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Predictors of Self-Management among Kidney Transplant Recipients

Somayeh Khezerloo¹, Hosein Mahmoudi², Hamid Sharif Nia³, Zohreh Vafadar^{*4}

Purpose: Self-management among kidney transplant recipients is a key factor in long-term survival. The present study aims to determine the predictors of self-management among kidney transplant recipients in Iran.

Materials & Methods: This cross-sectional analytical study was conducted on 360 kidney transplant recipients who were selected from six transplantation clinics affiliated to six major universities of medical sciences in Iran. The data were collected using a demographic and clinical characteristics questionnaire and the Persian version of the 24-item Self-Management Scale for Kidney Transplant Recipients.

Result: The mean score of the participants' self-management was 62.39 ± 8.04 . Multiple regression analysis revealed that the significant predictors of self-management among kidney transplant recipients were age ($B = -0.319$), gender ($B = -1.70$), pre-transplantation dialysis duration ($B = 0.256$), dialysis type ($B = 3.060$), duration after transplantation ($B = 0.08$), and marital status ($B = 4.44$) (model $R^2 = 0.444$).

Conclusion: This study showed that kidney transplant recipients in Iran have a moderate self-management status. The significant predictors of their self-management were age, gender, marital status, pre-transplantation dialysis type and duration, and the length of time passed after transplantation. The findings of this study provide a basis for developing interventions to improve self-management among kidney transplant recipients.

Keywords: self-management; transplantation; kidney

INTRODUCTION

Kidney transplantation is the best treatment for End-stage renal disease.⁽¹⁾ In 2014, 17107 kidney transplantations were performed and more than 100000 patients were still on the waiting list in the United States. The number of candidates for kidney transplantation increases by 3000 annually.⁽²⁾ In Iran, 2700 kidney transplantations are performed each year. In other words, 48% of the patients with end-stage renal disease in Iran receive kidney transplant, while the global rate is 20%. These statistics denote the good status of kidney transplantation in Iran.⁽³⁾

Self-management is among the most important factors behind transplant survival and outcomes.⁽⁴⁾ By definition, self-management is the ability to manage symptoms, treatments, physical and mental complications, and lifestyle behaviors in relation to a chronic condition.⁽⁵⁾ Currently, self-management is considered as a main aspect of successful healthcare delivery. It significantly improves patients' health status and quality of life and reduces the rate of re-hospitalization.^(6,7) Self-management has three main components, namely medical management, emotional management, and new

life roles management.⁽⁸⁾ Accordingly, self-management behaviors among kidney recipients may include adherence to the following: medications, regular monitoring of transplant rejection symptoms, regular medical visits, adequate fluid intake, adequate sun exposure protection, undergoing cancer screening tests, and a low-salt low-fat diet.⁽⁹⁾

Limited self-management may result in transplant rejection.⁽¹⁰⁾ Unhealthy lifestyle behaviors predispose transplant recipients to infection and other complications. These complications may result in psychological problems and thereby, undermine self-management ability.⁽¹¹⁾ On the other hand, transplant recipients need immunosuppression in order to prevent transplant rejection.⁽¹²⁾ The success of immunosuppression largely depends on adherence to immunosuppressive regimens.⁽¹³⁾ Poor treatment adherence among transplant recipients increases the risks of renal failure and transplant rejection by seven times and increases the likelihood of hospitalization mostly due to infections.⁽¹⁴⁾ Yet, estimates show that 30% of transplant recipients have poor treatment adherence⁽⁵⁻⁷⁾. In addition, another study conducted in Iran has shown that the rate of poor treatment adherence is as high as 57.8%.⁽¹⁵⁾

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Table 1. Participants' demographic and clinical characteristics.

Characteristics		N (%) or Mean \pm SD
Gender	Male	205 (56.9)
	Female	155 (43.1)
Age (Years)		47.11 \pm 11.84
Marital status	Single	122 (33.9)
	Married	283 (66.1)
Educational status	Below diploma	91 (25.3)
	Diploma	82 (22.8)
	Associate degree	10 (2.8)
	Bachelor's degree	137 (38.1)
Employment status	Master's degree and higher	40 (11.1)
	Unemployed	39 (10.8)
	Housewife	105 (29.5)
	Employee	138 (38.3)
Financial status	Self-employed	78 (21.7)
	Poor	114 (31.7)
	Moderate	191 (53.1)
Dialysis type	Good	55 (15.3)
	Peritoneal	139 (36.6)
	Hemodialysis	221 (61.4)
History of dialysis (Month)		51.48 \pm 19.98
Duration after transplantation (Month)		43.76 \pm 23.27
Organ source	Live donor	234 (65.0)
	Cadaver	126 (35.0)
Number of sleeping hours a day	Less than 7	108 (30)
	7–9	169 (46.9)
	More than 9	83 (23.1)
Daily fluid intake (Liter)	Less than 1	91 (25.3)
	1–2	204 (56.7)
	More than 2	65 (18.1)

A key prerequisite to self-management improvement is to determine its contributing factors. These factors (include donor factors, recipient factors, and immunological factors), which greatly influence the outcome of kidney transplantation. Of these three factors, the factors associated with the recipient are related to the patients' self-management. In order to design a plan for improving of these patients' self-management, in the first step, it is necessary to understand the current status of self-management behaviors and the predictor variables among kidney transplant recipients. However, in Iran, few studies have been done on these factors so far. Therefore self-management improvement interventions usually face different challenges and difficulties. Thus, the present study has been conducted to determine the predictors of self-management among kidney transplant recipients in Iran.

MATERIALS & METHODS

This cross-sectional analytical study was conducted from 2016 to 2017. The Study population consisted of the transplant recipients referring to the kidney transplantation clinics affiliated to six major universities of medical sciences in Iran situated in Tehran, Tabriz, Urmia, Mashhad, Kerman, and Hamadan. A random sample of 360 kidney transplant recipients were selected through cluster random sampling. The inclusion criteria were: age above eighteen, ability to answer the study questionnaires, and having stable physical and mental conditions.

Data Collection

The data collection instruments were a demographic and clinical characteristics questionnaire and the Self-Management Scale for Kidney Transplant Recipients. The items included in the first questionnaire (predictors) were related to age, gender, educational level,

marital status, employment status, financial status, dialysis type (hemodialysis or peritoneal dialysis), daily fluid intake, comorbid conditions, organ source (live or cadaver), the amount of sleep per day, the pre-transplantation dialysis history, and the length of time after transplantation. In this study no potential confounders were detected. The Self-Management Scale for Kidney Transplant Recipients was developed in 2013 by Kosaka et al.⁽¹⁶⁾ Khezerloo et al. translated this scale into Persian, evaluated its psychometric properties, and reported that it had the four subscales of self-monitoring (eight items), self-care behaviors (six items), early detecting and coping with abnormalities (six items), and drug management (four items). They also reported a Cronbach's alpha of 0.73 and an intraclass correlation coefficient of 0.9 for the scale.⁽¹⁷⁾ The items of this scale are scored from 1 to 4, resulting in a possible total score of 24 to 96—the higher the score, the greater the patient self-management.

Ethical Considerations

This study was part of a PhD dissertation in nursing approved by the Ethics Committee of Baqiyatallah University of Medical Sciences, Tehran, Iran (code: IR.BMSU.REC.1395.304). The aim of the study was explained to the participants and written informed consents were received from them. All the participants had the freedom to voluntarily withdraw from the study. The study data are kept confidentially.

Statistical Analysis

The SPSS software (v. 25.0) was used for data analysis. Initially, the distribution of the self-management variable was evaluated through the Kolmogorov-Smirnov test. Then, the simple and the linear regression analyses were used to predict the participants' self-management based on their demographic and clinical characteristics. Independent variables were entered into the regression

Table 2. The mean scores of self-management and its subscales.

Subscales	Min-Max	Mean \pm SD	Number of items	Subscale mean
Self-monitoring	8-25	17.22 \pm 5.43	8	2.15
Self-care behavior	12-24	18.34 \pm 3.31	6	3.056
Early detecting and coping with abnormalities	7-22	12.55 \pm 4.12	6	2.091
Drug management	9-16	14.27 \pm 1.68	4	3.56
Total	44-74	62.39 \pm 8.04	24	—

model using the hierarchical method (backward model). Multicollinearity was evaluated through variance inflation factor and tolerance value. The variance inflation factor values greater than 10 and the tolerance values of .1 or less were considered problematic.⁽¹⁸⁾ The level of significance was set at less than .05.

RESULTS

The participants were mostly male (56.9%) and married (66.1%), had received hemodialysis (61.4%), had received kidney transplant from live donors (65%), and aged 47.11 \pm 11.84 years on average. The mean age among the male and the female participants were 46.41 \pm 10.54 and 48.1 \pm 13.35 years, respectively (**Table 1**).

The mean score of the participants' self-management was 62.39 \pm 8.04 (in the range of 24 to 96). The mean scores of the male and the female participants' self-management were 61.45 \pm 9.09 and 63.63 \pm 6.19, respectively. **Table 2** shows the mean scores of self-management and its four subscales.

Multiple linear regression showed that the significant predictors of self-management among kidney transplant recipients were age ($B = -.319$), gender ($B = -1.70$), pre-transplantation dialysis duration ($B = .256$), dialysis type ($B = 3.060$), the length of time after transplantation ($B = .08$), and marital status ($B = 4.44$) (model $R^2 = .444$). Accordingly, older age, masculinity, shorter pre-transplantation dialysis duration, receiving dialysis

through the peritoneal route, shorter post-transplantation time, and singularity were associated with poorer self-management (all $P < .05$) (**Table 3**).

DISCUSSION

This study aimed to determine the predictors of self-management among kidney transplant recipients. The findings revealed that the mean score of the participants' self-management was 62.39 \pm 8.04 (ranging from 24 to 96), which indicates moderate self-management. Similarly, an earlier study had found that only a few kidney transplant recipients had good self-management status in areas such as fluid intake, physical exercise, and adherence to treatment and dietary regimens.⁽¹⁹⁾ However, another study reported that kidney transplant recipients had great self-management.⁽⁶⁾ This contradiction may be due to the differences in the settings, samples, and the contexts of the studies.

The study also shows that age is one of the significant predictors of self-management among kidney transplant recipients; older age was associated with poorer self-management. Greater self-management among the younger participants may be due to their unfamiliarity with serious health conditions, fear of the unknown, fear of the long-term effects of not adhering to the treatments and the greater support they receive from their

Table 3. Predictors for Effective factors on the self-management among kidney transplant recipients.

Predictor	Unadjusted model*		Adjusted model*		Tolerance	VIF
	B [95% CI]	P	B [95% CI]	P		
Age (Years)	.10 [0.03, .17]	.005	-.31 [-.39, -.24]	<.001	.488	2.051
Sex	Male	-.218 [-3.85, -.51]	.01	-1.70 [-3.07, -.32]	.016	.845
	Female	1	-	-	-	-
Marital status	Single	1	-	-	-	-
	Married	6.23 [4.62, 7.90]	<.001	4.44 [2.96, 5.92]	<.001	.797
Educational status	Below diploma	0.46 [-0.16, 0.99]	0.16	-	-	-
	Diploma	1	-	-	-	-
	Associate degree	1	-	-	-	-
	Bachelor's degree	1	-	-	-	-
	Master's degree and higher	1	-	-	-	-
Dialysis type	Peritoneal	1	-	-	-	-
	Hemodialysis	-1.92 [-3.62, -.22]	.02	3.06 [1.40, 4.71]	<.001	.604
History of dialysis (Month)	.202 [.16, 0.23]	<.001	0.256 [0.19, 0.31]	<.001	.282	3.542
Duration after transplantation (Month)	.14 [.11, .17]	<.001	.087 [.05, .12]	<.001	.604	1.654
Organ source	Live donor	1	-	-	-	-
	Cadaver	-5.83 [-7.74, -4.19]	.88	-	-	-

*Univariate Linear Regression and Multiple Linear Regression were used to Analyze the Association between multiple determinants of self-management.

families and peers. However, contrary to the findings of the present study, the previous studies have reported greater self-management among older kidney transplant recipients.^(20, 21) This contradiction may be due to the differences among different societies regarding cultural characteristics and health literacy. Culture and health literacy are among the significant factors affecting self-management among the patients with chronic conditions.⁽²²⁾

Gender was another significant predictor of self-management in the present study; the female participants had greater self-management than their male counterparts. Earlier studies reported that female organ recipients had better infection prevention and sun exposure protection behaviors^(4,23), while male organ recipients were better at drug management.^(23,24) Women seem to have poorer adherence to their medications due to their fear of the side effects of immunosuppressive agents on their appearance. Moreover, they are more adherent to sun protection due to the effects of sun exposure on their beauty and appearance. However, a study reported that women usually have better health-related knowledge; therefore, they have better self-monitoring and greater self-protection against health risk factors.⁽²⁵⁾ This contradiction may be due to the fact that the present study has assessed all the aspects of self-management, while the other one has only considered some of its aspects. Marital status was another significant predictor of self-management in the present study. The findings show that married participants have better self-management than their single counterparts. Previous studies reported the same finding, too.⁽²⁵⁾ Spousal and emotional support may be significant factors behind married participants' greater self-management. A previous study reported a positive relationship between social support and self-management among transplant recipients.⁽²⁶⁾ Moreover, spouses usually share their health-related knowledge with each other and help each other select appropriate health-related behaviors.

In addition, the findings of the present study revealed that pre-transplantation dialysis type and duration were significant predictors of self-management among kidney transplant recipients. The participants with a longer dialysis period and a history of hemodialysis had significantly greater self-management compared to those with a shorter dialysis period and a history of peritoneal dialysis. The patients with a longer dialysis period and a history of hemodialysis might have experienced more difficulties. Therefore, they might as well have attempted to more closely adhere to self-management behaviors in order to avoid returning to their difficult pre-transplantation conditions. Similarly, a previous study indicated that due to the significant effects of hemodialysis on the patients' lives and autonomy, the patients who were receiving hemodialysis had poorer quality of life compared to those who were receiving peritoneal dialysis.⁽²⁷⁾

The other predictor of self-management in the present study was length of time passed after transplantation—the longer the duration, the greater self-management. This factors lead to self-management improvement due to the acquisition of better coping and self-management abilities over time.⁽²³⁾ Contrarily, several earlier studies reported reduction in drug self-management over time.^(20,28,29) This contradiction may be due to the difference in the side effects of immunosuppressive agents experienced by the participants in these studies. The side

effects of immunosuppression are a significant factor affecting self-management among kidney transplant recipients—the more the side effects, the poorer medication adherence and self-management.⁽²⁰⁾ Another justification regarding self-management variation over time, may be the fact that the present study assessed all the components of self-management, while the other ones have only evaluated some.

To the best of our knowledge, this was the first study conducted in Iran on the prediction of self-management among kidney transplant recipients. One limitation of the study was that sampling was done among kidney transplant recipients who were over eighteen. Therefore, the study provides little information, if any, on self-management predictors among children and adolescents.

CONCLUSIONS

This study showed that kidney transplant recipients in Iran have moderate self-management status. The significant predictors of their self-management are age, gender, marital status, pre-transplantation dialysis type and duration, and the length of time passed after transplantation. The findings of this study provide a basis for developing interventions to improve self-management among kidney transplant recipients.

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CONFLICT OF INTEREST

The authors declare that they had no conflict of interest.

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