) and is used to determine the frequency of anxiety symptoms experienced by individuals. BAI is a four-point Likert-type inventory with 21 items. Ulusoy et al., (1998) conducted the validity and reliability study of the inventory in Türkiye.¹⁷ 0–7 points on the inventory is rated as minimal anxiety; 8–15 points as mild anxiety; moderate anxiety as 16–25 points; and severe anxiety as 26–63 points. Total score of the inventory ranges between 0 and 63 points, and the higher the score, the higher the severity of the anxiety that the individual suffers from. Its validity study, the Cronbach's alpha value of the inventory was reported to be .94. In the present study, its Cronbach's alpha value was determined as .87.

Self-Management Scale for Kidney Transplant Recipients (SMKTR): Kosaka et al., developed the Self-Management Scale for Kidney Transplant Recipients in 2013.¹⁸ This Likert-type scale

consists of 13 items. The scale items are rated as 1 point for “never,” 2 points for “rarely,” 3 points for “quite often,” and 4 points for “completely”. The Turkish validity and reliability study of the scale was conducted by Çetin et al., and the Cronbach’s alpha reliability coefficient for internal consistency was 0.73, and the Cronbach’s alpha reliability coefficient of the subscales ranged between 0.51-0.67.¹⁹ The subscales of the three-factor scale are “early detecting and coping with abnormalities after kidney transplantation”, “self-care behavior in daily life and stress management”, and “self-monitoring”. In the present study, the Cronbach’s alpha reliability value of the scale was found to be .67.

Immunosuppressive Therapy Adherence Scale (ITAS): Chisholm et al., developed the scale in 2004 to assess adherence to immunosuppressive therapy following organ transplantation.²⁰ Bahar Bayhan conducted the Turkish validity and reliability study of the scale in 2004.²¹ The scale consists of four items that examine the adherence to immunosuppressive treatment of patients after organ transplantation during the last three months. The scale items are rated using a 4-point Likert-type scale.

Table 1.

Some Socio-demographic characteristics of the participants

Characteristics		n	%
Age range	22-35 years old	6	20.7
	36-65 years old	21	72.4
	66 years and older	2	6.9
Gender	Female	10	34.5
	Male	19	65.5
Occupation	Housewife	10	34.5
	Worker	5	17.2
	Self-employed	11	37.9
	Retired	3	10.4
Educational level	Literate	4	13.8
	Primary school	16	55.2
	Secondary school	8	27.6
	High school	1	3.4
Marital status	Single	3	10,3
	Married	26	89,7
Perception of income level	Income more than their expenses	14	48.3
	Income less than their expenses	15	51.7
Chronic disease	Available	13	44.8
	None	16	55.2

Footnote: n: Number of participants; %: Percentage.

For responses to the questions on the scale, 3 points are assigned to the organ recipient for responses of 0%, 2 points for responses of 1-20%, 1 point for responses of 21-50%, and 0 point for responses of >50%. The total score of the scale varies between 0 and 12 points. A higher score indicates a higher level of adherence. In its validity and reliability study, the internal consistency reliability coefficient of the scale was reported as 0.65, and in the present study, Cronbach’s alpha value was found to be 0.85.

2.5. Data analysis

The SPSS-21 software was used to analyze the data. The numbers and percentages are provided. Since the number of participants was below thirty, non-parametric analyses were done. A Spearman’s correlation analysis was done between quantitative variables. $p < 0.05$ was considered as the statistical significance level.

3. RESULTS

The mean age of the participants was 44.59 ± 12.51 years (Min-Max: 22-73, Median: 44). Table 1 shows some of the characteristics.

All the participants stated that they received transplants from living donors. The rate of those who reported a consanguinity relationship between the donor and the recipient was 79.3%. The leading cause of the transplantation was hypertension (10 people, 34.5%). This was followed by proteinuria (4 persons, 13.8%) and diabetes (2 persons, 6.9%). Seven participants reported that its etiology was unknown (24.1%).

The etiological causes reported were hypertension and diabetes mellitus, nephrotic syndrome, horseshoe kidney, IGA-induced complaints, kidney calculi, and medication, one in each person (3.4%).

Table 2 shows the descriptive statistics of the scales. All of the participants suffered from severe anxiety.

Table 2.

Descriptive statistics of the scales

	Mean± SD	Median	Min	Max.	95% CI
1. Beck Anxiety Inventory (BAI)	47.55 ± 7.18	48.00	34.00	60.00	44.81-50.28
'Somatic/Physical' subscale	25.58 ± 4.63	27.00	17.00	33.00	23.81-27.34
'Cognitive' subscale	21.96 ± 3.16	22.00	14.00	28.00	20.76-23.17
2. Self-Management Scale for Kidney Transplant Recipients (SMSKTR)	42.03 ± 3.26	42.00	36.00	51.00	40.79-43.27
Early detecting and coping with abnormalities after kidney transplantation (EDCA)	21.03 ± 1.40	21.00	18.00	23.00	20.50-21.56
Self-care behavior in daily life and stress management (SDSM)	13.62 ± 1.39	13.00	12.00	16.00	13.08-14.15
Self-monitoring (SEM)	7.37 ± 1.65	7.00	5.00	12.00	6.74-8.75
3. Immunosuppressive Therapy Adherence Scale (ITAS)	7.68 ± 2.80	8.00	2.00	12.00	6.62-8.75

Footnote: SD: Standard Deviation; Min: Minimum; Max.: Maximum; CI: Confidence Interval; BAI: Beck Anxiety Inventory; SMSKTR: Self-Management Scale for Kidney Transplant Recipients; EDCA: Early Detecting and Coping with Abnormalities after Kidney Transplantation subscale; SDSM: Self-Care Behaviour in Daily Life and Stress Management subscale; SEM: Self-Monitoring subscale; ITAS: Immunosuppressive Therapy Adherence Scale.

There was a direct correlation between the somatic subscale and the cognitive subscale in terms of the anxiety levels of the participants in this study. Moreover, the self-management of kidney transplant recipients had a direct correlation with early detecting and coping with abnormalities after kidney transplantation, self-

care behavior in daily life and stress management, and finally self-monitoring. Also, their self-management had a direct correlation with early detecting and coping with abnormalities after kidney transplantation in terms of adherence to immunosuppressive therapy ($p<0.001$) (Table 3).

Table 3.

The correlation between the participants' scores on the scales and subscales

		Age	BAI	SP	C	SMSKTR	EDCA	SDSM	SEM	ITAS
Age	r	-								
	p									
BAI	r	.194	-							
	p	.314								
SP	r	.185	.957**	-						
	p	.337	.000							
C	r	.103	.879**	.738**	-					
	p	.596	.000	.000						
SMSKTR	r	.007	.018	.031	-.024	-				
	p	.970	.962	.874	.903					
EDCA	r	-.026	-.027	-.079	-.025	.788**	-			
	p	.895	.890	.685	.897	.000				
SDSM	r	-.146	.149	.137	.190	.640*	.352	-		
	p	.450	.441	.477	.323	.000	.061			
SEM	r	.118	.162	.217	.031	.667**	.328	.133	-	
	p	.541	.402	.257	.871	.000	.083	.491		
ITAS	r	.057	-.190	-.104	-.256	.476**	.395*	.172	.346	-
	p	.770	.323	.592	.180	.009	.034	.373	.066	

Footnote: *r: Spearman correlation coefficient; p: significance level; BAI: Beck Anxiety Inventory; SP: Somatic/Physical subscale; C: Cognitive subscale; SMSKTR: Self-Management Scale for Kidney Transplant Recipients; EDCA: Early Detecting and Coping with Abnormalities; SDSM: Self-Care Behaviour in Daily Life and Stress Management; SEM: Self-Monitoring; ITAS: Immunosuppressive Therapy Adherence Scale. *: $p < 0.05$; **: $p < 0.01$.

The gender variable was the only socio-demographic characteristic among the participants that made a difference in the BAI scores, and female participants had higher BAI scores ($p < 0.05$) (Table 4).

Table 4.

Distribution of the BAI, SMSKTR, and ITAS scores of the participants according to their socio-demographic characteristics

Characteristics		n	BAI Mean Rank*	Test and p value	SMSKTR Mean Rank*	Test and p value	ITAS Mean Rank*	Test and p value
Age range	22-35 years old	6	10.92	KW= 1.750 p= .417	13.33	KW= .963 p= .618	11.67	KW= 1.517 p= .468
	36-65 years old	21	16.07		15.88		16.17	
	66 years and older	2	16.00		10.75		12.75	
Gender	Female	10	19.50	U= 50.000 p= 0.038	14.35	U= 88.50 p= 0.764	13.45	U= 79.50 p= 0.467
	Male	19	12.63		15.34		15.82	
Occupation (n = 26)	Housewife		17.30	KW= 5.468 p= 0.065	13.15	KW= 1.228 p= 0.541	12.15	KW= 1.654 p= 0.437
	Worker	10	14.50		16.80		11.40	
	Self-employed	5	9.59		12.32		15.68	

Table 4. (Continued)

Educational Level	Literate	4	19.38	KW= 2.415 p= 0.491	16.75	KW= 3.528 p= 0.317	19.88	KW= 5.658 p= 0.129
	Primary school	16	13.13		13.09		12.16	
	Secondary school	8	15.81		16.31		16.75	
	High school	1	21.00		28.00		27.00	
Marital Status	Single	3	6.83	U= 14.500 p=0.078	13.33	U= 34.00 p= 0.719	13.33	U= 34.000 p= 0.714
	Married	26	15.94		15.19		15.19	
Income Level	Income exceeds expenses	14	12.11	U= 64.500 p= 0.076	14.89	U= 103.50 p= 0.948	16.25	U= 87.50 p= 0.435
	Income below expenses	15	17.70		15.10		13.83	
Chronic disease	Available	13	17.04	U= 77.500 p= 0.244	18.31	U= 61.00 p= 0.058	15.31	U= 100.000 p= 0.858
	None	16	13.34		12.31		14.75	

Footnote: KW: Kruskal-Wallis H test; U: Mann-Whitney U test; BAI: Beck Anxiety Inventory; SMSKTR: Self-Management Scale for Kidney Transplant Recipients; ITAS: Immunosuppressive Therapy Adherence Scale; Mean Rank: Average rank; p: Significance level.

4. DISCUSSION

Kidney transplantation is an experience that changes life positively. However, the multifaceted and complex patient care after transplantation makes it difficult for transplant recipients to adapt. While caring for the transplant recipient, it is necessary to focus not only on renal functions but also on the clinical and psychological state holistically.⁷ The behaviors and decisions of individuals during and after the transplantation process affect their health. Issues such as taking medication at the same hour every day, attending regular check-ups, recognizing early signs of rejection, monitoring side effects of medication, preventing infections, self-monitoring, and managing physical activity and diet are included in adaptation to a new life.^{22,23} Failure to follow healthcare behaviors and health-promoting recommendations is one of the most important causes of graft loss following kidney transplantation. It may be possible for kidney transplant recipients to assume responsibility for protecting and improving their health after transplantation through self-management.⁸ From this perspective, the aim of the present study, the assessment of anxiety, self-management, and treatment adherence in kidney transplant recipients, appears to be important.

The mean age of the participants in the study was 44.59±12.51 years (Min-Max: 22-73, Median: 44).

All the participants declared that they received transplants from living donors. 79.3% of the participants reported a consanguinity relationship between the donor and the recipient. The leading cause of the transplantation was hypertension (10 people, 34.5%). The results of the present study were compatible with the literature, and the sample group had similar characteristics.²⁴⁻²⁶

Anxiety is a common problem among organ transplant recipients. The risk of rejection after transplantation, the ability to get used to the medication, the risk of infection, and the fear of re-hospitalization may lead to anxiety. Furthermore, factors such as concerns about body image, social isolation, and changes in role and performance lay the groundwork for anxiety.^{24,26} It has been reported that recipients who suffer from rejection and complications within six months after organ transplantation experience elevated anxiety and depression.²⁷ Anxiety impairs the treatment adherence of patients after transplantation and raises the risk of rejection and mortality.^{26,28,29} Considering anxiety in kidney transplant recipients, the anxiety level of all participants was found to be severe. Upon the literature review, a study conducted by Lai et al., indicated that while 15.9% of the patients suffered from moderate anxiety, 25.2% of the patients suffered from severe anxiety.³⁰ In their study, Czyżewski et al.,

found that 11.3% of the patients suffered from moderate anxiety.³¹ Furthermore, it was observed that there was a direct correlation between the somatic subscale and the cognitive subscale in the anxiety levels of the participants in this study.

Non-adherence to immunosuppressive treatment in kidney transplant patients represents a major risk factor for unfavorable clinical outcomes after transplantation. Furthermore, it has been described as the second most common etiological factor for late rejection in kidney transplant patients.³² It has been reported that adherence to immunosuppressive treatment of less than 95% in kidney transplant patients constitutes a high risk for acute rejection and graft loss.³³ When assessing adherence to immunosuppressive therapy, it was found in the present study that self-management in kidney transplant recipients had a direct correlation with early detecting and coping with abnormalities after kidney transplantation ($p < 0.001$). In their study, Gorevski et al., found that awareness of physical health conditions improved recovery and adherence to immunosuppressive treatment.¹⁵ In their study, Calia et al., found that patients who suffered from anxiety and emotional problems were less adherent to immunosuppressive treatment. Furthermore, it was reported that patients who trusted themselves and had high self-confidence were more adherent to immunosuppressive treatment.³⁴

Self-management is defined as the individual's ability to self-monitor in order to maintain the prescribed treatment, prevent deterioration of health, and protect his or her function.³⁵ The present study revealed that there was a direct correlation between the self-management of kidney transplant recipients and early detecting and coping with abnormalities after kidney transplantation, self-care behavior in daily life and stress management, and finally self-monitoring. Adequate levels of self-care behaviors among recipients have a positive effect on solving problems, involving the dimensions of self-management.³⁶

When the distributions of the participants BAI, SMSKTR, and ITAS scores in terms of their sociodemographic characteristics were analyzed,

it appeared that gender variable was the only socio-demographic characteristic among the participants that made a difference in the BAI scores and female participants had higher BAI scores ($p < 0.05$). This result was considered to be due to the difficulty experienced by female patients in sustaining their lives with their maternal roles other than the disease. While the findings of some studies support the present study,^{24,26} some studies showed that there was no significant difference between gender and the analyzed criteria.^{11,18,37}

5. CONCLUSION

This study revealed that all of the participants suffered from severe anxiety and that kidney transplant recipients on immunosuppressive therapy lacked medication adherence and self-management. Based on these results,

- Kidney transplantation has become an exclusive method for the treatment of End-Stage Renal Failure. However, organ transplantation from cadavers is lower than expected in our country, and transplantation from living donors is more common. The number of patients on the waiting list for kidney transplantation is also growing day by day. Uncertainty about whether an organ will be available increases psychosocial problems in patients. The public should be informed about organ transplantation to increase the number of cadaveric transplants. Patients on the waiting list for kidney transplantation should be monitored from a psychological point of view, and if necessary, psychiatric treatment should be provided. Psychologists and psychiatrists should be available in dialysis centers.
- Although no statistically significant difference was found with the factors that are considered to affect immunosuppressive treatment adherence and self-management in the study findings, clinically significant results are believed to have been achieved. Based on these results, the identification of the factors that will affect the medication

adherence of patients and the planning of necessary interventions play an important role in determining the levels of immunosuppressive therapy adherence and the self-management of kidney transplant patients to improve medication adherence.

- Psychological conditions, immunosuppressive treatment adherence, and self-management levels of the recipients after transplantation should be evaluated periodically in transplantation centers by methods other than patient feedback (medication, psychological tests, monitoring of blood levels, etc.); possible factors that prevent such factors positively should be identified, and strategies of medication adherence and self-management should be devised.
- Future investigations should employ multicentre prospective cohort designs that follow kidney-transplant recipients from the pre- to post-transplant period under immunosuppression to generate more robust causal evidence.

Limitations

This study has several noteworthy limitations. First, it was conducted at a single center with a relatively small sample size, which restricts the external validity of the findings. Second, the absence of a control group limits our ability to draw firm causal inferences. Third, dialysis-duration data were not collected, preventing adjustment for this potential confounder in the anxiety-outcome relationship and further constraining the interpretation of our results. Future research should address these issues through larger, multicentre designs with appropriate control groups and comprehensive data collection.

Article Information Form

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Authors' Contribution

Conceptualization, A.B. (Cor. Aut.); and A.B; methodology A.B. (Cor. Aut.); and A.B; formal analysis, A.B. (Cor. Aut.); investigation, A.B; and A.B; resources; A.B; and A.B; data curation, A.B; and A.B; writing-original draft preparation, A.B. (Cor.Aut.); writing-review and editing, A.B; and A.B.

The Declaration of Conflict of Interest/ Common Interest

No conflict of interest or common interest has been declared by authors.

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No artificial intelligence tools were used while writing this article.

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