



The Assessment of The Quality of Life in Kidney Transplant Recipients in Ahvaz, Iran

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ABSTRACT

Background: The health-related quality of life in patients who have received kidney transplants plays a crucial role in determining the timing of their dialysis initiation and their involvement in family and community settings. Consequently, this study was conducted to evaluate the quality of life among kidney transplant recipients.

Method: This research is a retrospective descriptive-analytical study involving patients who have undergone kidney transplantation within the past year, carried out at Golestan and Imam Khomeini Ahvaz hospitals. A specific questionnaire, the KDQOL-SF, was employed to gather data on the quality of life of these patients. The study comprised 27 participants who were at least 6-months post-transplant.

Results: The results indicated that the overall quality of life among the participants was average, with those who were one-year post-transplant reporting improved quality of life scores. It was observed that men and married individuals had significantly higher quality of life scores compared to their female and single counterparts. Furthermore, participants aged 26 to 30 years exhibited the highest quality of life scores, and a significant positive correlation was found between quality of life and the level of social support received by kidney transplant patients.

Conclusion: In summary, the findings of this study suggest that the quality of life for kidney transplant recipients is generally average, with notable improvements occurring one year after the procedure. Additionally, demographic factors such as gender, marital status, and age, along with the presence of social support, are significant determinants of quality of life in this demographic.

Keywords:

Kidney Diseases, Kidney Transplantation, Patient, Life Quality.

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INTRODUCTION

The assessment of medical treatments' effectiveness is significantly informed by the quality of life, survival rates, and other clinical outcomes of patients. Over time, the emphasis in medical care has shifted from a primary focus on mortality rates and survival advantages to prioritizing quality of life as a crucial measure of treatment success. As a result, healthcare providers are tasked with carefully weighing the risk-benefit ratio alongside the considerable costs linked to various treatment options, particularly regarding their effectiveness. This consideration is especially pertinent in the realm of kidney transplantation, where while long-term survival

rates are impressive, there is a growing recognition of the importance of patient quality of life. Individuals undergoing continuous ambulatory hemodialysis and peritoneal dialysis frequently encounter a range of difficulties, including increased cardiovascular and endocrine risks. Studies suggest that dialysis may negatively affect the longevity of kidney transplants. Conversely, transplantation allows for complete physical rehabilitation, although it may bring about side effects from immunosuppressive medications and require ongoing clinic visits for health assessments. Additionally, the transplantation process can have implications for psychological health, such as body image

concerns, which in turn can influence overall quality of life (1,2). It has been noted that successful kidney transplantation in patients with chronic kidney failure not only increases their life span but also improves their overall quality of life (3-5). Recent research by Hiragi et al. (2019) has shown that individuals who have undergone kidney transplants report a higher quality of life compared to those with end-stage renal disease, as evaluated through the KDQOL-SF health-related quality of life questionnaire. The evaluation of quality of life, particularly in relation to health status, holds significant importance in the health sciences, with patient quality of life becoming a vital indicator for assessing treatment effectiveness, attracting considerable attention from various professionals in the field. The main goal of kidney transplantation for those with renal failure goes beyond simply prolonging life; it also seeks to improve their overall quality of life. Assessing quality of life provides a thorough understanding of the challenges faced by patients, which may lead to a reevaluation of medical treatments, especially since those with chronic conditions are often more profoundly affected by healthcare policies. Additionally, employing diverse methods to study the quality of life among patients with chronic kidney issues can facilitate progress in medical and care approaches (6, 7).

Recent studies have demonstrated that successful kidney transplantation provides both a survival advantage and an improved health-related quality of life when juxtaposed with maintenance dialysis. However, directly comparing different renal replacement therapy options poses significant difficulties. The characteristics of these therapies differ markedly; dialysis necessitates frequent and invasive interventions, along with a heavy and immediate dependence on healthcare providers and medical technology, whereas transplant recipients typically engage in more standard medical management. Additionally, transplant patients generally maintain a considerable level of renal function, in stark contrast to maintenance dialysis patients, who often have little to no renal function, significantly affecting their overall health and quality of life. Despite these differences, both groups share commonalities in their chronic medical conditions, as they both endure chronic renal failure and the associated

symptoms and complications of chronic kidney disease (CKD), resulting in overlapping health issues. Therefore, the creation of robust psychometric instruments to assess and compare health-related quality of life among these patient populations is of great significance (8). The KDQOL-SF is a valuable assessment instrument designed to evaluate the quality of life in individuals affected by kidney disease. This tool includes multiple subscales that focus on various dimensions of the patient's experience, such as functional capabilities, overall well-being, and health-related quality of life, as well as their self-perception regarding physical, psychological, and social factors (9). Specifically, version 1.3 of the KDQOL-SF combines a kidney disease-specific section with the SF-36 general health quality of life measure (10). Although it is a streamlined version of the more comprehensive 133-item KDQOL, the KDQOL-SF consists of 43 questions related to kidney disease and 36 questions from the SF-36, allowing for a thorough assessment. Importantly, there is a notable gap in extensive research concerning the quality of life of kidney patients in Ahvaz city, especially during the difficult period of the Covid-19 pandemic, which has been further complicated by the region's challenging environmental conditions. Therefore, this study seeks to investigate the overall health-related quality of life among kidney transplant recipients in Ahvaz city by employing the KDQOL-SF tool.

MATERIAL AND METHODS

The community of the study

The research population comprised all individuals who had undergone a kidney transplant and had reached a maximum of one-year post-transplantation at the Golestan and Imam Khomeini Ahvaz organ transplant centers and affiliated hospitals. Participants were selected through a random sampling method. The primary focus of the study was on patients with kidney disease who had received a kidney transplant, specifically analyzing a cohort of 27 patients who had recently undergone the procedure, utilizing demographic data from Ahvaz. Inclusion criteria for the study were restricted to those who had experienced either a primary or a repeat kidney transplant. In contrast, individuals younger than 18 years, those who had been transplanted for more than one year, and patients with cognitive

impairments or active psychiatric disorders were excluded from the study.

Data collection

Initially, medical records of patients were obtained from the transplant centers, using a telephone survey. Patients with sufficient literacy completed the questionnaire independently, while those with limited literacy had their answers recorded through verbal questioning. The demographic and clinical data collected included gender, age at the time of transplant, height, weight, body mass index, dialysis status, type and duration of dialysis, overall medical condition, presence of underlying diseases at the time of transplantation (such as hypertension and diabetes), and the type of transplant donor (living or deceased). Furthermore, patients were divided into two groups based on their time since transplantation—six months and one year—and the quality of life was compared between these two groups. The data collection tool employed in this research was a questionnaire specifically designed to evaluate the quality of life among individuals with kidney disease, known as the KDQOL-SF. This extensive instrument comprised 79 items designed to assess various facets of life quality for individuals with kidney conditions. The questionnaire includes both general and specific dimensions relevant to quality of life. The general dimension is subdivided into two primary categories: physical health and mental health, which together encompass eight distinct domains. The physical health aspect covers four specific areas: overall health, physical functioning, role limitations due to physical health, and experiences of physical pain. Conversely, the mental health dimension focuses on four areas related to emotional well-being, social functioning, psychological health, and participation in activities. The specific dimension of the questionnaire is more intricate, consisting of 11 areas that investigate symptoms and challenges, the impact of kidney disease, the associated burden, cognitive abilities, the quality of social interactions, availability of social support, sleep patterns, employment status, sexual health issues, and overall satisfaction with care and hospital personnel. This questionnaire functions as a robust and reliable multi-dimensional tool that incorporates all aspects of the KDQOL-SF-36 questionnaire, along with variables relevant to kidney disease,

demonstrating significant homogeneity and internal consistency. Each dimension is scored on a scale from 0 to 100, where a score above 50 in any dimension or area indicates an enhanced quality of life. Additionally, the validity and reliability of the questionnaire within the Iranian context were evaluated using Cronbach's alpha, resulting in a value of 0.85 (11-13).

Data analysis

SPSS software was used to analyze the data. Using the K_s test, the normality of the data was checked. T-test was used to compare between groups. Data were presented as Mean \pm SEM and $P < 0.05$ was considered significant.

RESULTS

The demographic information of the participants in the study

A total of 27 patients took part in the current study, as determined by the established entry and exit criteria. The participant group comprised both women and men. The mean age of the participants was recorded (29.5 ± 1.4), and their body mass index (BMI) was also assessed (24.6 ± 2.17). Based on the average age and the calculated BMI, it was concluded that the participants fell within the healthy weight range according to standard BMI classifications for adults.

The results of the quality-of-life score of the studied patients according to the dimensions of the questionnaire (General aspect)

The data presented in Table 1 indicates that the dimension of physical conditions encompasses four key areas: general health, physical function, physical role, and physical pain. Additionally, the dimension of mental conditions comprises four areas: emotional role, social functioning, mental health, and activity. This investigation focused on patients who underwent kidney transplantation, assessing their conditions six months to one-year post-surgery. The statistical analysis revealed that the quality-of-life scores for general health ($P = 0.035$), physical function ($P = 0.028$), physical pain ($P = 0.031$), social function ($P = 0.047$), and vitality ($P = 0.025$) were significantly improved one year after the transplant compared to six months post-operation. However, no significant differences were observed in the indicators of physical role ($P = 0.062$), emotional role ($P = 0.054$), and mental health ($P = 0.073$) between the two time points.

Table 1. Quality of life scores based on mental and physical conditions in kidney transplant patients 6 months and one year after kidney transplant. t-test statistical analysis. The results are displayed as SEM±Mean. * vs 6 months after kidney transplant.

Significant Level	Quality of life score After a year	Quality of life score After 6 months	Dependent variables	Dimensions of the questionnaire
*P=0.035	4.13±0.11	3.11±0.09	Public Health	Physical conditions
*P=0.028	3.54±0.7	3.22±0.03	Physical Performance	
P=0.062	3.98±0.51	3.45±0.68	Playing A Physical Role	
*P=0.031	2.11±0.37	3.10±0.22	Physical Pain	Mental condition
P=0.054	4.69±0.18	4.27±0.16	Playing An Emotional Role	
*P=0.047	3.46±0.25	3.09±0.17	Social Performance	
P=0.073	4.31±0.44	4.29±0.38	Mental Health	
*P=0.025	3.19±0.61	2.06±0.56	Activity	

The results of the quality-of-life score of the studied patients according to the dimensions of the questionnaire (Specific aspect)

As indicated in Table 2, the specific dimension encompasses 11 areas, which include a range of symptoms and problems, the effects of kidney disease, the associated burden, cognitive function, the quality of social relationships, social support, sleep patterns, employment status, sexual health issues, and overall satisfaction levels. The evaluation of care and departmental staff was conducted among patients at intervals of 6 months and 1-year post-kidney transplant. Statistical analysis revealed that patients

exhibited a significantly improved quality of life one year after surgery compared to six months post-transplant in several areas, including symptoms and problems ($P=0.0017$), the impact of kidney disease ($P=0.034$), quality of social relationships ($P=0.017$), job status ($P=0.025$), and sexual issues ($P=0.037$). However, while differences were noted in the indices related to the burden of kidney disease ($P=0.051$), cognitive function ($P=0.069$), social support ($P=0.063$), sleep status ($P=0.057$), and satisfaction with care and staff ($P=0.061$), these did not reach statistical significance when comparing the two time points.

Table 2. Quality of life scores based on specific conditions in kidney transplant patients 6 months and one year after kidney transplant. t-test statistical analysis. The results are displayed as SEM±Mean. * vs 6 months after kidney transplant.

significant level	Quality of life score After a year	Quality of life score After 6 months	Dependent variables	Dimensions of the questionnaire
**P=0.0017	3.41±0.2	2.07±0.03	Symptoms and problems	Specific conditions
*P=0.034	3.41±0.71	3.38±0.15	The effect of kidney disease	
P=0.051	3.98±0.17	3.19±0.46	Burden of kidney disease	
P=0.069	4.66±0.31	4.49±0.27	Cognitive function	
P=0.017**	3.12±0.35	1.4±0.06	The quality of social relations	
P=0.063	2.49±0.31	2.12±0.22	Social support	
P=0.057	3.6±0.59	3.19±0.46	Sleep state	
P=0.025*	3.17±0.33	2.02±0.6	Employment status	
*P=0.037	3.05±0.42	2.00±0.18	Sexual issues	
P=0.061	3.41±0.58	3.23±0.39	The level of satisfaction with the care and staff of the department	

Level of quality of life in kidney transplant patients in Ahvaz based on demographic variables

As illustrated in Table 3, the study's variables, which encompass age, sex, and marital status, were analyzed in patients at the 6-month and 1-year marks following kidney transplant surgery. The statistical analysis revealed that, at the 6-month post-transplant interval, male patients reported a significantly higher quality of life score compared to their female counterparts. Furthermore, the age group of 26 to 30 years exhibited the highest quality of life scores. An assessment of marital status indicated that married patients had a superior quality of life score in comparison to those who were unmarried.

Table 3. Quality of life score based on demographic indicators in kidney transplant patients 6 months and one year after kidney transplant. t-test statistical analysis. The results are shown as mean \pm SEM. * vs Female and # vs 6 months after kidney transplant.

Significant level	Quality of life score one year after transplantation	Quality of life score 6 months after transplantation	Variable
P=0.012## P=0.042#	*4.26 \pm 0.2 3.64 \pm 0.37	*3.37 \pm 0.16 3.09 \pm 0.09	Gender Male Female
P=0.0001### P=0.053 P=0.062 P=0.085	3.81 \pm 0.22 *4.2 \pm 0.31 3.89 \pm 0.5 3.35 \pm 0.62	2.46 \pm 0.06 3.85* \pm 0.12 3.41 \pm 0.9 3.37 \pm 0.18	Age 25-20 26-30 31-35 36 \geq
P=0.0014## P=0.041#	3.98 \pm 0.26 *4.18 \pm 0.31	2.6 \pm 0.15 *3.7 \pm 0.43	Married status Single Married

The level of quality of life in kidney transplant patients in Ahvaz based on the studied variables

The variables examined in the study, as presented in Table 4, encompass various aspects such as job activity type and workload, health-related issues experienced over the past four weeks, monthly income, pre-existing medical conditions, daily activity duration, quality of daily leisure, and levels of concern and anxiety. Additionally, the study evaluates the quality of social engagements, interactions with family and friends, physical discomfort, overall physical condition during work, status of kidney disease, sexual activity, sleep quality, and satisfaction with the dialysis process. These factors were compared among patients six months and one year following kidney transplant surgery.

DISCUSSION

Quality of life is increasingly acknowledged as a crucial factor in evaluating medical and interventional treatments. To our knowledge, this study represents one of the few investigations that compare the quality of life among kidney transplant patients in Iran. The results indicate that transplant recipients experienced

significantly improved quality of life scores during the first-year post-transplant when compared to the initial six months, across all dimensions including physical, psychological, social relationships, and environmental health. Furthermore, the overall assessment of quality of life and general health was markedly better in the first year following transplantation than in the first six months. While these findings underscore the effectiveness of kidney transplantation in enhancing the quality of life for individuals with end-stage renal disease (ESRD), it is important to note that the Iranian healthcare system grapples with challenges related to limited and inequitable access to transplant services. The diminished quality of life observed in the physical domain during the first six months post-transplant can be linked to issues such as physical pain, fatigue, insomnia, and restrictions in daily activities (14). Kidney transplantation is recognized as the optimal treatment for end-stage kidney failure, and quality of life plays a vital role in the longevity of transplant success, highlighting the necessity for social support to enhance patients' overall well-being. Quality of life serves as a critical predictor of mortality in patients experiencing end-stage renal failure, and it is

Table 4. Quality of life score based on the studied indicators in kidney transplant patients 6 months and one year after kidney transplant. t-test statistical analysis. The results are displayed as SEM±Mean. * vs 6 months after kidney transplant.

Significant level	Quality of life score one year after transplantation	Quality of life score 6 months after transplantation	Variable
*P=0.037	4.07±0.33	3.14±0.26	Type of job activity and workload
P=0.067	3.15±0.12	2.99±0.07	Health-related factors during the last 4 weeks
P=0.055	3.37±0.19	3.55±0.58	The amount of monthly income
P=0.088	2.1±0.92	2.06±0.08	underlying disease
*P=0.033	3.8±0.63	3.17±0.44	Duration of daily activity
P=0.079	2.2±0.12	2.14±0.5	Quality of daily entertainment
P=0.071	2.05±0.17	2.8±0.09	The amount of daily worry and anxiety
*P=0.027	4.16±0.31	3.05±0.2	Quality of social activities
*P=0.036	3.14±0.091	2.67±0.26	Quality of social and family interactions
*P=0.01	3.15±0.32	1.46±0.18	physical pain
*P=0.001	3.61±0.03	2.25±0.38	Physical condition during work activities
P=0.07	2.3±0.06	2.19±0.05	kidney disease
*P=0.037	3.05±0.42	2.00±0.18	Sexual activity status
P=0.057	3.6±0.59	3.19±0.46	sleeping position
P=0.087	2.59±0.09	2.14±0.28	Satisfaction with the dialysis process

regarded as the foremost metric for assessing health outcomes and implications in this population (15). The objective of this study is to assess the quality of life among kidney transplant recipients in Ahvaz city. The findings indicate that, in terms of general health, physical functioning, pain levels, social functioning, and vitality, the quality-of-life scores for patients one-year post-surgery were markedly higher than those recorded six months following the kidney transplant. The analysis of quality of life among kidney transplant patients revealed that the majority exhibited an average quality of life score. Various studies, including the research conducted by Ranabhat et al. in 2020, have highlighted the health-related quality of life differences between hemodialysis patients and kidney transplant recipients, emphasizing the superior quality of life experienced by transplant patients across all four domains of the WHOQOL-BREF (16). Furthermore, this study explored the significant correlations between age and gender among both dialysis patients and transplant recipients, corroborating the results found in this research. Additionally, the findings

align with those of Mendonja et al. in 2015, which analyzed the physical dimensions of quality of life in kidney transplant patients, demonstrating a significant relationship between physical performance and overall quality of life (17). In the research that assessed Kiangin's physical quality of life scores prior to and following kidney transplantation, a notable enhancement in quality of life was observed (18), corroborating the findings of the current study. In 2021, Kamal al-Dini and colleagues conducted a comparative analysis of the quality of life between patients undergoing hemodialysis and those who had received kidney transplants, revealing that transplant recipients experienced a markedly superior quality of life compared to their hemodialysis counterparts (19). This leads to the conclusion that kidney transplantation plays a significant role in enhancing quality of life. Furthermore, Das et al (2013) investigated the quality of life in individuals with end-stage renal disease post-kidney transplantation through a cross-sectional study involving forty participants, comprising twenty kidney transplant recipients and twenty donors of both genders

(20). The follow-up, conducted via telephone from two weeks before the transplant to six months post-procedure, indicated that recipients exhibited statistically significant improvements across all measured parameters ($p < 0.05$). Noteworthy changes in both quality of life and mental health status were documented for both recipients and donors before and after the transplantation process. Junchotikul and associates (2015) conducted a study in Thailand involving 232 patients to assess their quality of life before and after kidney transplantation, focusing on the influence of fundamental factors such as gender, age, educational attainment, marital status, and income on post-transplant quality of life (21). The findings revealed a notable enhancement in quality of life, as measured by the EQ5D, across various dimensions including self-mobility, self-care, pain, distress, anxiety, and depression following the transplantation. The average Visual Analog Scale (VAS) score increased from 40.98 prior to the transplant to 83.10 afterward, leading the authors to conclude that a successful kidney transplant significantly elevates quality of life and represents a preferred treatment option for patients with end-stage renal disease. Similarly, Mendonca and colleagues (2014) (22) performed a descriptive study involving 63 patients to explore the changes in quality-of-life post-kidney transplantation and to assess the impact of socio-demographic factors at a referral center in northeastern Brazil, finding significant improvements across all quality-of-life domains. Additionally, Purnajo and his team (2020) analyzed patient-reported outcomes from phase III trials of belatacept to investigate the connections between health-related quality of life pathways, symptom experiences, and allograft outcomes. Health-related quality of life was assessed in 831 patients eligible for kidney transplantation at baseline, as well as at 12, 24, and 36 months post-transplant (23). Following the procedure, patients indicated enhancements across all subscales of the SF-36 when compared to baseline measurements, and these findings align with those of previous studies. The limited number of kidney transplant patients observed within the initial six months post-transplant can be linked to the stress associated with the risk of transplant rejection, which significantly impacts various dimensions of an individual's health,

including physical, mental, psychological, and social well-being. Furthermore, the financial burden and ongoing care required after transplantation contribute to both mental and economic strain on the recipient, highlighting the urgent need to identify and address these challenges to improve the overall situation effectively.

The statistical analysis conducted in our research revealed that male patients who underwent kidney transplant surgery reported a significantly higher quality of life score compared to their female counterparts. Furthermore, individuals aged between 26 and 30 years exhibited the highest quality of life scores. An analysis of marital status indicated that married patients had a superior quality of life score in comparison to those who were unmarried. Supporting this finding, the study by Raisifar et al. demonstrated that the average quality of life for men was notably greater than that for women. Additionally, the research conducted by Omid et al. in 2018 established a statistical correlation between quality of life and marital status, indicating that married patients had higher average quality of life scores than single or widowed individuals (24). Similarly, the findings of Taher et al. in 2014 corroborated those married patients experienced a higher quality of life. Collectively, these studies suggest that as age increases, the quality of life tends to decline due to the aging process and the escalation of disease-related complications, which aligns with the results of the current study (25). The findings of the current study indicate that the quality-of-life scores, which are influenced by factors such as the nature of occupational activities, workload, daily activity duration, social engagement quality, social interaction quality, physical pain, overall physical condition, and sexual activity, show significant improvement among patients one-year post-transplantation compared to those six months after the procedure. Lin et al. (2015) highlighted a direct correlation between social support and the quality of life in kidney transplant recipients, suggesting that enhanced social support correlates with improved quality of life (26). This observation is logical, as the family unit serves as the primary and most significant social institution, facilitating daily interactions that profoundly affect individuals' quality of life. Generally, after one-year post-transplantation,

patients experience greater stability in their health, leading to increased physical and sexual activity, as well as longer durations of daily activities, which collectively contribute to an enhanced quality of life.

CONCLUSION

The findings of the current study indicate that the overall quality of life for individuals is at a moderate level, with patients who have undergone a kidney transplant experiencing an enhanced quality of life one-year post-surgery. Notably, the quality-of-life scores were significantly higher among men and those who are married compared to women and single individuals. Furthermore, individuals aged between 26 and 30 years reported the highest quality of life scores. A direct and significant correlation exists between the quality of life and the degree of social support received by kidney transplant patients. Consequently, it is imperative to emphasize the importance of familial and societal involvement in enhancing the quality of life for these patients, which in turn can lead to better health outcomes. Health and medical professionals, by leveraging the supportive, educational, and collaborative roles of patients, can implement strategies to mitigate complications associated with kidney transplants and further improve patients' quality of life.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

- [1] Jofre R, Lopez-Gomez JM, Valderrabano F, et al. Changes in quality of life after renal transplantation. *Am J Kidney Dis*. 1998;32:93e100.
- [2] Rose C, Gill J, Gill JS. Association of Kidney Transplantation with Survival in Patients with Long Dialysis Exposure. *Clin J Am Soc Nephrol*. 2017;12(12):2024-2031.
- [3] Womasz W, Piotr S. A trial of objective comparison of quality of life between chronic renal failure patients treated with hemodialysis and renal transplantation. *Ann Transplant*. 2003;8:47e5
- [4] Reimer J, Franke GH, Heemann U, et al. Quality of life in patients before and after kidney transplantation. *Psychother Psychosom Med Psychol*. 2002;52:16e23.
- [5] Hiragi S, Goto R, Tanaka Y, et al. Estimating the net utility gains among donors and recipients of adult living donor kidney transplant. *Transplant Proc* 2019;51:676e83.
- [6] Namadi M, Movahedpur A. Comparison of quality of life in hemodialysis patients and renal transplant in centers hospitals of Ardabil [In Persian]. *J Ardabil Univ*. 2009;9(2):171–9.
- [7] Tol A, Esmaeil Shahmirzadi S, Moradian Sorkhkolae M, Azam K. Determination of quality of life of dialysis and kidney transplant patients compared to healthy people. *J Res Health Systems*. 2012;7(6):1170–7.
- [8] Barotfi S, Molnar MZ, Almasi C, Kovacs AZ, Rempert A, Szeifert L, et al. Validation of the Kidney Disease Quality of Life-Short Form questionnaire in kidney transplant patients. *J Psychosom Res*. 2006;60(5):495-504.
- [9] Hays RD, Kallich JD, Carter WB, et al. Development of the kidney disease quality of life (KDQOL) instrument. *Qual Life Res* .1994;3:329e38.
- [10] Miura Y, Green J, Fukuhara S. KDQOL-SFTM version 1.3. Japanese version. Tokyo: Public Health Research Foundation;2001
- [11] Ranabhat, K., Khanal, P., Mishra, S.R. et al. Health related quality of life among haemodialysis and kidney transplant recipients from Nepal: a cross sectional study using WHOQOL-BREF. *BMC Nephrol* 21, 43
- [12] Yekaninejad MS, Mohammadi Zeidi I, Akaberi A, Golshan A, pakpour A. Validity

- and reliability of the Kidney Disease Quality of Life - Short Form (KDQOL-SF™ 1.3) in Iranian patients. *J North Khorasan Univ Med Sci* 2012; 4(2):261-72.
- [13] Fardinmehr O, Farajzadegan Z, Emami Naini A, Mortazavi M, Gholamrezaei A. The validity and reliability of the Persian Version of Kidney Disease Quality of Life Questionnaire-Short Form (KDQOL-SF) in Iranian patients. *Journal of Isfahan medical school* 2012; 29.
- [14] Deng LX, Sharma A, Gedallovich SM, Tandon P, Hansen L, Lai JC. Caregiver burden in adult solid organ transplantation. *Transplantation*. 2023 Jul 1;107(7):1482-91.
- [15] Abecassis M, Bartlett ST, Collins AJ, Davis CL, Delmonico FL, Friedewald JJ, Hays R, Howard A, Jones E, Leichtman AB, Merion RM. Kidney transplantation as primary therapy for end-stage renal disease: a National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQI™) conference. *Clinical Journal of the American Society of Nephrology*. 2008 Mar 1;3(2):471-80.
- [16] Ranabhat K, Khanal P, Mishra SR, Khanal A, Tripathi S, Sigdel MR. Health related quality of life among haemodialysis and kidney transplant recipients from Nepal: a cross sectional study using WHOQOL-BREF. *BMC nephrology*. 2020 Dec;21:1-8.
- [17] Mendonça AE, Salvetti MD, Maia EM, Silva AC, Torres GD. Analysis of the physical aspects of quality of life of kidney recipients. *Revista da Escola de Enfermagem da USP*. 2015 Jan;49:76-81.
- [18] Kostro JZ, Hellmann A, Kobiela J, Skóra I, Lichodziejewska-Niemierko M, Dębska-Ślizień A, Śledziński Z. Quality of life after kidney transplantation: a prospective study. *InTransplantation proceedings* 2016 Jan 1 (Vol. 48, No. 1, pp. 50-54). Elsevier.
- [19] Mosaku K, Kolawole B, Mume C, Ikem R. Depression, anxiety and quality of life among diabetic patients: a comparative study. *Journal of the national medical association*. 2008 Jan 1;100(1):73-8.
- [20] Das RC, Srivastava K, Tudu J, Hooda AK. Crosssectional study of quality of life after renal transplant in end stage renal disease. *Industrial psychiatry journal*. 2014 Jan 1;23(1):40-3.
- [21] v. Wintzingerode F, Göbel UB, Stackebrandt E. Determination of microbial diversity in environmental samples: pitfalls of PCR-based rRNA analysis. *FEMS microbiology reviews*. 1997 Nov 1;21(3):213-29.
- [22] Mendonça AE, Torres GD, Salvetti MD, Alchieri JC, Costa IK. Changes in Quality of Life after kidney transplantation and related factors. *Acta Paulista de Enfermagem*. 2014;27:287-92.
- [23] Dobbels F, Wong S, Min Y, Sam J, Kalsekar A. Beneficial effect of belatacept on health-related quality of life and perceived side effects: results from the BENEFIT and BENEFIT-EXT trials. *Transplantation*. 2014 Nov 15;98(9):960-8.
- [24] Moudi A, Shahinfar S, Razmara MR, Salehiniya H. Is the quality of life different in single and remarried elderly?. *Journal of education and health promotion*. 2020;9.
- [25] Noto S. Perspectives on Aging and Quality of Life. *InHealthcare* 2023 Jul 26 (Vol. 11, No. 15, p. 2131). MDPI.
- [26] Zhao SM, Dong FF, Qiu HZ, Li D. Quality of life, adherence behavior, and social support among renal transplant recipients in China: a descriptive correlational study. *InTransplantation Proceedings* 2018 Dec 1 (Vol. 50, No. 10, pp. 3329-3337). Elsevier.