

# Evaluation of physical performance and quality of life among patients with previous kidney transplantation: A Cross-sectional study

Shami, Mohammed Adel M  
Abdulrahman Mohammed Ali  
Saud Mohammed Saud Aleisa  
Meshari Ghali Alnefaie

Urologist, King Abdulaziz Specialist, Taif, Saudi Arabia

## Corresponding author:

Shami, Mohammed Adel M  
Email: 5o6af71@gmail.com

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## Abstract

**Background:** While patients with kidney conditions have been reported to predominantly have concerns about their quality of life, most of the studies comparing the different kidney replacement therapy alternatives have been focused on patients and graft survival while patient reported QoL outcomes are either underreported or completely ignored in patients with kidney transplantation. It is important to have a full understanding of the post-transplantation QoL and physical performance changes over time. Therefore, the aims of this study are to assess the physical performance of patients after kidney transplantation as well as their perceived quality of life.

**Methodology:** This is a cross sectional study that was conducted among patients with CKD who underwent kidney transplantation in the last 10 years in Jeddah region, Saudi Arabia using a self-reported questionnaire which was distributed online among the patients. The questionnaire included the instrument of the World Health Organization, World Health Organization Quality of Life (WHOQOL-Bref), composed of 26 questions. Of these, two questions assess the overall perception of QOL and general health, and the others are divided into four domains: physical, psychological, social relationships and environment.

**Results:** In this study, we were able to collect data from 67 patients who reported undergoing kidney transplantation during the last ten years. Among the patients, 56.7 % of them were males while 37.3 % of the patients were older than 50 years old and 7.5 % were younger than 30 years old. According to WHOQOL-BREF used in this study, we found that the mean score of the overall QoL was 13.15 and physical health domain was 13.09 (out of 20). Moreover, the higher the educational level of the patients, the better the quality of life they reported, significantly ( $P=0.004$ ), and the same considering monthly income where those with higher monthly income reported better scores ( $P=0.001$ ). Living with family also has a significant positive impact on the scores of QoL with mean score of 13.9 compared with 12.3 in those living alone ( $P=0.001$ ).

**Conclusion:** This study showed that patients who underwent kidney transplantation showed good QoL and physical health when compared to the literature review of patients on hemodialysis. Higher educational level, living with family, having higher income and no need for hemodialysis after the surgery were associated significantly with better QoL.

**Key words:** physical performance, QOL, kidney transplantation

## Introduction

Chronic kidney disease (CKD) is one of the causes of an early loss of physical and mental performance which is associated with self-perceived poor quality of life (QoL) [1]. CKD is characterized by increasing the levels of urea and creatinine in the blood which mainly cause hypertension, diabetes mellitus and glomerulonephritis [2,3]. In the end stage of the disease, main treatment strategies usually include hemodialysis (HD), peritoneal dialysis and kidney transplant [3]. Renal transplant is considered the best therapeutic expectation for uremic patients and it is associated with significant improvement of patients QoL with a reduction in pain and general increase in functional capacities [4,5]. However, this modality of management of CKD leads the person to a condition of chronicity which generates a great uncertainty. These patients require continuous nursing care from the pre-transplant to the post-transplant stages to maintain the capacity for personal fulfilment [6].

After kidney transplantation, the patient presents early physiological results which appear as the immediate function of the graft as well as creating high expectations at personal, social and family levels. However, the process is also associated with some risks, concerns and dependence on pharmacological treatment and a high social and economic impact [7]. Thus, however, the advantages of the kidney transplantation of improving the QoL [8–10], life after kidney transplantation may have some negative as well as positive aspects. QoL is one of the terms of the highest multifactorial expressions which have different definitions however, in our study, we use the definition of quality of life proposed by the World Health Organization (WHO) which defined QoL as the individual's perception about his/her position in life within the context of cultures and values which is associated with his/her goals, expectations, concerns and standards [11]. In general, the measurement instruments for QoL are evaluated from the following domains including psychological, environment, physical and social aspects [12]. The physical domain of QoL includes the perception of the patients considering their physical pain, fatigue, daily activities, work capacity, sleep and treatment dependence [11].

Disability is particularly severe in patients who are undergoing hemodialysis or peritoneal dialysis which is associated with increase in the prevalence of unemployment, pain, depression, low sleep quality and increased risk for malnutrition, anemia and inflammation [13–15]. In those with defective physical performance, it is common to have protein-energy wasting and abnormal body composition which could lead to increased hospitalization and mortality [16]. There is a strong correlation between physical performance and clinical, social and mental outcomes [17–19].

The evaluation of QoL in patients with chronic non-communicable diseases such as CKD enables the identification of aspects that affect the perception of these individuals about their own existence and about their perception of modifications imposed by the disease and by treatment [20,21]. Considering CKD, successful kidney transplantation is considered a therapeutic strategy that increases the chances of returning the patients to their routine of life before the onset of the disease [22]. The

measurement of QoL is an important parameter in order to evaluate the real benefit of the available therapies in patients with CKD, considering that the transplant is not considered a cure for these patients who remain in this stage classified as chronic kidney disease patients [12]. However, patients with kidney conditions have been reported to have predominantly concerns about their quality of life [22]. Most of the studies comparing the different kidney replacement therapy alternatives have been focused on patients and graft survival while patient reported QoL outcomes are either underreported or completely ignored in patients with kidney transplantation [23]. Moreover, results of QoL could help as prognostic markers where poor scores indicate the increased risk for worse outcomes [24]. Considering the scarcity of kidneys, transplants should primarily be allocated to patients who are expected to take full advantage of transplantation [25]. Thus, it is important to have full understanding of the post-transplantation QoL and physical performance changes over time. Therefore, the aims of this study are to assess the physical performance of patients after kidney transplantation as well as their perceived quality of life.

## Methodology

### Study design:

This is a cross sectional study that was conducted among patients with CKD who underwent kidney transplantation in the last 10 years in Jeddah region, Saudi Arabia.

### Study sample:

#### - Sample size:

Sample size of the study was calculated using software of Calculator.net using confidence interval of 95 %, margin of error of 5 % and population of 746 patients according to a study conducted in Jeddah in 2005. According to these data, sample size was calculated to be 67 participants.

#### - Subjects:

In this study, we included the participants according to the following inclusion and exclusion criteria.

#### Inclusion criteria:

- Patients with CKD
- Treated with kidney transplantation
- Underwent the surgery in the last 10 years
- Both genders
- Any age

#### Exclusion criteria:

- Having any injury that affects the physical performance or quality of life, other than CKD.
- Patients who are unable to give the authors consent

#### - Sampling strategy:

A simple random sampling system was used to collect the sample size.

#### - Study instrument:

In this study, we depended on self-reported questionnaire which was distributed online among the patients. The questionnaire started with agreement to consent as well as questions as to if the participants have had kidney transplantation in order to apply the inclusion and exclusion criteria. Then the questionnaire included the instrument of the World Health Organization, World Health

Organization Quality of Life (WHOQOL-Bref), composed of 26 questions. Of these two questions assess the overall perception of QOL and general health, and the others are divided into four domains: physical, psychological, social relationships and environment. The answers were filled in using a Likert scale, ranging from 1 to 5, with 1 being the negative extreme and 5 the positive extreme. Thus, the higher the scores, the better the quality of life [11]. Moreover, the questionnaire also included questions considering the demographic features of the participants.

#### - Statistical analysis:

MS Excel was used for data entry as well as cleaning and coding, while data analysis was conducted using SPSS version 26. Frequency and percent were used to describe the categorical variables while mean and standard deviation described the ongoing categories. Chi test, t test and ANOVA test were used to assess the relation between variables. All statements were considered significant if p value is lower or equal to 0.05.

12.92 in those 18-30 years old). Moreover, males reported higher scores than females (13.24 vs 12.91) however this difference is not significant (0.267). Saudi patients reported a significantly higher level of quality of life than non-Saudi patients (13.32 vs 12.5,  $p=0.023$ ). Moreover, the higher the educational level of the patients, the better the quality of life they reported significantly ( $P=0.004$ ), and the same considering monthly income where those with higher monthly income reported better scores ( $P=0.001$ ). Living with family also has a significant positive impact on the scores of QoL with mean score of 13.9 compared with 12.3 in those living alone ( $P=0.001$ ). The duration of the condition had no significant impact on the quality of life as reported by patients however, having dialysis after the surgery reduced significantly the quality of life to 11.7 compared with 14.6 in those who reported no need for dialysis after the surgery.

## Results

In this study, we were able to collect data from 67 patients who reported undergoing kidney transplantation during the last ten years. Different demographic factors of the patients were assessed and are presented in Table 1. Among the patients, 56.7 % of them were males while 37.3 % of the patients were older than 50 years old and 7.5 % were younger than 30 years old. Moreover, almost all of the sample population were Saudi Arabian (95.5 %) while 31.3 % reported having monthly income of more than 20,000 SR (Saudi Riyal) and 22.4 % reported having less than 5,000 SR as monthly income. Considering the educational level, we found that 64.2 % reported having secondary education or below while 35.8 % had university education level. Moreover, 73.1 % of the patients were married and 97 % were living with family. Furthermore, 64.2 % reported having the transplantation during the last five years while 35.8 % reported having it from 5-10 years ago. Moreover, 11.9 % of the patients reported the need for dialysis after the surgery.

According to WHOQOL-BREF used in this study, we found that the mean score of the overall QoL was 13.15 (out of 20). The highest score was reported in the social relationship domain with 13.89 (out of 20), followed by psychological domain with 13.53 (out of 20), physical domain with 13.09 (out of 20) while the environmental health domain had the lowest score of 12.1 (out of 20). Considering patients' perception of quality of life, the mean score was 3.49 which indicated that most of the patients reported good quality of life while the mean perception of general health was 3.49 which indicated satisfaction (Table 2).

In Table 3, we assessed the relation between demographic factors of the patients and their quality of life. There is no significant difference between patients with different age categories considering the quality of life ( $P=0.113$ ) however, we found that older patients had higher scores than younger participants (14.00 in those > 50 years and

**Table 1: The demographic factors of patients who underwent kidney transplantation during the last 10 years (N=67)**

Variable		Count	Percent
Gender	Male	38	56.7%
	Female	29	43.3%
Age	18-30	5	7.5%
	31-40	20	29.9%
	41-50	17	25.4%
	>50	25	37.3%
Nationality	Saudi Arabian	64	95.5%
	Non-Saudi Arabian	3	4.5%
Monthly income:	< 5,000 SR	15	22.4%
	5,000 -10,000	13	19.4%
	10,000 – 20,000	18	26.9%
	> 20,000	21	31.3%
Educational level:	Secondary school or below	43	64.2%
	University or above	24	35.8%
Marital status:	Single	11	16.4%
	Married	49	73.1%
	Widow/ divorced	7	10.4%
Living with:	Alone	2	3.0%
	With family	65	97.0%
When have you had the transplantation surgery?	1 -5 years ago	43	64.2%
	5 – 10 years ago	24	35.8%
Do you need for dialysis after the surgery?	Yes	8	11.9%
	No	59	88.1%

**Table 2: Mean domain score for renal transplant recipient**

Physical	13.09	1.61
Psychological	13.53	2.12
Social relationship	13.89	2.13
Environment health	12.1	2
Perception of quality of life	3.49	0.73
Perception of general health	3.49	0.81
Overall QOL score	13.15	1.45

**Table 3: The relation between demographic factors and quality of life.**

Variables	Categories	Transplant patients (n=67)
		Mean (SD)
Age (years)	18-30	12.92 (1.73)
	31-40	13.16 (1.30)
	41-50	13.04 (1.50)
	>50	14.00 (0.99)
	P-value	0.113
Sex	Male	13.24 (1.26)
	Female	12.91 (1.93)
	P-value	0.267
Nationality	Saudi Arabian	13.32 (1.45)
	Non-Saudi Arabian	12.50 (1.30)
	P-value	0.023□
Marital status	Unmarried	13.79 (2.25)
	Ever married	13.11 (1.37)
	P-value	0.167
Education	Secondary school or below	12.54
	University or above	13.73 (1.61)
	P-value	0.004□
Monthly income:	< 5,000 SR	11.9 (0.61)
	5,000 -10,000	12.3 (1.23)
	10,000 – 20,000	13.8 (1.01)
	> 20,000	14.2 (0.71)
	P-value	0.001*
Living with:	Alone	12.3 (0.41)
	With family	13.9 (1.23)
	P-value	0.001*
When have you had the transplantation surgery?	1 -5 years ago	13.12 (1.23)
	5 – 10 years ago	13.17 (1.12)
	P-value	0.992
Do you need for dialysis after the surgery?	Yes	11.7 (0.56)
	No	14.6 (1.23)
	P-value	0.0001*

## Discussion

Quality of life is considered one of the increasingly recognized key outcomes parameters among patients with any medical and interventional treatment. The aim of this study was to determine the QoL of patients who underwent kidney transplantation during the last 10 years and the influencing factors that were assessed by the WHOQOL-BREF questionnaire. In the study, we found that the scores of quality of life and physical performance domain among patients who underwent kidney transplantation were 13.15 and 13.09. This is similar to the results of a previous study conducted by Ranabhat K et al, among 92 kidney transplant patients [26]. In comparison with hemodialysis, another intervention used in patients with kidney failure, the literature reported significantly lower scores of WHOQOL-BREF including a study of Ranabhat K et al, who reported the mean quality of life and physical domains among patients on hemodialysis of 11.46 and 10.61 [26]. Many previous studies enforced our results that QoL of life and physical assessment in patients who underwent kidney transplantation is better than those on hemodialysis. In a study conducted by Sapkota A et al, the authors used the same tool we used and reported that the mean total QoL and physical health domains scores were 14.2 and 15.2 respectively which reported to be better than those on hemodialysis had mean scores of 12.5 and 11.9 respectively [27]. Moreover, another study reported that the physical health domain score was significantly higher in patients who underwent kidney transplantation than those who were on hemodialysis (16.5 and 10 respectively) and the same study showed that physical health in patients with asthma (11.5) was better than those on hemodialysis but worse than those who underwent kidney transplantation [28]. In a previous study conducted by Rambod M, the authors reported that the mean total QoL score of kidney transplanted patients was 21.36 which is significantly higher than that reported among patients on hemodialysis with mean score of QoL of 20.35 using Quality of Life Index–Dialysis and Transplantation Version questionnaire [29]. The lower QoL in the physical domain in patients on hemodialysis reported in these studies, than in the transplant patients, can be associated with physical pain, weakness, insomnia and hindrance to daily activities associated with hemodialysis [30]. A previous study showed that the increase in duration of hemodialysis was associated with worse QoL [31]. Many other studies that used different tools to assess the quality of life and physical health reported similar results that patients with kidney transplantation had better quality of life than those on hemodialysis [5,31–33]. These results as well as our results showed that kidney transplantation has a significant positive impact on patients' quality of life and causes significant improvement considering the physical performance of patients. This result was reported in many previous studies [9,10,34–37].

The second aim in this study was to determine the demographic factors associated with better QoL among patients who underwent kidney transplantation. In this study, males had slightly better quality of life however, this

difference is not significant. This is in agreement with the result of a previous study which showed that 72.7 % of the male patients and 70 % of female patients reported good QoL with no significant difference between the two genders [38]. However, the association between gender of the patients and QoL of patients with kidney transplantation is still under debate. Based on the literature, a previous study showed that women had better survival rates than males based on their adherence to their medication [39]. While other studies showed that male patients had significantly better QoL because they had the time to participate in more daily activities than women which increase their self-confidence while adapting to new body conditions after the surgery [40,41]. Educational level is one of the factors that affects the quality of life of patients where the higher the education level, the better quality of life. This is similar to the results of a previous study [38]. This could be explained by that higher educated patients had higher levels of understanding of the necessity for adhering to their medications and thus had better improvement in their health [39,42]. Kidney transplantation is a surgery that requires patience, motivation, and high confidence level in order to achieve good quality of life, thus, a patient's QoL will be better along with better educational level of patient. Living with family is associated significantly with better QoL of patients who underwent kidney transplantation. In a previous study conducted by Friedman, the author reported that family support that consisted of behaviors and acts of acceptance toward the patients and in the form of informational, assessment, and emotional support is one of the factors that affect the QoL of the patients [43]. The family support is also needed to encourage these patients to adhere to the medication and development new skills [38]. Moreover, we found that need for hemodialysis after having the surgery had a significantly negative impact on QoL of the patients which is expected as a feeling of failure and depression, anxiety and stress associated with the hemodialysis are associated with worse QoL [44–46].

This study had some limitations including depending on self-reported questionnaire which may lead to some personal bias where some patients underestimate or overestimate the aspects of their life. The distribution of questionnaire with online instrument had its positive effect on increasing the spread of the questionnaire however, it did not ensure being patients with kidney transplantation which is another limitation. Therefore, conducting the same study among patients who are admitted to clinics or hospitals should be considered.

In conclusion, this study showed that patients who underwent kidney transplantation showed good QoL and physical health when compared to the literature review of patients on hemodialysis. Higher educational level, living with family, having higher income and not needing hemodialysis after the surgery were associated significantly with better QoL.

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