

## Artículo de investigación

**Quality of life and its related factors in kidney transplant recipients**

Качество жизни и связанные с ней факторы у реципиентов почечного трансплантата

Calidad de vida y sus factores relacionados en receptores de trasplante renal

Recibido: 16 de junio de 2019

Aceptado: 22 de julio de 2019

Written by:

Farbod Ebadi Fard Azar<sup>138</sup>Mahnaz Solhi<sup>139</sup>Aghil Habibi Soola<sup>140</sup>Firouz Amani<sup>141</sup>**Abstract**

Patients undergoing transplantation, experience significant changes in their quality of life. The aim of this study was to determine the quality of life and related factors in kidney transplant recipients. This descriptive-analytic cross-sectional study was performed on 136 kidney transplant recipients referring to nephrology clinic of Imam Khomeini Hospital in Ardabil through convenience sampling method in 2016. Data was collected by using a demographic form, Short Form Health Survey (SF36), physical stress index, Kidney Transplantation Self-Management Scale, Kidney Transplantation Self-Care Self-Efficacy Scale and Beck's Depression Inventory. Data were analyzed by SPSS software version 16 using descriptive and analytical methods. The mean score of physical health ( $55.01 \pm 19.48$ ) was slightly higher than the mental health ( $42.86 \pm 20.91$ ). Self-efficacy ( $\beta = 0.29$ ), depression symptoms ( $\beta = -0.34$ ), age ( $\beta = -0.36$ ) and gender ( $\beta = 0.15$ ) were as predictors of the physical health component of quality of life. Self-efficacy ( $\beta = 0.58$ ), depression symptoms ( $\beta = -0.25$ ), age ( $\beta = -0.16$ ) and education level ( $\beta = -0.28$ ) were determined as predictors of the mental health component of quality of life. It is imperative that the kidney transplant care team improve patients' quality of life by teaching self-care behaviors to improve patients' self-efficacy and early screening for depression symptoms. On the other hand, care services should be provided with greater support from women and the elderly

**Аннотация**

Пациенты, перенесшие трансплантацию, испытывают значительные изменения в качестве своей жизни. Целью данного исследования было определение качества жизни и связанных с ней факторов у реципиентов почечного трансплантата. Это описательно-аналитическое поперечное исследование было проведено на 136 реципиентах почек с обращением в нефрологическую клинику имам Хомейни в Ардебиле методом удобной выборки в 2016 году. Данные были собраны с использованием демографической формы, Краткого обследования состояния здоровья (SF36), физического индекса стресса, шкалы самоуправления трансплантации почки, шкалы самоэффективности самообслуживания трансплантации почки и описи депрессии Бека. Данные были проанализированы с помощью программного обеспечения SPSS версии 16 с использованием описательного и аналитического методов. Средний балл физического здоровья ( $55,01 \pm 19,48$ ) был несколько выше, чем психическое здоровье ( $42,86 \pm 20,91$ ). Самоэффективность ( $\beta = 0,29$ ), симптомы депрессии ( $\beta = -0,34$ ), возраст ( $\beta = -0,36$ ) и пол ( $\beta = 0,15$ ) были предикторами физического здоровья, составляющего качество жизни. Самоэффективность ( $\beta = 0,58$ ), симптомы депрессии ( $\beta = -0,25$ ), возраст ( $\beta = -0,16$ ) и

<sup>138</sup> PhD. Professor. Department of Health Services and Health Education, School of health, Iran University of medical science, Tehran, Iran ebadi.f@iums.ac.ir

<sup>139</sup> PhD. Associate Prof. Department of Health Services and Health Education, School of Health, Iran University of Medical Sciences, Tehran, Iran Solhi.m@iums.ac.ir

<sup>140</sup> PhD Candidate of Health Education and Health Promotion, Department of Health Services and Health Education, School of Health, Iran University of Medical Sciences, Tehran, Iran (Corresponding Author) a.habibi@arums.ac.ir

<sup>141</sup> PhD. Associate Prof. Department of Community medicine, Ardabil University of Medical Sciences, Ardabil, Iran Firouz.amani@arums.ac.ir

patients in order to improve their physical and mental health.

**Key Words:** Quality of life, Kidney transplant recipient, Self-efficacy, Self-management, Depression symptoms.

уровень образования ( $\beta = -0,28$ ) были определены в качестве предикторов компонента качества жизни для психического здоровья. Крайне важно, чтобы команда по уходу за трансплантацией почек улучшала качество жизни пациентов, обучая поведению по уходу за собой повышать самооффективность пациентов и проводя ранний скрининг на симптомы депрессии. С другой стороны, услуги по уходу должны предоставляться при большей поддержке со стороны женщин и пациентов пожилого возраста с целью улучшения их физического и психического здоровья.

**Ключевые слова:** Качество жизни, пересадка почки, самооффективность, самоконтроль, симптомы депрессии

## Resumen

Los pacientes sometidos a trasplante experimentan cambios significativos en su calidad de vida. El objetivo de este estudio fue determinar la calidad de vida y los factores relacionados en los receptores de trasplante renal. Este estudio transversal descriptivo-analítico se realizó en 136 receptores de trasplante de riñón que se referían a la clínica de nefrología del Hospital Imam Khomeini en Ardabil a través del método de muestreo de conveniencia en 2016. Los datos se recopilaron mediante un formulario demográfico, Short Form Health Survey (SF36), físico índice de estrés, Escala de autogestión de trasplante de riñón, Escala de autoeficacia de autocuidado de trasplante de riñón e Inventario de depresión de Beck. Los datos fueron analizados por el software SPSS versión 16 utilizando métodos descriptivos y analíticos. La puntuación media de salud física ( $55.01 \pm 19.48$ ) fue ligeramente mayor que la salud mental ( $42.86 \pm 20.91$ ). La autoeficacia ( $\beta = 0.29$ ), los síntomas de depresión ( $\beta = -0.34$ ), la edad ( $\beta = -0.36$ ) y el género ( $\beta = 0.15$ ) fueron predictores del componente de salud física de la calidad de vida. La autoeficacia ( $\beta = 0,58$ ), los síntomas de depresión ( $\beta = -0,25$ ), la edad ( $\beta = -0,16$ ) y el nivel educativo ( $\beta = -0,28$ ) se determinaron como predictores del componente de salud mental de la calidad de vida. Es imperativo que el equipo de atención de trasplante de riñón mejore la calidad de vida de los pacientes al enseñar comportamientos de autocuidado para mejorar la autoeficacia de los pacientes y la detección temprana de los síntomas de depresión. Por otro lado, los servicios de atención deben proporcionarse con un mayor apoyo de las mujeres y los pacientes de edad avanzada para mejorar su salud física y mental.

**Palabras clave:** Calidad de vida, receptor de trasplante de riñón, autoeficacia, autogestión, síntomas de depresión.

## Introduction

Kidney transplantation (KT) is the best replacement therapeutic method in end-stage renal disease (ESRD), which improves quality of life (QOL) and reduces health care costs (Kostro et al., 2016). In recent years, the survival rate of the transplant and patient has significantly increased. Therefore, improving the QOL of KT recipients has become a highly important issue for transplant teams (Weng et al., 2010).

Comparing the use of therapeutic methods for ESRD patients in Iran and the world shows that the rate of KT in Iran is much higher than the

global average, and we still observe nearly 3% growth of transplant patients in Iran. The high ratio of transplant patients is among the unique indices of renal replacement therapy in Iran because transplanting from living donors is supported and encouraged (Iranian dialysis calendar 2015).

Recently, QOL is discussed as a major indicator of the health of patients who undergo KT (Adey, 2013). QOL is discussed by the physical, psychological and social aspects of health and seems to be affected by the experiences, beliefs,

expectations and perceptions of individuals (Burra et al., 2007). For most patients, KT means to return to a healthy life with changes in lifestyle et al., 2012). While some studies have demonstrated that the QOL of KT recipients is nearly normal (Hossain et al., 2015), others state that the aspects of QOL among these patients is not different from those of dialysis patients and it cannot be equal to those of the general population due to permanent care (Nyumura (Hossain et al., 2017; Rezaei, 2016).

Different studies have shown that in addition to various socio-economic and educational levels (Mistretta et al., 2009), the QOL of the KT recipients is affected by self-efficacy and self-management (Weng et al., 2010), depression (Jana et al., 2014), distress symptoms et al., 2007) and transplant rejection (Crawford et al., 2017). KT recipients experience less depression than dialysis patients, but the depressive symptoms are still more prevalent among them compared to healthy people (Veater & East, 2016; Jabbari et al., 2019). Although progress in surgical procedures and immunosuppressive drugs has led to improvement in the transplant process, the patients still suffer from numerous problems associated with drug regimen management, unpleasant side-effects and lack of proper observance on the proposed health care's, which decreases their ability for effectively dealing with the condition (Mistretta et al., 2009). However, patients who are actively looking for solving their problems would experience fewer depressive symptoms (Christensen et al., 2000). Treatment-related behaviors in the KT recipients, such as regular periodic visits and regular behaviors of post-transplant drug use have a positive relationship with QOL. Moreover, the KT recipients with a proper diet control and health promoting behaviors have reported better QOL (Schäfer-Keller, 2009; SHABANY et al., 2011; Kheirabadi & Mirzaei, 2019; Matsubara & Yoshida, 2018).

According to social-cognitive theory, high self-efficacy can improve the results through certain behaviors. Based on this theory, self-care self-efficacy is defined as the trust of a person in his/her ability to perform self-care behaviors associated with particular situations (Bandura, 2004). Some studies on KT recipients have shown that self-efficacy has positive effects on problem solving, patient-provider partnership, self-care behavior and self-management. Self-efficacy and self-care behaviors can also affect the mental health dimension of QOL (Weng et al., 2010), (Soltannezhad et al., 2013). An increase in self-efficacy leads to further

adaptation, reduced stress, reduced physical and mental symptoms, and increased life satisfaction (Chen et al., 2010; Eslami & Ahmadi, 2019).

Some of the studies have been also focused on the relationship between self-efficacy and medication adherence, showing that patients with higher self-efficacy have also better medication adherence (Schäfer-Keller, 2009; SHABANY et al., 2011). Improving the self-efficacy of patients is one of the main responsibilities of health care providers to convert a dependent person into a self-efficacious person (Rahimi et al., 2014; Kashisaz & Mobarak, 2018).

With respect to the studies and different results of QOL as well as various effective factors in KT recipients, further works in this regard can provide valuable information for the healthcare team to promote the health care planning. This study was performed to determine the QOL of KT recipients and its effective factors.

## Method

This research was a descriptive-analytic cross-sectional study. Sampling was performed using convenient sampling from June through October 2016. All referrals to the Nephrology Clinic of Imam Khomeini Hospital in Ardabil, meeting the inclusion criteria and willing to participate in the study were included. The inclusion criteria were: 1. KT at least 6 months and no longer than 10 years prior; 2. Be at least 18 years old; 3. Be in a stable medical condition and 4. Agree to participate and to sign the written informed consent form. Also, the recipients with physical disabilities and chronic diseases such as cancer, which can affect the QOL, were excluded. From among 193 patients with files in the clinic, 19 patients had not referred to the clinic for future visits, 23 patients did not meet the inclusion criteria and 15 patients did not wish to participate in the study. As a result, 136 patients (70.46%) were included in the study. The data were collected using the following instruments:

## General and demographic information form

We used 9 items to determine the demographic variables, including age, gender, education, marital status, employment status, transplant type (living or cadaveric), forgetting to take medications, time since transplantation and cGFR.

## Physical stress index

In order to evaluate the physical stress index, 6 items were used on the readmission for treatment of infection, graft rejection, other complication or other co-morbidity including diabetes mellitus, hypertension and cardiovascular diseases, which are responded to as "Yes" (1 point) and "No" (0 point) such that the range of total points is 0-6.

### **SF36 QOL Questionnaire**

SF36 QOL Questionnaire examines QOL in two areas of physical component summary score (PCS) including Physical functioning, Role-physical, Pain and General Health; and mental component summary score (MCS) including Social functioning, Role-emotional, Emotional wellbeing and Energy/fatigue. The aspects of "physical function" are studied with 10 items, "Role-physical" with 4 items, "Pain" with 2 items, "General health" with 5 items, "social functioning" with 2 items, "Emotional wellbeing" with 5 items, "Energy/fatigue" with 4 items and "Role-emotional" with 3 items. Each question is scored from 0 to 100 and a higher score indicates better QOL in that area. SF36 is mainly used to assess the QOL of renal transplant patients in Iran and other countries ( Raiisifar et al., 2014; Butt et al., 2008). This questionnaire has been localized by Montazeri & et al. in Iran (Montazeri et al., 2005).

### **KT Self-Management Scale**

This scale was designed by Weng (2008) to assess the self-management of KT recipients (Weng et al., 2010). The 27-item scale contains 3 aspects of "problem solving", "patient-provider partnership" and "self-care behavior".

The "problem solving" aspect contains 10 items and is focused on problem solving activities of recipients with KT problems. The "patient-provider partnership" aspect contains 4 items and measures the relationship between the patient and health care providers. The "self-care behavior" aspect contains 13 items and measures the number of KT care behaviors.

All the items were scored on a 5-point Likert-type scale, ranging from 0 (never do it) to 4(always do it). The range of total score is 0-40 for "problem solving", 0-16 for "patient-provider partnership" and 0-52 for "self-care behavior". Cronbach's  $\alpha$  in the study by Weng for the aspects of "problem solving", "patient-provider partnership" and "self-care behavior" was equal to 0.80, 0.70 and 0.81 respectively (Weng et al., 2010). In this study, the Cronbach's  $\alpha$  obtained

for these three aspects was equal to 0.77, 0.81 and 0.74, respectively.

### **KT Self-Care Self-Efficacy Scale**

The KT Self-Care Self-Efficacy Scale was designed by Weng for the self-care of KT patients based on clinical experiences and literature ( Weng et al., 2010). This scale contains 13 items and assesses the self-confidence of patients in their ability related to prescribed diet, exercise and medication regimes (3 items), monitoring the early signs of infection and transplant rejection (5 items), monitoring blood pressure and other physical parameters (3 items) and monitoring of emotional distress (2 items).

All of the items were scored on a 5-point Likert-type scale, from 0 (lack of self-confidence) to 4 (high self-confidence). The range of total scores is 0-52 and a high score shows high self-efficacy. Cronbach's  $\alpha$  in the study by Weng was 0.90 ( Weng et al., 2010), while it was 0.84 in this study.

### **Depressive symptoms**

They were measured using the 21-item Beck's Depression Inventory. The items were scored on a 4-point Likert-type scale from 0 (rarely or none of the time) to 3 (most or all of the time). The patient's response should be related to the past 2 weeks. The range of total scores is 0-63 and a high score indicates more problems with depressive symptoms. The scores 0-10 indicate lack of depression, 11-18 indicate mild depression, 19-29 indicate moderate depression and scores above 30 indicate severe depression. This inventory is used in numerous local and foreign studies for renal transplant patients and its validity and reliability are confirmed (Weng et al., 2010; Parsaei Mehr et al., 2014).

For sampling, by submitting an introduction letter from the university, the researcher introduced himself to the head of Nephrology Clinics of Imam Khomeini Hospital, Ardabil University of Medical Sciences. The objectives of the study were explicitly described for each of the research steps and they were included after obtaining the written consent. In order to win the trust of the participants, the name and surname of the participants were not mentioned in any part of the questionnaires and they were assured of the confidentiality of information. Participation was voluntary for all the research steps. The data were analyzed with SPSS-16 using descriptive (mean, standard deviation, number and

percentage) and analytical (ANOVA, t-test, Pearson's correlation coefficient and linear regression) statistical tests.

### Results

From among 136 KT recipients, 71 were female (52.2%) and 65 patients were male (47.8%). The mean age of the participants was 41.99 years old

(SD = 12.24) and, on average, 63.07 months (SD = 34.72) had passed since their transplantation. Most of the participants were married (61%) and unemployed (72.8%). Also, 47.1% of the patients had high school education and 72.8% had never forgotten to take their medications. Most of them had received KT from living donors (90.4%). The mean cGFR of the sample was 83.12 (SD = 19.42) (Table 1).

**Table 1.** Demographic and physical stress data and univariate analysis result (n=136)

Variable	M	SD	n	%	p-value	
					PCS	MCS
Age	41.99	12.24			p<0.001	p<0.01
<b>Gender</b>						
Male			65	47.8	0.58	0.16
Female			71	52.2		
<b>Education</b>						
None			25	18.4	p<0.001	0.03
Primary			32	23.5		
High			64	47.1		
Academic			15	11.0		
<b>Marital status</b>						
Single			45	33.1	p<0.001	p<0.001
Married			83	61.0		
Divorced/Widowed			8	5.9		
<b>Employment</b>						
Yes			37	27.2	p<0.01	p<0.001
No			99	72.8		
Time since KT(months)	63.07	34.72			0.48	0.09
<b>Source of KT</b>						
Cadaveric			13	9.6	0.49	0.31
Living			123	90.4		
<b>Forgetting to take medications</b>						
Yes			37	27.2	0.37	0.05
No			99	72.8		
cGFR	83.12	19.42			p<0.001	p<0.001

cGFR, calculated glomerular flow rate

Mean QOL in two areas of PCS and MCS was 55.01 (SD = 19.48) and 42.86 (SD = 20.91), respectively. The highest score was related to "physical performance" 69.41 (SD = 19.02) and the lowest score was related to "mental problems" 22.31 (SD = 36.30). The mean self-

efficacy was 34.16 (SD = 7.36) and self-management aspects including "problem solving", "patient-provider partnership" and "self-care behaviors" were 27.66 (SD = 5.90), 12.26 (SD = 2.00), and 32.54 (SD = 7.04), respectively. The mean depression score was 16.62 (SD = 9.37) and physical stress index was 1.91 (SD = 1.12) (Table 2).

**Table 2.** Descriptive Statistics for studied variables (n=136)

Variable	Mean	SD	Range
QOL			
Physical functioning	69.41	19.02	10-100
Role-physical	32.72	31.84	0-100
Role-emotional	22.31	36.30	0-100
Energy/fatigue	42.90	21.79	0-90
Emotional well being	53.26	19.89	8-92
Social functioning	47.61	20.77	12.5-87.5
Pain			
General health	46.22	22.07	0-90
Physical health (PCS)	55.01	19.48	5.71-90.71
Mental health (MCS)	42.86	20.91	9.29-86.43
Self-efficacy	34.16	7.36	19-52
Self-management Problem solving	27.66	5.90	11-38
Patient-provider Partnership	12.26	2.00	5-16
Self-care behavior	32.54	7.04	14-49
Depressive symptoms	16.62	9.37	1-47
Physical Stress Index	1.91	1.12	0-5

In order to assess the relationship between areas of QOL and age, time since KT and cGFR", Pearson's correlation was used, and the results showed that with an increase in age, the mean PCS and MCS score was decreased ( $p < 0.01$ ). Also, with an increase in cGFR, the mean PCS and MCS score was increased ( $p < 0.01$ ). In order to assess the relationship between areas of QOL and variables of gender, Employment, Source of KT and forgetting to take medications, independent t-test was used. The results showed that the mean PCS score was more in employed people than the unemployed ( $t = 3.20$ ,  $p < 0.01$ ). The mean MCS score was higher in employed people ( $t = 3.93$ ,  $p < 0.01$ ) and those who had not forgotten to take medications ( $t = -1.98$ ,  $p < 0.05$ ).

In order to assess the relationship between the areas of QOL and marital status and education, ANOVA was used. The mean PCS score was higher among single and lower among divorced/widowed participants ( $F = 20.64$ ,  $p < 0.01$ ). The mean MCS score among people with primary and high school education was also higher than others ( $t=3.24$ ,  $p < 0.05$ ).

Finally, multivariate linear regression showed that self-efficacy, depressive symptoms, age and gender as the predictors of physical health component, while self-efficacy, depressive symptoms, age and education as the predictors of mental health component (Table 3).



**Table 3.** Multiple regression analysis for QOL

	$\beta$	
	PCS	MCS
<b>Self-efficacy</b>	0.29*	0.58***
<b>Self-management</b>		
<b>Problem solving</b>	0.02	0.10
<b>Patient-provider partnership</b>	-0.03	0.02
<b>Self-care behavior</b>	0.01	0.03
<b>Depressive symptoms</b>	-0.34***	-0.25***
<b>Physical Stress Index</b>	-0.06	-0.07
<b>Age</b>	-0.36***	-0.16*
<b>Gender</b>	0.15*	0.01
<b>Education</b>	0.002	-0.28***
<b>Marital status</b>	0.02	0.08
<b>Employment</b>	-0.10	-0.06
<b>Time since kidney transplant</b>	0.03	0.01
<b>Forgetting to take medications</b>	-0.04	-0.02
<b>cGFR</b>	0.05	-0.01
<b>R2</b>	0.72	0.78
<b>Adj.R2</b>	0.69	0.75

cGFR, calculated glomerular flow rate.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

## Discussion

### QOL

Mean score of areas of QOL was moderate in the KT recipients. However, the mean PCS was slightly higher than MCS, which was consistent with similar studies in this area (Weng et al., 2010; Mersal & Aly, 2014). In the study conducted in Tehran (Raiisifar et al., 2014), the mean QOL was slightly higher than that reported in this study and can be explained with respect to the facilities and living conditions in Tehran compared to a border province. As in similar studies, the highest score among the eight aspects of QOL was related to "physical functioning", but the lowest score was related to the "Role-emotional", which was not consistent with similar studies (Kostro et al., 2016; Weng et al., 2010; Gentile et al., 2013). After the KT, there is no need for dialysis and bearing the machines for several hours, and patients would have less pain and distressing symptoms, which improves their physical functioning. However, frequently visiting the clinic, long-term use of multiple drugs, diseases such as diabetes and high blood pressure, frequent tests and anxiety about infection and rejection of the transplant can cause mental problems for these patients.

### Self-efficacy and self-management

Mean self-efficacy score in the participants was higher than the average and showed that most patients had higher self-confidence in self-care behaviors. The highest self-confidence was reported in "Able to take anti-rejection drugs regularly" and "Able to visit clinic regularly". A review of the self-management aspects showed that the mean "problem-solving" was slightly higher than the average and "continually check the laboratory data with my doctor" was the most frequent behavior. The mean "self-care behavior" was slightly higher than the average and "I would follow the methods that doctor or nurse told me" behavior was the most observed behavior. These points showed that the patients had the highest trust in the health care team, which was consistent with the objectives of post-transplant care, and most of the behaviors were in line with the objectives of the health care team. These behaviors lead to correct decisions in the lives of patients and strengthen their decisions (Schäfer-Keller, 2009). The results also showed the effective patient-provider partnership, consistent with similar studies. A good patient-provider partnership is necessary for successful

self-management and mutual respect (Thomas-Hawkins & Zazworsky, 2005).

### Depressive symptoms

Mean depression score showed the mild depression of the samples. Confirming similar studies (Veater, N. L., & East, 2016; Mehr et al., 2011), this finding demonstrated that despite the benefits of renal transplants, there was still evidence for depression in these patients. The patients undergoing transplantation report multiple post-operative mental disorders and one of the most common disorders is depression (Lin et al., 2016). Although the depression rate is expected to be reduced after transplant, the concern of patients on continuing the treatment after the transplant and fear of rejection still pose the risk of depression (Zelle et al., 2012).

### QOL predictors

Since disease alone cannot determine the perception of people of QOL and many other factors such as age, gender and education play an important role in the evaluation of the person from QOL, it is necessary to evaluate the relationship between different variables and QOL (Raisifar et al., 2014).

Self-efficacy is one of the predictors of QOL in terms of PCS and MCS. Increasing self-efficacy can improve self-care behaviors and, finally, promote the QOL (Soltannezhad et al., 2013; Mersal & Aly, 2014). According to Weng (2010), the self-efficacy of KT recipients was not statistically associated with QOL, but it improved the self-management behaviors and indirectly affected their QOL. He believes that the self-efficacy might be necessary to begin some behaviors, thereby affecting their health status and QOL (Weng et al., 2010). Self-efficacy increases the motivation and improves the performance of behaviors (Bandura & Locke, 2003). It might affect the health behaviors and daily activities of patients and promote their physical and mental health.

Results of this study showed that "depression symptoms" was one of the predictors of low QOL in both PCS and MCS. The effect of depression is potentially more severe on renal transplant patients and could increase the risk factors associated with mortality (Veate & East, 2016). According to Jana (2014), the QOL of depressed patients in all aspects was less than the QOL of those without depression. Chen (2014) also showed that depression is one of the main predictors of social functioning in post-renal

transplant patients. The depression symptoms might cause conditions that affect social relationships and mental health of the patients, and reduce the QOL.

According to the findings, which approved the previous studies (Raisifar et al., 2014; Gentile et al., 2013), aging is one of the predictors of low QOL in PCS and MCS. The elderly patients deal with numerous physical, psychological and mental problems, and it is not surprising that they will have negative effects on their QOL (MasoudRayyani et al., 2014). In general, with the start of aging process and increase in diseases complications, the QOL of patients is reduced (Raisifar et al., 2014). Aging, in addition to the many measures that KT recipients must adhere to, might lead to many mental and physical problems for these patients.

In terms of physical health, men were significantly better than women. This finding has been approved previous studies (Gentile et al., 2013). Some studies have even shown that the post-renal transplant recovery is faster in men than women (Nicolás et al., 2014; Mussabekov et al., 2018). However, since Ardabil is a religious-historical city, the physical health of male participants might be better because there are more job opportunities for them with more participation in social activities.

Results of the study showed that high education level was one of the predictors of low mental health. This finding was inconsistent with similar studies (Gentile et al., 2013; MasoudRayyani et al., 2014; Rasooli & Abedini, 2017). However, in some studies, no relationship is observed between QOL and education (Raisifar et al., 2014). Probably with an increase in the knowledge of the participants about the side-effects of immunosuppressive drugs as well as constraints on employment despite their level of education, they are dissatisfied with life which reduces mental health.

### Limitations

The sample was selected from only one center and generalization of the finding should be used carefully in other settings. So, we recommend longitudinal studies in other regions considering the social, economic and cultural conditions of the participants. This study was also cross-sectional, in which it is not possible to any intervention on predictive factors.



## Conclusion

KT recipients experience significant changes in QOL after the transplant operation. However, the expectations and quality of future life in these patients are affected by unique conditions of each patient.

Mean QOL in these participants was moderate, and self-efficacy, depressive symptoms and age had the highest effect on PCS and MCS. The women did not have desirable physical QOL and those with high educational level did not have desirable mental QOL. Therefore, with respect to the results, in order to promote the QOL of these patients, it is essential that the caregivers take an effective step to promote the self-efficacy of patients by teaching the self-care behaviors up to the **mastery**, proposing appropriate **models** with successful life after renal transplant, **encouraging** patients to follow health behaviors and **training** the symptoms associated with proper renal functioning. By screening the patients in terms of depressive symptoms and early diagnosis, it is possible to increase the life satisfaction by referring them to psychiatrists and restricting the factors affecting mental conditions. Care services should be given with larger support from women and the elderly to improve the need for health care, compliance with therapeutic regimen, and physical and mental health.

## Acknowledgments

The authors would like to thank the personnel of the Nephrology Clinic of Imam Khomeini Hospital, as well as KT recipients for their cooperation in this study.

## Authors' contribution

AH conducted the study, collected data, and prepared the manuscript. FEF supervised the study. AF participated in data analysis. MS was the advisors of the study. All the authors approved the content of the manuscript.

## Funding/Support

This paper is the outcome of a PhD thesis and research project approved and supported by Vice chancellor for research and Technology, Iran University of Medical Sciences (Grant No.27236).

## Conflict of Interests

The authors declare no conflict of interests

## Ethical considerations

This paper was approved in Research Ethical Committee, Iran University of Medical Sciences with the ethics code of IR.IUMS.REC.1394.27236. Also ethical Issue (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

## Bibliographic references

- Adey, D. B. (2013). Women and kidney transplantation. *Advances in chronic kidney disease*, 20(5), 427-32
- Bandura, A. (2004). Health promotion by social cognitive means. *Health education & behavior*, 31(2), 143-164.
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of applied psychology*, 88(1), 87.
- Burra, P., De Bona, M., Germani, G., Canova, D., Masier, A., Tomat, S., & Senzolo, M. (2007, September). The concept of quality of life in organ transplantation. In *Transplantation proceedings* (Vol. 39, No. 7, pp. 2285-2287). Elsevier.
- Butt, Z., Yount, S. E., Caicedo, J. C., Abecassis, M. M., & Cella, D. (2008). Quality of life assessment in renal transplant: review and future directions. *Clinical transplantation*, 22(3), 292-303.
- Chen, K. H., Huang, H. L., Wang, Y. W., Weng, L. C., Chiang, Y. J., & Chou, H. F. (2014). Factors determining social function of patients after renal transplantation in Taiwan. *Transplantation proceedings*, Elsevier.
- Chen, K. H., Weng, L. C., & Lee, S. (2010). Stress and stress-related factors of patients after renal transplantation in Taiwan: a cross-sectional study. *Journal of clinical nursing*, 19(17-18), 2539-2547.
- Chen, W. C., Chen, C. H., Lee, P. C., & Wang, W. L. (2007). Quality of life, symptom distress, and social support among renal transplant recipients in Southern Taiwan: a correlational study. *The journal of nursing research: JNR*, 15(4), 319-329.
- Christensen, A. J., Ehlers, S. L., Raichle, K. A., Bertolatus, J. A., & Lawton, W. J. (2000). Predicting change in depression following renal transplantation: Effect of patient coping preferences. *Health Psychology*, 19(4), 348.
- Crawford, K., Low, J. K., Manias, E., & Williams, A. (2017). Healthcare professionals can assist patients with managing post-kidney transplant expectations. *Research in Social and Administrative Pharmacy*, 13(6), 1204-1207.

- Eslami, R., & Ahmadi, S. (2019). Investigating the Role of Educational Media on Secondary School Students' Learning Process Improvement in Jahrom City. *Journal of Humanities Insights*, 3(01), 13-6.
- Gentile, S., Beauger, D., Speyer, E., Jouve, E., Dussol, B., Jacquelinet, C., & Briançon, S. (2013). Factors associated with health-related quality of life in renal transplant recipients: results of a national survey in France. *Health and quality of life outcomes*, 11(1), 88.
- Ghadami, A., Memarian, R., Mohamadi, E., & Abdoli, S. (2012). Patients' experiences from their received education about the process of kidney transplant: a qualitative study. *Iranian journal of nursing and midwifery research*, 17(2 Suppl1), S157.
- Hossain, R. M., Iqbal, M. M., Alam, M. R., Islam, S. F., Faroque, M. O., & Selim S. I. (2015). Quality of life in renal transplant recipient and donor. *Transplantation proceedings*, Elsevier.
- Iranian dialysis calendar 2015. Tehran-Iran: Iranian dialysis Consersium 2016 2016.<http://www.icdgroup.org/Content/Upload/pdf/1395.pdf>
- Jabbari, E., Charbaghi, Z., & Dana, A. (2019). Investigating the Effects of Educational and Motivational Education at Different Levels on the Performance and Application of dart throwing. *Journal of Humanities Insights*, 3(02), 37-44.
- Jana, A. K., Sircar, D., Waikhom, R., Praharaj, S. K., Pandey, R., RayChaudhury, A., & Dasgupta, S. (2014). Depression and anxiety as potential correlates of post-transplantation renal function and quality of life. *Indian journal of nephrology*, 24(5), 286.
- Kashisaz, S., & Mobarak, E. (2018). The Effects of Private Education Institutes in Providing Modern Financial Knowledge in Developing Countries. *Journal of Humanities Insights*, 02(04), 172-8.
- Kheirabadi, M. A., & Mirzaei, Z. (2019). Descriptive valuation pattern in education and training system: a mixed study. *Journal of Humanities Insights*, 3(01), 7-12.
- Kostro J, Hellmann A, Kobiela J, Skóra I, Lichodziejewska-Niemierko M, Dębska-Ślizień A. (2016). Quality of life after kidney transplantation: A prospective study. *Transplantation proceedings*. Elsevier.
- Lin, X., Lin, J., Liu, H., Teng, S., & Zhang, W. (2016). Depressive symptoms and associated factors among renal-transplant recipients in China. *International Journal of Nursing Sciences*, 3(4), 347-353.
- Matsubara, M., & Yoshida, H. (2018). FOSTERING AUTONOMOUS LEARNERS OF VOCABULARY ACQUISITION USING CONTENT-BASED ICT METHODS. *Humanities & Social Sciences Reviews*, 6(1), 36-43. <https://doi.org/10.18510/hssr.2018.617>
- Mehr, Z. P., Hami, M., & Eshgh, Z. M. (2011). Anxiety and depression: a comparison between living and cadaveric renal transplant recipients. *International journal of organ transplantation medicine*, 2(4), 178.
- Mersal, F. A., & Aly, R. A. E. S. (2014). Effect of patient education on coping, quality of life, knowledge and self efficacy of kidney recipient patients. *American Journal of Nursing*, 3(5), 78-86.
- Mistretta, A., Veroux, M., Grosso, G., Contarino, F., Biondi, M., Giuffrida, G., ... & Corona, D. (2009, May). Role of socioeconomic conditions on outcome in kidney transplant recipients. In *Transplantation proceedings* (Vol. 41, No. 4, pp. 1162-1167). Elsevier.
- Montazeri, A., Goshtasebi, A., Vahdaninia, M., & Gandek, B. (2005). The Short Form Health Survey (SF-36): translation and validation study of the Iranian version. *Quality of life research*, 14(3), 875-882.
- Mussabekov, G., Auyezov, B., Tasova, A., Sultanbekova, Z., Akhmetova, Z., & Kozhakhmetova, G. (2018). Formation of readiness of future teachers to creative activity in school. *Opción*, 34(85-2), 569-599.
- Nyumura, I., Babazono, T., Tauchi, E., Yamashita, S., Toyonaga, A., Yoshida, N., ... & Tanaka, N. (2017). Quality of life in Japanese patients with type 1 diabetes and end-stage renal disease undergoing simultaneous pancreas and kidney transplantation. *Diabetology international*, 8(3), 268-274.
- Parsaei Mehr, Z., Moshtagh Eshgh, Z., Hami, M., & Fesharaki, M. (2014). Comparison of depression between kidney transplant recipients from live donors with cadavers in hospitals of Mashhad University of Medical Sciences. *Advances in Nursing & Midwifery*, 23(81), 41-46.
- Rahimi, F., Gharib, A., Beyramijam, M., & Naseri, O. (2014). Effect of self-care education on self efficacy in patients undergoing hemodialysis. *Life Science Journal*, 11(1 SPEC), 136-140.
- Raisifar, A. T. A., Ebadi, A., Najafi, S., Hashemi, S., & Asiyabi, M. (2014). An investigation of Quality of life in Kidney Transplant Patients. *Iranian Journal of Critical Care Nursing*, 4(3), 149 – 52
- Rasooli, M., & Abedini, M. (2017). The Relationship between Organizational Support and Job Satisfaction of Experts and Managers of Islamic Azad University of Qeshm and

Subsidiaries (International Units, Medical, Sama, Hormuz and Khamir). *Dutch Journal of Finance and Management*, 1(2), 42. <https://doi.org/10.29333/djfm/5818>

Rezaei, R. (2016). Effect of physical training on education of students. *UCT Journal of Management and Accounting Studies*, 4(3), 6-9.

Schäfer-Keller, P. (2009). *Patient self-management in kidney transplantation. definition, measurement, and intervention* (Doctoral dissertation, University\_of\_Basel).

SHABANY, H. M., MOHMMAD, A. J., Shekarabi, R., & Hosseini, A. F. (2011). The relationship between medication adherence and quality of life in Renal Transplant Patients.

Soltannezhad, F., Farsi, Z., & Moroei, M. J. (2013). The effect of educating health promotion strategies on self-care self-efficacy in patients undergoing kidney transplantation: A double blind randomized trial. *Nursing and midwifery studies*, 2(4), 64.

Thomas-Hawkins, C., & Zazworsky, D. (2005). Self-Management of Chronic Kidney Disease: Patients shoulder the responsibility for day-to-day management of chronic illness. How can nurses support their autonomy?. *AJN The American Journal of Nursing*, 105(10), 40-48.

Veater, N. L., & East, L. (2016). Exploring depression amongst kidney transplant recipients: a literature review. *Journal of renal care*, 42(3), 172-184.

Weng, L. C., Dai, Y. T., Huang, H. L., & Chiang, Y. J. (2010). Self-efficacy, self-care behaviours and quality of life of kidney transplant recipients. *Journal of advanced nursing*, 66(4), 828-838.

Zelle, D. M., Dorland, H. F., Rosmalen, J. G., Corpeleijn, E., Gans, R. O., van der Heide, J. J. H., ... & Bakker, S. J. (2012). Impact of depression on long-term outcome after renal transplantation: a prospective cohort study. *Transplantation*, 94(10), 1033-1040.