Life Quality and Compliance After Transplant: The Case of Turkey

H. Guzel[a,*] and M. Korkmaz[b]

[a]Sanko University Health Sciences Faculty Nursing Department, Turkey; and [b]Malatya Inonu University Nursing Faculty, Turkey

ABSTRACT

Objective. Chronic renal failure is one of the most significant health problems in Turkey, as it is all over the world, and negatively affects quality of life. The aim of this study is to find factors affecting compliance levels and quality of life of patients undergoing kidney transplant.

Materials and methods. The population of the study consisted of 244 patients who underwent kidney transplant. Although the study aimed to cover the entire target population in the sampling selection, it was conducted among 206 patients. The data were collected by face-to-face interview.

Results. Of the patients, 92.7% were between 46 and 59 years of age, 54.4% had a living donor transplant, 54.9% had adverse effects, and 2.9% had rejection due to incompatibility. There was a significant relationship between compliance and quality of life; increasing frequency of adverse effects would decrease in direct proportion to compliance, which would, therefore, increase quality of life. All the subscale scores of the 36-Item Short Form Health Survey were found to have an average of 60 and above. The mean of the compliance scale was 48.33 (SD, 3.21), and, with the maximum score at 55, the mean of the group was high. In our country, patients view transplant as a final and definite treatment method. This might be related to fact that the longer the time after transplant, the lower the level of compliance.

CHRONIC renal failure is one of the most significant health problems in Turkey, as it is all over the world [1]. Renal replacement therapies are expensive and considerably affect patients and their families, which creates a heavy burden. According to the data of Turkish Society of Nephrology in 2015, a total of 935.4 persons in 1 million are in the last stage of renal failure and need renal replacement therapies [2]. The renal replacement therapy options for patients in the last stage of renal failure are dialysis (hemodialysis and peritoneal dialysis) and kidney transplant [3,4].

Kidney transplant (Tx), a permanent solution to increase quality of life, is more successful compared with other treatment options. However, it has important disadvantages as well as advantages [5,6]. Immunosuppressive drugs used to prevent rejection in kidney transplant might cause some complications (viral, bacterial, and fungal) in the immune system because they suppress the immune system [5]. Therefore, a good team is needed to monitor patients after kidney transplant. In this team, nurses have important duties. Success of kidney transplant increases as a consequence of training sessions given to patients [7]. The most significant aspect of the training is its contribution to ensuring compliance with immunosuppressive therapies [5].

In order to maintain graft function and prevent rejection after transplant, maintenance of immunosuppressive drug compliance is important. Compliance is a concept used to reveal that training given to patients and behaviors and attitudes suggested to patients are not in conflict [8]. Noncompliance refers to the conflict between patient behaviors and suggestions given to patients [9]. The compliance of the patient with the treatment is significant in obtaining beneficial and successful results after transplant [10]. In the studies conducted before, it has been reported that the rate of noncompliance with immunosuppressive therapy varies 15% to 68% [8–11].

*Address correspondence to Hatice Guzel. E-mail: hguzel8080@hotmail.com

230 Park Avenue, New York, NY 10169

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The most common noncompliance findings in organ transplant patients are to keep drugs and to forget to keep a replacement drug. In noncompliant patients, graft injury or loss might lead to a decreased quality of life and even to death [12].

Maintaining immunosuppressive therapy is necessary to prevent any potential rejection after transplant. To achieve it, the level of compliance and the reasons of noncompliance should be known [13]. Transplant units should have a number of different approaches in terms of preventing noncompliance after Tx [14]. This significant task should be carried out by nurses and other health care professionals. To increase compliance with immunosuppressive therapy, nurses should cooperate with patients and their families and provide consultancy service to them [13,14].

MATERIALS AND METHODS

This research was conducted as a descriptive study in order to determine the compliance level of the kidney transplant patients with immunosuppressive drugs and their quality of life. The data of the study were collected in the Kidney Transplant Polyclinic of a large private hospital with 650 beds between September 2016 and January 2017. The population of the study consisted of 244 kidney Tx patients registered in this hospital's Kidney Transplant Polyclinic between 2011 and 2016. Although the study aimed to cover the entire target population in the sampling selection, it was conducted among 206 patients who met the acceptance criteria.

Data Collection

The data of the study were collected using the Patient Information Form, the Immunosuppressive Drug Use Scale, and the 36-Item Short Form Survey (SF-36) Life Quality Scale. The data were collected by face-to-face interview. To carry out the study, the necessary permissons were obtained from the hospital, the authors of the scales, and the Non-Interventional Clinical Research Ethics (Ethical Committee 21.10.2016 2016/03 Decision No: 5).

Evaluation of Data

Statistical Package for Social Sciences 23.0 (IBM, Armonk, NY, United States) was used to analyze the data. A 95% CI was used. Values less than α level of 0.05 were significant. In this study, the coefficients of kurtosis and skewness were calculated to test whether the data were within the values of the normal distribution. Based on these values, it was decided to carry out parametric tests to evaluate the data of the study because the other conditions were also appropriate. In the analysis of the data, the independent sample *t* test, the Pearson correlation coefficient, the one-way analysis of variance, and, in case the difference would be significant, the least significant difference as a post hoc test were performed in addition to the descriptive statistics such as number, percentage, mean (SD).

FINDINGS

The mean age of the patients was 41.4 (SD, 11.88) while their ages ranged from 18 to 71 years. A total of 92.7% of the sample consisted of patients between 46 and 59 years of age. Of the patients, 66.0% were male, 79.1% were married, 45.2 %were literate primary school graduates, 68.4% were nuclear family members, and 26.7% were retired (Table 1).

Table 1. Sociodemographic Distribution of Compliance Levels of Patients With Immunosuppressive Drugs and Their Quality of Life

Sociodemographic Characteristics	Subscale Scores of SF-36 Life Quality Scale																Compliance Score	
	Physical Function		Role-Strength Physical F.		Pain		Public Health		Vitality		Social Function F.		Role Strength Emotional F.		Mental Health			
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
All Groups	73.33	22.61	67.48	37.67	74.36	18.38	63.58	18.51	63.57	23.03	72.51	29.05	64.56	38.13	68.56	18.96	48.33	3.21
Age group, y																		
18–30 (n = 41)	83.54	12.26	77.44	33.45	77.85	17.09	67.32	18.11	66.10	23.49	69.82	30.49	68.29	34.12	65.76	18.46	47.73	3.56
31–45 age (n = 94)	72.34	21.64	70.74	33.73	71.93	18.23	63.64	17.87	64.95	21.60	73.01	24.61	65.96	39.71	68.77	18.32	48.15	3.12
46–59 (n:56)	73.04	23.93	61.16	41.26	75.16	19.38	63.18	18.64	63.48	22.84	75.22	31.03	64.88	36.19	73.21	17.43	49.41	2.87
<60 age (n = 15)	52.67	30.46	43.33	46.74	77.13	18.57	54.53	21.49	48.33	27.56	66.67	42.43	44.44	43.03	57.60	25.06	47.00	3.21
F-*P*	7.715-< .001		3.933-.009		1.196-.31		1.782-.15		2.521-.06		0.488-.69		1.580-.20		3.199-.02		3.683-.01	
Sex																		
Female (n = 70)	71.79	22.59	58.93	41.71	71.79	18.64	64.10	17.57	61.29	24.73	70.71	31.12	55.24	43.18	67.43	19.60	48.63	2.89
Male (n = 136)	74.12	22.66	71.88	34.75	75.69	18.18	63.32	19.03	64.74	22.11	73.44	27.99	69.36	34.44	69.15	18.67	48.17	3.37
t-*P*	0.700-.49		2.363-.02		1.448-.15		0.287-.77		1.021-.31		0.636-.52		2.552-.01		0.615-.54		0.972-.33	
Marital status																		
Married (n = 163)	71.53	23.04	65.34	38.52	73.60	18.52	62.55	19.26	62.76	23.45	73.31	28.52	65.03	38.63	69.06	19.21	48.36	3.28
Single (n = 43)	80.12	19.71	75.58	33.40	77.28	17.74	67.51	14.85	66.63	21.35	69.48	31.14	62.79	36.52	66.70	18.05	48.19	2.99
t-*P*	2.236-.03		1.592-.11		1.170-.24		1.571-.12		0.979-.33		0.770-.44		0.342-.73		0.725-.47		0.319-.75	

Abbreviation: SF-36, 36-Item Short Form Survey.

It was found that 53.5% of the patients did not return to work after the transplant, and 70.7% of them were retired. It was also found that 48.5% of the patients had a balance between their incomes and expenditures.

It was determined that 99.2% of the patients in our study were informed by the health care personnel and 92.2% found this information adequate, while 35.9% did not know the reason for renal failure and 30.6% had renal failure as a consequence of hypertension.

In 39.3% of the patients, the duration of renal failure had been experienced for 121 months or more. It was found that 88.3% of the patients received dialysis treatment prior to transplant and that 29.1% of them had had dialysis treatment for at least 10 years. A total of 85.7% of the dialysis patients received hemodialysis treatment. It was found that 52.4% of the patients were within the 12- and 60-month range in terms of duration after the transplant, that 54.4% had a living donor transplant, and that 61.2% were aware of potential complications after the transplant.

After transplant, 93.1% of the patients used steroid plus tacrolimus as an immunosuppressive drug, 18% used antiviral drugs, 18.4% used antifungal drugs, 55.3% used antihypertensive drugs, and 14.1% used antidiabetic drugs. A total of 54.9% of the patients experienced adverse effects, and 72% of these patients reported them to their doctor.

A total of 2.9% of the patients experienced rejection due to noncompliance; 94.6% of the patients stated that using drugs was their top priority in life.

The mean scores of the subscales of the SF-36 Life Quality Scale and the Compliance Scale were high, and the scores for all the subscales of the SF-36 Scale were at least 60 or above. The mean of the compliance score was found to be 48.33 (SD, 3.21), and, with the maximum score at 55, the mean of the group was generally high.

When the distribution of the subscale scores of physical function was analyzed according to age, the difference between the distributions was statistically significant ($f = 7.715$; $P > .99$). The role-strength physical scores of the patients were high in the 18 to 30 years age group. The difference between the group including patients aged between 46 and 59 years and the group including patients 60 years and older was significant ($f = 3.933$; $P = .009$). At the same time, the role-strength physical function scores of the patients between 31 and 45 years of age were higher than those of the group including patients 60 years and older, and the differences among other groups were statistically significant. The mental health score of the group including patients 60 years and older had the lowest score, while the difference between the 31 to 45 years age group and the 46 to 59 years age group was significant ($f = 3.199$; $P = .02$). The 46 to 59 years age group, having the highest compliance score, was found to have significantly higher scores than the other groups ($f = 3.683$; $P = .01$).

The male patients had higher role-strength function ($t = 2.363$; $P = .02$) and role-strength emotional function scores ($t = 2.552$; $P = .01$). The patients who were single had higher physical function subscale scores ($t = 2.236$; $P = .03$). The distributions between the scores of the Compliance Scale and the SF-36 Life Quality Scale and the scores of the other subscales were not statistically significant ($P > .05$).

As the level of educational status increased, the scores of physical function ($f = 4.755$; $P = .003$) and role-strength physical function ($f = 4.861$; $P = .003$) also increased. The score of public health was high in the extended families ($t = 2.009$; $P = .046$) and the worker and civil servant occupational group ($f = 3.122$; $P = .03$). The role-strength physical function ($f = 4.315$; $P = .006$) and role-strength emotional function ($f = 2.680$; $P = .048$) scores of the worker and civil servant occupational group were found to be significantly high.

When the distribution of the patients returning to work after Tx was analyzed, the scores of role-strength physical function ($t = 3.239$; $P = .001$), social function ($t = 2.457$; $P = .02$), role-strength emotional function ($t = 2.656$; $P = .009$), and compliance ($t = 2.395$; $P = .02$) were higher in the group including patients who returned to work, whereas the score of compliance was higher in the group including patients who did not return to work (Table 2).

The subscale scores of physical function ($f = 3.658$; $P = .03$), role-strength function ($f = 4.905$; $P = .008$), and mental health ($f = 4.065$; $P = .02$) were higher in the group consisting of patients with middle income. The difference was significant only between the group including patients with high income and the group including patients with medium income.

When the distribution of the scores of the subscales of the SF-36 Life Quality Scale and the Compliance Scale was taken into account, there was no statistically significant difference among dialysis treatment, donor type, complication after Tx, and adverse effect condition ($P > .05$). The score of compliance ($t = 2.505$; $P = .01$) was higher in the group in which no adverse effect was experienced (Table 3).

There was no significant relationship between the patients' age ($\rho = 0.101$; $P = .15$), BY ($\rho = 0.047$; $P = .51$) and DT times ($\rho = 0.131$; $P = .08$), and compliance score (Table 4). A significantly weak and negative ($\rho = -0.205$; $P = .003$) relationship was found between Tx score and compliance score. When the Tx time increased, the compliance level decreased. There was a positively significant weak relationship among the scores of physical function ($\rho = 0.140$; $P = .045$), vitality ($\rho = 0.207$; $P = .003$), mental health ($\rho = 0.211$; $P = .002$) and compliance. When the compliance score increased, the scores also increased.

DISCUSSION

When the status of returning to work after Tx was taken into account, the majority of the patients did not continue working. Other studies had similar outcomes [15,16]. However, according to some studies, the majority of patients after Tx continued working [17]. In this study, the most important reason for this situation is that the majority of the patients were retired.

It was determined that only 3.9% of the patients in this study had high income and that the patients with low income and middle income constituted 96.1% of the total [16,17].

Table 2. Sociodemographic Distribution of Compliance Levels of Patients With Immunosuppressive Drugs and Their Quality of Life-2

	Subscale Scores of SF-36 Life Quality Scale																	
	Physical Function		Role-Strength Physical F.		Pain		Public Health		Vitality		Social Function		Role-Strength Emotional. F.		Mental Health		Compliance Score	
Sociodemographic Characteristics	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Educational status																		
Illiterate (11)	56.36	28.29	45.45	43.04	67.27	20.93	54.00	12.42	62.73	31.09	71.59	36.70	45.45	42.88	63.27	23.17	49.36	2.94
Literate-Primary school (93)	70.32	24.00	59.95	39.72	72.44	21.03	62.92	19.49	60.32	23.36	74.73	28.31	60.22	38.78	68.86	17.31	48.60	3.32
Secondary school, High school (82)	76.52	20.54	75.91	33.44	76.67	14.46	65.20	17.82	67.44	21.36	70.27	28.98	69.11	36.58	68.63	20.51	47.89	3.29
Bachelor, MA, PhD (20)	83.50	11.93	80.00	29.91	77.75	17.33	65.30	18.72	63.25	22.55	71.88	29.77	76.67	34.37	69.80	18.24	48.25	2.36
F-*P*	4.755-.003		4.861-.003		1.554-.20		1.293-.28		1.403-.24		0.347-.79		2.434-.07		0.319-.81		1.120-.34	
Types of family																		
Nuclear family (n = 141)	72.84	22.44	66.49	39.40	74.05	17.93	61.84	18.48	63.87	23.28	75.52	29.51	64.78	39.99	68.37	18.91	48.43	3.33
Extended family (n = 65)	74.38	23.11	69.62	33.80	75.05	19.46	67.37	18.12	62.92	22.64	72.50	28.23	64.10	34.01	68.98	19.21	48.11	2.94
t-P	0.456-.65		0.553-.58		0.361-.72		2.009-.046		0.272-.79		0.004-> .99		0.117-.91		0.216-.83		0.659-.51	
Occupation																		
Housewife (n = 52)	69.90	21.77	54.33	43.08	70.42	18.52	61.94	18.10	59.52	24.92	70.19	32.57	52.56	43.46	67.00	18.69	49.12	2.73
Worker-civil servant (n = 57)	77.46	22.66	77.63	30.50	76.18	18.23	68.28	17.00	69.74	20.01	79.39	25.61	72.51	34.00	70.88	19.06	47.82	3.48
Self-employed (n = 42)	74.88	22.75	74.40	35.13	76.26	18.35	66.00	17.88	64.05	24.53	71.43	28.99	65.87	34.91	67.43	19.59	47.98	3.26
Retired (n = 55)	71.09	23.05	64.09	37.50	74.76	18.35	58.42	19.77	60.64	22.13	68.41	28.45	66.67	37.41	68.51	18.90	48.36	3.26
F-*P*	1.282-.28		4.315-.006		1.141-.33		3.122-.02		2.243-.08		1.573-.20		2.680-.048		0.448-.72		1.695-.17	
After Tx, status of returning to work																		
Yes (n = 87)	76.32	21.36	76.72	33.63	75.72	16.82	65.79	17.53	68.68	21.53	77.44	25.85	71.65	35.77	69.33	18.43	47.53	3.55
No (n = 100)	69.80	24.18	59.25	39.35	73.25	19.35	60.59	19.03	59.40	23.35	67.13	30.86	57.00	39.15	67.08	19.50	48.66	2.90
t-P	1.942-.05		3.239-.001		0.926-.36		1.934-.06		2.810-.005		2.457–0.02		2.656-.009		0.808-.42		2.395-.02	
Income status																		
High (n = 8)	68.13	40.44	56.25	37.20	76.00	24.19	64.50	22.30	56.88	36.74	70.31	38.92	70.83	37.53	67.00	30.89	47.63	4.07
Middle (n:100)	77.65	16.70	75.75	35.61	76.52	17.15	66.36	18.45	66.60	20.75	74.13	28.50	70.67	35.86	72.36	18.52	48.48	3.16
Low (n = 98)	69.34	25.30	59.95	38.28	72.03	19.01	60.67	17.99	61.02	23.75	71.05	28.98	57.82	39.63	64.82	17.65	48.22	3.22
F-*P*	3.658-.03		4.905-.008		1.517-.22		2.379-.10		1.819–0.16		0.300-.74		2.977-.05		4.065-.02		0.352-.70	

Abbreviations: SF-36, 36-Item Short Form Survey; Tx, transplant.

Table 3. Distribution of Compliance Levels of Patients With Immunosuppressive Drugs and Their Quality of Life According to Medical Characteristics

	Subscale Scores of SF-36 Life Quality Scale																	
	Physical Function		Role-Strength Physical F.		Pain		Public Health		Vitality		Social Function		Role-Strength Emotional. F.		Mental Health		Compliance Score	
Sociodemographic Characteristics	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Dialysis treatment																		
Yes (n = 182)	72.72	23.12	67.45	37.92	74.43	18.39	63.65	18.74	64.18	22.85	73.63	28.66	65.20	37.87	69.03	19.12	48.40	3.27
No (n = 24)	77.92	18.05	67.71	36.47	73.88	18.67	63.04	16.99	58.96	24.32	64.06	31.13	59.72	40.50	65.00	17.66	47.75	2.74
t-P	1.059-.29		0.032-.97		0.138-.89		0.152-.88		1.044-.30		1.521-.13		0.661-.51		0.979-.33		0.933-.35	
Donor type																		
Living donor (n = 112)	73.71	22.65	68.08	35.55	75.70	17.99	64.23	18.95	62.59	23.08	72.43	27.37	63.99	38.00	68.43	17.54	48.19	3.09
Deceased donor (n = 94)	72.87	22.68	66.76	40.23	72.78	18.81	62.81	18.04	64.73	23.03	72.61	31.07	65.25	38.46	68.72	20.61	48.49	3.36
t-P	0.263-.79		0.251-.80		1.136-.26		0.549-.58		0.665-.51		0.043-.97		0.236-.81		0.111-.91		0.671-.50	
Complication after Tx																		
Yes (n = 126)	75.40	20.90	70.24	36.97	75.78	17.67	65.22	18.35	65.71	22.35	72.92	27.15	67.99	38.96	69.68	18.41	48.15	3.24
No (n = 80)	70.06	24.86	63.13	38.56	72.14	19.36	61.00	18.58	60.19	23.81	71.88	31.98	59.17	36.35	66.80	19.79	48.60	3.16
t-P	1.657-.10		1.323-.19		1.388-.17		1.602-.11		1.686-.09		0.250-.80		1.625-.11		1.064-.29		0.978-.33	
Adverse effect condition																		
Yes (n = 113)	72.35	24.65	70.13	37.48	75.13	17.43	64.32	17.24	65.44	23.15	72.90	28.19	68.14	36.29	69.73	18.93	47.82	3.41
No (n = 93)	74.52	19.92	64.25	37.84	73.43	19.54	62.69	20.00	61.29	22.79	72.04	30.19	60.22	40.01	67.14	19.00	48.94	2.85
t-P	0.685-.49		1.117-.26		0.661-.51		0.628-.53		1.290-.20		0.210-.83		1.489-.14		0.977-.33		2.505-.01	

Abbreviations: SF-36, 36-Item Short Form Survey; Tx, transplant.

Table 4. Correlation Between Patients' Age, BY, DT, Tx Times, and Some Subscale Scores of SF-36 and Compliance Scales

	Compliance Score	
	ρ*	*P* Value
Age	0.101	.15
BY time	0.047	.51
DT time	0.131	.08
Tx time	−0.205	.003
Physical function	0.140	.045
Vitality	0.207	.003
Mental health	0.211	.002

Abbreviations: Tx, transplant.
*Pearson correlation coefficient.

The vast majority of the patients were informed about immunosuppressive drugs in relation to organ transplant, and this was found out to be adequate by the patients. A study conducted by Özdemir in 2015 had similar outcomes [18]. Training was significant in terms of increasing the level of compliance with the use of immunosuppressive drugs and preventing rejection. Many studies also show that efficient training increases the level of compliance with drug use [19–24]. In this respect, training is provided for the use of drugs for transplant patients in transplant centers. In this study, most of the participants were trained about immunosuppressive drugs. Our findings are similar.

Most of the patients did not know the reasons for renal failure. Patients thought hypertension was the second most significant reason for renal failure. In a study conducted by Yakupoğlu et al, the patients' most popular answer was "I do not know" [15,25]. These outcomes support our finding; however, in a study carried out by Gökkaya, the majority of the patients were aware of the reasons for renal failure [26]. The knowledge of the cause of renal failure might have varied according to the characteristics of the samples.

When the patients' duration of renal failure was considered, 39.3% of the patents had renal failure for 10 years or more. In a study by Soylu, the majority of the patients (56.5%) had renal failure for 10 years or less [15]. The difference between the 2 studies might be related to the fact that the sample size of Soylu's study was smaller (n = 46) and that it, for that reason, did not reflect the patient population with kidney transplant.

When time period after transplant was taken into account, the 12- and 60-month group had the highest rate (52.4%). In the studies of Üstündağ et al and Soylu, the majority of the patients received transplants more than 1 year ago [15,27]. Our study has similar findings. This might be because the transplant center has been active for 5 years.

When the donor types in this study were analyzed, the majority of the patients (54.4%) had a transplant from a living donor. In a study conducted by Özdemir in 2015, the majority of the patients had a transplant from a living donor. Other studies had similar findings [28,29]. In the studies conducted by Hoşcoşkun et al and Soylu, findings were similar [15,30]. According to the data in Turkey as of 2018, it has been reported that 2661 patients had a kidney transplant from a living donor, while 748 had a kidney transplant from a deceased donor [31].

The majority of the patients (93.1%) used steroid plus tacrolimus after Tx. In a study conducted by Özdemir 2015, the majority of the patients also used steroid plus tacrolimus after Tx. Similar findings were found in other studies [32–34]. Our findings have similarities with those in the literature. This might be because the most efficient immunosuppression therapy is the combination of steroid plus tacrolimus.

Many patients in this study experienced adverse effects. In a study by Özdemir in 2015, the majority of the patients also had similar adverse effects. In other studies, there are similar findings [35,36].

Six of 206 patients (2.9%) in this study experienced rejection. In the study of Hoşçoşkun, 1-, 3-, and 5-year graft survival rates of 70 cases with deceased donors were 95%, 85%, and 76% for kidney transplants from deceased donors, while it was 92%, 82%, and 70% for kidney transplants from living donors [30]. In another study, the majority of the group (96%) did not experience prevention [27]. In this regard, our study has similarities with the findings of other studies in the literature.

In our study, the scores of the SF-36 Life Quality Scale were generally high, especially the subscale scores of pain, social function, and physical function. Üstündağ et al also reported that the mental health, vitality, and pain scores of the transplant patients were high [27]. In a study comparing the life qualities of the kidney transplant patients undergoing hemodialysis, Pınar et al reported that the life quality of the patients increased following transplant [37]. The findings of our study have similarities with those of Tanrıverdi et al and Öğütmen et al [38,39]. In many studies, it is revealed that kidney transplant increases life quality [39–41]. This might be associated with the fact that the disadvantages of hemodialysis are eliminated following transplant. Negative conditions such as fatigue, headache, pruritus, intensive invasive procedures, infections, blood pressure changes, anemia, dependence on dialysis, and dietary restrictions frequently encountered in patients receiving dialysis are substantially eliminated after transplant.

The youngest group had the highest subscale scores of physical function and role-strength physical function, while the group including patients between 46 and 59 years of age had the highest subscale scores of mental health. A study conducted by Fujisawa et al in 2000 had similar findings. In a study comparing the subscale scores of the liver transplant patients according to age groups, Çolakdalcı et al reported that the mental scores of the group including patients between 18 and 29 years of age were lower than those of the groups including patients between 30 and 49 years of age and patients 50 years and older. It was reported that there was no statistically significant difference among the mean subscale scores of the patients (physical function, physical role, pain, public health perception, vitality, social function, and mental health) according to age groups [42].

In this study, no significant relationship was found among the physical function, vitality, and mental health scores of the patients. Özşaker reported that there was no significant relationship between the age and life quality scores of the kidney transplant patients [43]. In another study conducted by Atasoy et al, there was a negative correlation between the subscales of the SF-36 Life Quality scale, with the exception of vitality and age [44].

In our study, the subscale scores of the role-strength function and role-strength emotional function of the male patients were higher. According to the review of Drent et al about symptom control and life quality of liver transplant patients, the life quality scores of the female patients were lower, and, our study, in this regard, had similar outcomes [45]. Contrary to those findings, Üstündağ et al reported that there was no difference among the life quality scores of the patients according to age groups and sex [27]. In another study conducted by Soylu, no significant relationship among the subscale scores of the patients, with the exception of vitality, was found according to sex [15]. Our findings have similar outcomes with those in the literature.

In our study, the subscale scores of physical function were higher in patients who were single. Considering the findings in the literature, life quality of patients who were married was higher [42,43]. Our outcomes are, in this regard, different. The mean age of the patients who were single (31.7 [SD, 9.90]) was much lower than the mean age of the patients who were married (44.0 [11.01]), which clarifies the reason why the subscale scores of the physical function of the patients who were single were higher.

It was determined that the subscale scores of physical function and role-strength physical function increased when the level of education increased. In other studies the life quality increased in direct proportion to the level of education [46,47]. There are also some other studies having different outcomes [27,39]. In this study, because the group with the higher level of education had a lower mean age, their scores of physical function and role-strength function might have been higher.

When the distribution of the subscale scores of life quality was considered according to types of family, only the public health score was higher in the group having extended families. In a study conducted by Çolakdalcı, no significant difference was found among types of family [42]. The reason might be related to the fact that extended families in our country have more responsibilities and social support.

When the distribution of the subscales scores of the status of returning to work following Tx were taken into account, the scores of role-strength physical function, vitality, social function, and role-strength emotional function were higher in the group consisting of patients who continued working following Tx. In a study conducted by Soylu, no significant difference was found [15]. However, our findings have different outcomes. This might be associated with the fact that those patients who continued working were younger and in a better condition in terms of vitality, social function, role-strength, and emotional function scores.

The scores of physical function, role-strength function, and mental health were higher in the group including patients with moderate income. In a study by Çolakdalcı, there was no significant difference between the liver transplant patients' level of income and life quality [42]. In a study conducted by Soylu, there was not a significant difference either [15]. To articulate the reason for this difference, the group consisting of patients with middle income was analyzed, and 92 out 100 in this group were younger than 60 years of age. The fact that a significance difference was found among some age-related scores of the SF-36 Life Quality Scale might be because of the characteristics of the group.

The mean score of the compliance scale was found to be 48.3 (SD, 3.21). In this regard, the compliance level of the majority of the patients with immunosuppressive drugs was good. Similarly, in a study conducted by Weng et al, the compliance level of the kidney transplant patients with immunosuppressive drugs was high [48]. Apart from studies reporting that compliance level of patients with immunosuppressive drugs following transplant is high, there are also studies revealing the cases in which compliance level of patients with immunosuppressive drugs is considerably low [49–51]. However, the majority of the studies in the literature show that noncompliance with immunosuppressive drugs is still a problem experienced by patients having a solid organ transplant.

While there was no significant difference among the distributions of the compliance level of the patients according to sex, marital status, educational status, family, and occupation, significant outcomes about the status of returning to work and adverse effect condition were found. The patients who had less possibility of having adverse effects had a higher level of compliance. In the literature, it is reported that noncompliance with immunosuppressive drugs following solid organ transplant might affect treatment and therapy in a negative way and in some cases result in prevention, graft loss, and even death [51–53].

Contrary to the findings of our study, in a study conducted by Özdemir, there was no significant difference between the compliance levels of the patients with immunosuppressive drugs and the distribution of the scores of sociodemographic characteristics [18]. In another study by Chisholm-Burns et al, the compliance levels of the older patients with immunosuppressive drugs were higher [54]. The group having the highest compliance levels consisted of patients aged between 46 and 59 years. On the other hand, the patients 60 years and older had higher mental health scores. As stated in the correlation analysis before, there is a positively significant relationship between mental health scores and compliance levels. The fact that the compliance level increasing with age is higher in this group might be associated with lower mental health scores.

A statistically significant difference and a negative weak relationship were found between time period after transplant and compliance level. When time period after transplant increases, compliance level decreases. There are different outcomes in the literature [18,21,55]. This might be connected to the fact that patients in these studies might have forgotten the threat of rejection and related problems after a long time period following transplant. It might also be because patients might have thought that using drugs would be useless after a long treatment and therapy. Patients in our country assume that organ transplant is a permanent solution and that they recover from their health problems following organ transplant.

In conclusion, there was no significant difference among the compliance levels of the patients according to age and duration of renal failure. The scores of physical function, vitality, and mental health increased when the compliance level increased. As a consequence of the findings of this study, it is thought that there is a significant relationship between compliance level and life quality, that adverse effects could be lessened, and that life quality could be increased when compliance is achieved.

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