



Predictors of Quality of Life in Patients With End-Stage Renal Disease on Hemodialysis And With Kidney Transplantation

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SUMMARY

Introduction: The aim of the study was to investigate the impact of various factors on the quality of life (HRQoL) of patients with chronic kidney disease (CKD) treated with hemodialysis (HD) and kidney transplantation (KT) in the Specialized Center of the Military Medical Academy (VMA).

Material and Methods: The study was designed as a cross-sectional study, and conducted on a sample of 144 subjects (67 HD and 77 KT) patients. We evaluated HRQOL using a 15D standardized questionnaire. The data were collected by anamnesis, physical examination, anthropometric measurement, analysis of medical records, analysis of conducted questionnaire and laboratory tests.

Results: The study groups did not differ significantly in terms of gender, marital status and educational level, while a significant difference was observed with respect to age, working status, BMI, hemoglobin, albumin, urea, glucose and CRP concentrations. The results of the correlation analysis between the total 15D score of HRQoL and the examined parameters showed that age and unemployment were significantly negatively correlated with quality of life in both study groups (HD: $p < 0.001$; KT $p < 0.005$ for both correlations). A positive correlation of the total 15D score of HRQoL.

Conclusion: The largest number of studies examining the quality of life of patients with terminal renal insufficiency are cross-sectional and there are significantly fewer prospective studies that would follow patients for shorter or longer periods and compare their HRQoL. The results of both studies indicate that the transplant is associated with a better quality of life compared to hemodialysis, which is consistent with our results.

Keywords: Quality of Life, Predictors, Hemodialysis, Kidney Transplantation

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INTRODUCTION

Chronic kidney disease (CKD) is severe impairment of health, which is related to poor quality of life, early death, as well as to expense medical treatment. The incidence of CKD is growing (11% of world human population), which may be attributed to increasing incidence of obesity, diabetes mellitus and hypertension, as major risk factors for developing of CKD [1]. According to World Health Organization, CKD is 12th leading cause of death in world [2]. The fifth stadium of CKD is end-stage renal disease (ESRD) which requires some method for renal function replacement such as kidney transplanted, peritoneal dialysis or hemodialysis. Every one of them specifically influences the quality of life.

Health-related quality of life (HRQoL) refers to social, economic and physical wellbeing of individual within the whole society. It defines the state of general physical and mental health which enables everyday functioning of individual within family, work and social environment. Any acute or chronic disease undoubtedly may lead to impairment of everyday functioning of individual and lowering of quality of life. World Health Organization defines HRQoL as perception of one's own state in life in particular cultural context and according to his own aims, expectations and standards [3,4]. HRQoL shows particular influence of specific conditions on quality of life.

Kidneys are organs included in numerous processes in human organism, thus CKD may lead to various health impairments which decrease HRQoL. Numerous studies show decreased quality of life in patients with chronic diseases, due to diminished physical, social and mental functioning [5-9], while in patients with CKD the substantial prevalence of psychiatric, cardiovascular and mental disorders is reported [10-12]. Mental health of patients on hemodialysis and with kidney transplanted may be changeable, due to fear of possible complications and alterations of functional status [13]. Causes of such changes are numerous, and vary from presence of progressive illness itself to symptoms and clinical manifestations of given illness. Patients on hemodialysis depend on health facility, with consequences on one's profession, marriage, family and social life, and with possible worsening the financial state. Cognitive impairments are

also present, such as loss of memory and poor concentration. Alterations in body appearance, presence of uremic symptoms, sleeping impairment, along with major limitations in nutrition and fluid intake substantially influence the quality of life [12]. On the other side, kidney transplanted enables reestablishing of some normal functions, but also considers numerous challenges, such as constant and precise immune suppressive therapy, prevention of infections in conditions of decrease immunity defense, regular clinical controls, strict limitations in nutrition and physical activity [14]. Complex medical treatment considers discipline, even minimal deviation may cause problems in graft functions [15], and increase the fear of graft rejection [16]. Difficulties in finding appropriate job, lower monthly income as well as social pressure to return to normal pre-disease routine also influence quality of life in these patients [17]. Investigations suggest that social activity in patients after kidney transplanted is decreased, even more than in patients on hemodialysis [8]. Quality of life may be useful as parameter of mortality, as well as a measure of influence of medical treatment, but also for comparison of HRQoL between different groups. It represents important method of clinical monitoring and part of patient's care. It enables recognition of persons in particular risk; therefore, it gives opportunity for improving HRQoL in these subpopulations.

This study endeavors to investigate HRQoL in ESRD patients undergoing hemodialysis and kidney transplant recipients, elucidating the influence of demographic, socio-economic, and clinical factors on HRQoL outcomes within both patient cohorts [8].

MATERIAL AND METHODS

The research was designed as a cross-sectional study and was conducted at the Military Medical Academy (VMA), Clinic of Nephrology and the Center for Solid Organ Transplantation (VMA) in Serbia.

The study included 144 subjects of both sexes who were treated with different methods of renal function replacement (67 patients with hemodialysis and 77 with kidney transplantation). The inclusion criteria for participants in the study were as follows: individuals over 18 years of age, willing to participate in the research, undergoing di-

alysis treatment at least three times weekly for over six months, and following a kidney transplantation at least six months prior to the study. Exclusion criteria included the presence of acute systemic diseases, inflammatory bowel disease, lack of permanent vascular access for hemodialysis, current rejection of the transplanted kidney, any acute illnesses at the time of the study, malignancies, and mental disorders potentially affecting daily activities. To enroll participants, the researchers initially identified potential candidates through the study settings. Subsequently, they conducted face-to-face interviews and examined clinical records to assess participants' eligibility. Individuals who met the criteria and expressed interest were then enrolled in the study.

To measure HRQoL we used the generic questionnaire 15D [18,19], as described in our previous study [9], with the consent of the author of the questionnaire [9]. Consent for the use of the 15D questionnaire was obtained from the author of the questionnaire, and the conditions of use imply that the translation, validation and cross-cultural adaptation of the questionnaire is performed by the author of the questionnaire. The Serbian version of the 15D questionnaire was applied to patients with asthma and sarcoidosis, where it showed good psychometric measurement characteristics [20,21].

The total 15D score can be between 0 and 1, and higher values indicate a better quality of life. The data were collected by anamnesis, physical examination, anthropometric measurement, analysis of medical records, analysis of questionnaires and laboratory tests. Demographic and socioeconomic parameters, as well as behavior and behavior characteristics were collected using a structured questionnaire designed for the purpose of this research. Dialysis quality was measured using the Kt / V index. while blood levels of hemoglobin, urea, creatinine before hemodialysis, as well as glucose, albumin, and C-reactive protein were measured by standard methods.

The study was approved by the VMA Ethics Committee, number: MFVMA/8/15-17. Before commencing the research study, necessary permissions and approvals were obtained from the study settings' authorities. Each participant received detailed information sheets outlining the study's objectives and procedures. They were informed that their participation required signed consent, assurance of identity confidentiality, and the freedom to withdraw from the study without repercussions. It was mutually understood that data from withdrawn participants would not be included in the analysis. The study is not commercial and there are no financial incentives.

The obtained research results were

Table 1. Average and percentage values of demographic and socioeconomic parameters in both investigated groups

HD - hemodialysis group
KT - kidney transplantation group

Demographic and socio-economic characteristics		HD	KT	χ^2	p
Gender	Males	61.2%	59.7%	$\chi^2=0.032$	p>0.05
	Females	38.8%	40.3%		
Age (yrs)		58.6±15.6	43.8±11.2	t= 6.459	p<0.001
Marital status	Married	71.6%	70.1%	$\chi^2=8.184$	p>0.05
	Single	28.4%	29.9%		
Education	College/University	43.3%	36.4%	$\chi^2=5.671$	p>0.05
	High school	40.3%	57.1%		
	Elementary school	16.4%	6.5%		
Employment status	Employed	9%	24.7%	$\chi^2=12.274$	p<0.01
	Unemployed	14.95%	27.3%		
	Retired	67.2%	42.9%		
	Other	9%	5.2%		
Monthly income	> 400 USD	32.8%	19.5%	$\chi^2=11.762$	p>0.05
	201-400 USD	44.8%	40.3%		
	< 200 USD	22.4%	40.2%		
Alcohol intake	Yes	73.1%	19.5%	$\chi^2=39.625$	p<0.001
	No	26.9%	80.5%		
Smoking cigarettes	Yes	82.1%	19.5%	$\chi^2=53.739$	p<0.001
	No	17.9%	80.5%		

Characteristics of patients	HD (X ±SD)	KT (X ±SD)	Z	p
Hemoglobin (g/L)	103.33±18.18	127.03±18.31	Z=-6.770	p<0.001
Albumin (g/L)	38.627±3.30	42.312±3.44	Z=-6.009	p<0.001
Creatinine before HD (µmol/L)	848.88 ±167.93	134.58±71.87	Z=-10.316	p<0.001
Urea before HD (mmol/L)	26.20±7.57	8.56±3.82	Z=-10.156	p<0.001
Glucose (mmol/L)	7.52±2.81	4.83±1.25	Z=-7.523	p<0.001
CRP (mg/L)	8.54±11.37	4.34±7.65	Z=-2.857	p<0.01
BMI (kg/m ²)	23.42	24.55	Z=-2.287	p<0.05
Kt/V	1.52±0.27			

Table 2. Average values of biochemical and clinical parameters in HD and KT groups

HD - hemodialysis group
KT - kidney transplantation group

classified into specific groups and the statistical analysis of the results was carried out using the commercial *Statistical Package for the Social Sciences (SPSS)*, version 18.0, and the $p<0.05$ considered statistically significant, the distribution was normal and we used parametric tests. For statistical processing we used X^2 , Student's T- test, ANOVA, and Mann-Whitney test, while correlation was estimated by point biserial correlation. The effect of individual independent predictors on the depend variable (total 15D score of HRQoL) was examined using generalized linear model.

RESULTS

Demographic and socio-economic characteristics of patients in both groups are presented in Table 1. There was no significant difference between groups regarding gender, marital status and education level. Patients in HD group were significantly older than in KT group. There was statistically significant difference between groups regarding employment status: in HD group there were significantly more retired patients (67.2% vs. 42.9%) and less employed (9% vs. 24.7%). Patients in HD group also reported lower income: 40.2% of them have monthly income per family member below 200 USD, which is significantly more than 22.4% patients in KT group. Patients on HD are significantly more prone to unhealthy habits: among them 82.1% were smokers and 73.1% consume alcohol compared to 19.5% with similar lifestyle in KT group. Average values of biochemical and clinical parameters in both investigated groups are described in Table 2.

Compared to HD group, patients in KT group had significantly higher concentrations of hemoglobin and albumin (127.03±18.31 and 42.31±3.44 vs. 103.33±18.18 and 38.63±3.30 g/L, respectively). In HD group the most patients were normally nourished (64.2% had Body Mass Index (BMI) between 18.5 and 24.9 kg/m² compared to 48.1% in KT group, where the similar percentage was recorded in the overweight category (44.2%). Average value of BMI in KT group was significantly higher than in HD group (24.55kg/m² vs. 23.42 kg/m²; $p<0,05$). Concentration of creatinine was significantly higher in HD group (when measured before HD procedure) compared to KT group (848.88 ±167.93 vs. 134.58±71.87 µmol/L), as well as concentration of urea (26.20±7.57 vs. 8.56±3.82 mmol/L). Average levels of glucose and CRP in HD group were also significantly higher in HD group (7.52±2.81 mmol/L and 8.54±11.37 mg/L vs. 4.83±1.25 mmol/L and 4.34±7.65 mg/L in KT, respectively). In 89.6% patients on HD the hemodialysis itself was adequate, with Kt/V above 1.2 while average value of Kt/V was 1.52 ± 0.27. Table 2. HRQoL was measured by 15D questionnaire. Total 15D may be between 0 and 1, with higher values indicating better quality of life. In our study, total 15D scores vary between 0.45 and 1 in HD group, and between 0.55 and 1 in KT group. Average values of total 15D scores shows significantly bet groups is recorded in 11 domains (0.92±0.09 vs. 0.78±0.1; $p<0.001$). Maximal values of total 15D score (i.e. 1) were recorded in only 4.5% patients on HD, compared to 16.9% in KT group. Percentile distribution of subjects according to values of 15D score is described in Table 3. In the HD group,

Groups	Percentiles						
	5	10	25	50	75	90	95
HD	0.48	0.52	0.65	0.83	0.92	0.96	0.99
KT	0.69	0.83	0.91	0.96	0.98	1.00	1.00

Table 3. Percentile distribution of 15D total scores in both groups

HD - hemodialysis group
KT - kidney transplantation group

Table 4. Correlation between HRQoL and demographic, socio-economic and clinical parameters in HD and KT group

HD - hemodialysis group
KT - kidney transplantation group

Investigated parameter	Correlation with total 15D score (coefficient; significance)	
	HD group	KT group
Gender	-0,184; $p>0,05$	-0,084; $p>0,05$
Age	-0,681; $p<0,001$	-0,420; $p<0,001$
Education level	0,175; $p>0,05$	0,201; $p>0,05$
Employment status	-0,491; $p<0,001$	-0,229; $p<0,05$
Monthly income	0,181; $p>0,05$	0,171; $p>0,05$
Alcohol consumption	0,036; $p>0,05$	-0,114; $p>0,05$
Smoking	0,067; $p>0,05$	0,0999; $p>0,05$
BMI	0,008; $p>0,05$	0,029; $p>0,05$

Table 5. Correlations between total 15D score and biochemical parameters

HD - hemodialysis group
KT - kidney transplantation group

Investigated parameter	Correlation with total 15D score (coefficient; significance)	
	HD group	KT group
Hemoglobin	0,309; $p<0,05$	0,215; $p>0,05$
Albumin	-0,026; $p>0,05$	0,062; $p<0,001$
Creatinine (in HD group before HD)	0,507; $p<0,001$	-0,064; $p>0,05$
Urea (in HD group before HD)	-0,190; $p>0,05$	-0,080; $p<0,05$
Glucose	-0,023; $p>0,05$	-0,028; $p>0,05$
CRP	-0,202; $p>0,05$	0,019; $p>0,05$
Kt/V	0,127; $p>0,05$	

90% of patients had a total of 15D scores between 0.48 and 0.99, while in KT group scores in 90% patients varied between 0.69 and 1, which is apparently better. 15D scores in HD group were spread in wider range, indicating worse quality of life. Table 3. Correlation between total 15D score and demographic, socioeconomic and clinical parameters is shown in Table 4. Age and employment status are in significant negative correlation with total 15D score of HRQoL in HD group ($p<0.001$ for both correlations). Similar correlation was recorded in KT also, but with some weaker significance for age ($p<0.05$). These results indicate lower quality of life in older patients, unemployed and retired. Gender, education level, monthly income, consuming of alcohol, smoking and BMI did not show any significant correlation with HRQoL regardless of type of kidney replacement therapy. Correlation between total 15D score of HRQoL with biochemical parameters in both investigated groups is shown in Table 5. Significant positive correlation of total 15D score and concentrations of hemoglobin as well as creatinine was recorded only in HD group, where patients with higher values of these parameters had better quality of life. In KT group there was no investigated parameter that significantly correlated to HRQoL. The influence of independent variables on total 15D score, i.e. age,

employment status, concentrations of hemoglobin and creatinine in HD group, as well as age and employment status in KT group was estimated by multiple regression analysis. The results of ANOVA showed high significance in HD group ($F=14,274$; $p<0.001$) and also in KT group ($F=12,763$; $p<0.001$), which confirms validity of chosen models. In HD group multivariate regression analysis indicated only age as significant independent predictor of quality of life ($t=5.404$; $p<0.001$). The particular influence of this independent predictor in defining the value of 15D score in HD group is (58.7%). In KT group, multivariate regression analysis indicated age and employment status as significant independent predictors of quality of life ($t=4.094$; $p<0.001$, and $t=2.739$; $p=0.008$, respectively). Greater influence was reported for age (41.1%) than for employment status (27.5%).

DISCUSSION

Terminal renal insufficiency is a chronic disease that significantly impairs the physical and working capacity of patients, which overall has a negative impact on personal experience of health and vitality and leads to impaired social interactions and the emergence of some mental illnesses [18,22]. The assessment of

HRQoL, patients with end-stage CKD, has become a key tool for developing better treatment and care plans and reflects the importance attached to patients' subjective feeling as well as their satisfaction with the treatment method chosen. With the use of traditional reviews of indicators related to the disease itself. In the last three decades, there has been a focus on the quality of life of patients on dialysis and kidney transplantation. Health-related quality of life (HRQoL) in patients with chronic kidney disease (CKD) is significantly affected, regardless of the stage of CKD. Literature suggests that the general population has a higher HRQoL than CKD patients in all domains. Patients on hemodialysis have a lower quality of life compared to transplant recipients, which our study also confirmed [22].

Majority of studies that compared the quality of life of patients on hemodialysis and after kidney transplantation with normal population mostly show the influence of renal disease and treatment on domains of quality of life [7,18,23]. Some surveys showed the differences in HRQoL in patients treated with same therapy in different medical facilities [24,25], thus we wanted to investigate this problem in Military Medical Academy, as specific medical facility in Serbia. Average age of patients in our study was 58,6 years which is similar as in numerous investigations conducted in our country and in world [8], but there are few studies with subjects of different age: 65 years for HD and 55.2 in KT [15,26]. Our results indicate the relation between age and total 15D score in both investigated groups, which is in agreement with literature data [13,22,26] older patients on hemodialysis had lower total 15D score. Most of our patients in both groups were married (64.2% in HD and 62.3% in KT group). The ratio of different types of family was similar in both groups. Our results are similar to results obtained by Gentile et al. in 2013, where they found 70% of married patients on HD [26]. Quality of life in patients with chronic renal disease is under great influence of education level [13,22]. Patients on HD with elementary school had lower HRQoL scores [27,28]. Our results, however do not confirm relation between quality of life and education, neither we found any significant difference in education level between HD and KT groups. CKD sufferers are retired or unemployed in relation to their working status, which is in accordance with the results of our

research. Gentile et al. in their study published in 2013. measured HRQoL of patients with ESRD before and after kidney transplantation and concluded that 80% of patients may return to their professional activities in 3 months after transplantation, compared to less than 30% patients who remained on HD treatment [26]. The work status of the respondents in our study differed significantly between the study groups, with a higher percentage of post-transplant respondents being employed compared to those from the HD group. Such results can be explained by the fact that the group of KT patients is predominantly younger. Kidney transplantation as a method of treatment requires less time, as opposed to hemodialysis which requires more time and as such makes professional engagement harder. This can be supplemented by Chronic Kidney Disease complications and impairs in the physical aspect of health as well as one year of age, as over 60% of our study respondents from the HD group were over 60 years of age. Patients in our study had significantly different employment status depending on type of treatment. Possible explanation is that time spent on regular hemodialysis disables them in their professional engagement, but the physical impairment and older age may also contribute (50% of HD patients were older than 50 years). There was low percentage of employed patients in HD group, however they had higher total 15D scores than unemployed/retired, which is in agreement with results of other investigators [26] In both investigated groups we found significant correlation between employment status and total 15D scores of HRQoL. Other investigations reported the relation between monthly income per family member and quality of life, with suggestion that higher income may significantly contribute to higher quality of life [8,22,25]. The results in our study indicate significantly lower income in KT compared to HD group. This could be explained by younger age of KT patients, who is often only one employed in family, supporting young children. However, contrary to studies mentioned above [8,22,25], our survey did not confirm significant relationship between total 15D score and monthly income regardless of type of treatment. Recent Chinese study [27], recorded expected negative correlation between smoking and physical domain of health, but also as unexpected positive correlation between smoking and mental domain of health.

Authors speculated that relaxation and pleasure that smokers report may influence mental component of health. Our patients on HD more often consume tobacco and alcohol compared to KT group and that difference is significant, but neither in HD nor in KT group we could not confirm any significant correlation between smoking or alcohol consumption and total 15D score. Murali et al. reported significant correlation between hemoglobin concentration and quality of life in patients on HD [29]. Our results confirm their findings, since we had similar observation in HD group. In addition, we found significantly lower hemoglobin concentrations in HD compared to KT group. Contrary, in some other studies [28,30], investigators did not record any significant relationship between this parameter and HRQoL. In several investigations that monitored concentrations of creatinine and urea in patients on HD and their influence on HRQoL, correlation between creatinine concentrations and quality of life was proved [22, 30]. In our study we confirmed such findings, i.e. we found significant positive correlation between creatinine concentrations and total 15D scores in HD group. We also found significantly higher concentrations in HD compared to KT group. Relationship between urea concentrations and total 15D score was not recorded in either group. Glucose concentrations were significantly higher in HD group compared to KT group, but was not related to total 15D scores in either group. Chronic or recurrent inflammatory processes are common in patients with Chronic Kidney Disease, especially in the terminal stage, and inflammation that reflects an elevated level of inflammation markers is an important measure for detecting the risk of adverse specific health outcomes, and it is all related to poor outcomes including mortality and disability. For elderly patients over 65 years of age, it is important to rule out cardiovascular diseases, which can be bad for a good prognosis after kidney transplantation [31-34]. In our study, patients in both groups were normally nourished, which confirms the findings of other survey conducted in our country [22]. There were no significant correlations between average BMI and total 15D score in either group, which is similar to observations of [35,36], who also did not find any correlation between BMI and physical or mental domain in quality of life. Studies have shown that patients with kidney transplants had better

HRQoL than those on hemodialysis, but worse than the general population [7,8] which can be explained by the characteristics of patients selected for transplantation. Among other things, they are younger people, which is in line with our results. Peritoneal dialysis showed that the 15D quality of life score was significantly higher in the renal transplant patient group compared to the hemodialysis group (0.94 ± 0.011 ; vs. 0.57 ± 0.22) (158DD). The results of our study also show higher values in the transplant group (0.92 ± 0). Only 4.5% of hemodialysis patients and almost 17% of patients with kidney transplantation had the highest 15D score. An even greater difference was noted by researchers in a study where HRQoL rates as very good almost 30% of patients with transplanted kidney and none on hemodialysis, which is in support of the fact that differences in quality of life may depend on treatment in different dialysis centers [8]. A study examining HRQoL using a 15D questionnaire in 365 patients treated with renal function replacement, but a higher quality of life score was obtained in our HD group of subjects. The study [37], showed that satisfaction with patients with a transplanted kidney was significantly higher, and that there was a correlation between satisfaction and quality of life. In our hemodialysis patient group, the total 15D score was associated with age, occupational status, hemoglobin and creatinine concentration, whereas an independent predictor of HRQoL are years of life, which participated with 57.8% in defining of the 15D score. Years of life in hemodialysis patients were the only independent predictors of both PCS and MCS in the study [13]. In the group of kidney transplant patients, there was an association between years of life, working status and 15D scores, and both parameters stood out as independent predictors of quality of life, and participated in defining the values of 15D scores with approximately 41% and 28%.

CONCLUSION

The largest number of studies examining the quality of life of patients with terminal renal insufficiency are cross-sectional and there are significantly fewer prospective studies that would follow patients for shorter or longer periods and compare their HRQoL. The results of both studies indicate that the transplant is associated with a better quality of life compared to hemodialysis, which is consistent with our results.

LIMITATIONS

The potential Limitations of this study are the relatively small sample of subjects, the lack of a group of patients treated with peritoneal dialysis (due to the lack of sufficient number of patients to form a representative sample (PD) of the group at this specialized institution. Absence of follow-up and other factors that could possibly affect the HRQoL of these patient categories.

Another limitation is the design of the study itself - a cross-section that makes it impossible to detect changes in HRQoL over time. Further research is needed which would include other possible predictors as well as longitudinal studies that would monitor the impact of predictors on HRQoL over time. Given the numerous studies that have demonstrated the multidimensional impact of various factors on HRQoL, future research should focus on the selection and monitoring of strategies employed to improve HRQoL as well as the outcomes of their implementation.

CONFLICTS OF INTEREST

All authors declare no conflict of interest.

REFERENCES

1. White SL, Chadban SJ, Jan S, Chapman JR, Cass A. How can we achieve global equity in provision of renal replacement therapy? *Bull World Health Organ.* 2008 Mar;86(3):229-37. doi: 10.2471/blt.07.041715.
2. Kim D, Pollock C. Epidemiology and burden of chronic kidney disease-associated pruritus. *Clin Kidney J.* 2021 Oct 14;14(Suppl 3):i1-i7. doi: 10.1093/cjk/sfab142.
3. World Health Report: life in the 21st century-a vision for all. Geneva: WHO; 1993.
4. Ortiz Pastelero P, Martínez Lara C. Influencia del profesional de enfermería en la calidad de vida de pacientes receptores de trasplante renal [Influence of the nursing professional over the quality of life in patients receiving kidney transplants.]. *Rev Esp Salud Publica.* 2021 Jul 7;95:e202107093.
5. Landreneau K, Lee K, Landreneau MD. Quality of life in patients undergoing hemodialysis and renal transplantation--a meta-analytic review. *Nephrol Nurs J.* 2010 Jan-Feb;37(1):37-44. PMID: 20333902.
6. Jaar BG, Chang A, Plantinga L. Can we improve quality of life of patients on dialysis? *Clin J Am Soc Nephrol.* 2013 Jan;8(1):1-4. doi: 10.2215/CJN.11861112.
7. Ortiz F, Aronen P, Koskinen PK, Malmström RK, Finne P, Honkanen EO, Sintonen H, Roine RP. Health-related quality of life after kidney transplantation: who benefits the most? *Transpl Int.* 2014 Nov;27(11):1143-51. doi: 10.1111/tri.12394.
8. Petrović L, Mitić I, Božić D, Vodopivec S, Đurđević Mirković T. Quality of life in patients with chronic renal failure. *Medicinski pregled.* 2006;59(9-10):411-4. doi: 10.2298/MPNS0610411P
9. Miljanović G, Marjanovic M, Radaković S, Janošević M, Mraović T, Rađen S. Health-related quality of life in patients undergoing hemodialysis. *Vojnosanitetski pregled, 2016 OnLine-First (00):* 211-211. DOI: 10.2298 / VSP160511211M
10. Kimmel PL. Psychosocial factors in dialysis patients. *Kidney Int.* 2001 Apr;59(4):1599-613. doi: 10.1046/j.1523-1755.2001.0590041599.x.
11. Kimmel PL, Peterson RA. Depression in patients with end-stage renal disease treated with dialysis: has the time to treat arrived? *Clin J Am Soc Nephrol.* 2006 May;1(3):349-52. doi: 10.2215/CJN.00890306.
12. Brown EA, Zhao J, McCullough K, Fuller DS, Figueiredo AE, Bieber B, Finkelstein FO, Shen J, Kanjanabuch T, Kawanishi H, Pisoni RL, Perl J; PDOPPS Patient Support Working Group. Burden of Kidney Disease, Health-Related Quality of Life, and Employment Among Patients Receiving Peritoneal Dialysis and In-Center Hemodialysis: Findings From the DOPPS Program. *Am J Kidney Dis.* 2021 Oct;78(4):489-500.e1. doi: 10.1053/j.ajkd.2021.02.327.
13. Legrand K, Speyer E, Stengel B, Frimat L, Ngueyon Sime W, Massy ZA, Fouque D, Laville M, Combe C, Jacquelinet C, Durand AC, Edet S, Gentile S, Briançon S, Ayav C. Perceived Health and Quality of Life in Patients With CKD, Including Those With Kidney Failure: Findings From National Surveys in France. *Am J Kidney Dis.* 2020 Jun;75(6):868-878. doi: 10.1053/j.ajkd.2019.08.026.
14. Neipp M, Jackobs S, Klempnauer J. Renal transplantation today. *Langenbecks Arch Surg.* 2009 Jan;394(1):1-16. doi: 10.1007/s00423-008-0335-1. Epub 2008 May 14. PMID: 18478256.
15. Denhaerynck K, Dobbels F, Cleemput I, Des-

- myttere A, Schäfer-Keller P, Schaub S, De Geest S. Prevalence, consequences, and determinants of nonadherence in adult renal transplant patients: a literature review. *Transpl Int*. 2005 Oct;18(10):1121-33. doi: 10.1111/j.1432-2277.2005.00176.x.
16. Chen KH, Weng LC, Lee S. Stress and stress-related factors of patients after renal transplantation in Taiwan: a cross-sectional study. *J Clin Nurs*. 2010 Sep;19(17-18):2539-47. doi: 10.1111/j.1365-2702.2009.03175.x.
17. Sutton TD, Murphy SP. Stressors and patterns of coping in renal transplant patients. *Nurs Res*. 1989 Jan-Feb;38(1):46-9. PMID: 2643089.
18. Sintonen H. The 15D instrument of health-related quality of life: properties and applications. *Ann Med*. 2001 Jul;33(5):328-36. doi: 10.3109/07853890109002086.
19. Kelley AT, Turner J, Doolittle B. Barriers to Advance Care Planning in End-Stage Renal Disease: Who is to Blame, and What Can be Done? *New Bioeth*. 2018 Jul;24(2):150-157. doi: 10.1080/20502877.2018.1438772.
20. Gvozdencović B, Milošević S, Vuković M, Plavšić S, Tomić V. '15D' and 'MiniAQLQ': Validity of the Serbian version of the questionnaires for measurement of quality of life: Use in asthma. *Opšta medicina*. 2001;7(1-2):21-36.
21. Gvozdencovic BS, Mihailovic-Vucinic V, Ilic-Dudvarski A, Zugic V, Judson MA. Differences in symptom severity and health status impairment between patients with pulmonary and pulmonary plus extrapulmonary sarcoidosis. *Respir Med*. 2008 Nov;102(11):1636-42. doi: 10.1016/j.rmed.2008.05.001.
22. Kelley AT, Turner J, Doolittle B. Barriers to Advance Care Planning in End-Stage Renal Disease: Who is to Blame, and What Can be Done? *New Bioeth*. 2018 Jul;24(2):150-157. doi: 10.1080/20502877.2018.1438772.
23. Lopez-Vargas PA, Tong A, Howell M, Craig JC. Educational Interventions for Patients With CKD: A Systematic Review. *Am J Kidney Dis*. 2016 Sep;68(3):353-70. doi: 10.1053/j.ajkd.2016.01.022.
24. Simic-Ogrizovic S, Jemcov T, Pejanovic S, Stosovic M, Radovic M, Djukanovic L. Health-related quality of life, treatment efficacy, and hemodialysis patient outcome. *Ren Fail*. 2009;31(3):201-6. doi: 10.1080/08860220802669842.
25. Legrand K, Speyer E, Stengel B, Frimat L, Nguenon Sime W, Massy ZA, Fouque D, Laville M, Combe C, Jacquelinet C, Durand AC, Edet S, Gentile S, Briançon S, Ayav C. Perceived Health and Quality of Life in Patients With CKD, Including Those With Kidney Failure: Findings From National Surveys in France. *Am J Kidney Dis*. 2020 Jun;75(6):868-878. doi: 10.1053/j.ajkd.2019.08.026.
26. Gentile S, Beauger D, Speyer E, Jouve E, Dusol B, Jacquelinet C, Briançon S. Factors associated with health-related quality of life in renal transplant recipients: results of a national survey in France. *Health Qual Life Outcomes*. 2013 May 30;11:88. doi: 10.1186/1477-7525-11-88.
27. Wan EY, Chen JY, Choi EP, Wong CK, Chan AK, Chan KH, Lam CL. Patterns of health-related quality of life and associated factors in Chinese patients undergoing haemodialysis. *Health Qual Life Outcomes*. 2015 Jul 29;13:108. doi: 10.1186/s12955-015-0308-3.
28. Poppe C, Crombez G, Hanoulle I, Vogelaers D, Petrovic M. Improving quality of life in patients with chronic kidney disease: influence of acceptance and personality. *Nephrol Dial Transplant*. 2013 Jan;28(1):116-21. doi: 10.1093/ndt/gfs151.
29. Murali R, Sathyanarayana D, Muthusethupathy MA. Assessment of quality of life in chronic kidney disease patients using the kidney disease quality of life-short form questionnaire in indian population: a community based study. *Asian J Pharm Clin Res* 2015; 8: 271-274.
30. Lins L, Carvalho FM. SF-36 total score as a single measure of health-related quality of life: Scoping review. *SAGE Open Med*. 2016 Oct 4;4:2050312116671725. doi: 10.1177/2050312116671725.
31. Shrestha P, Haugen CE, Chu NM, Shaffer A, Garonzik-Wang J, Norman SP, Walston JD, Segev DL, McAdams-DeMarco MA. Racial differences in inflammation and outcomes of aging among kidney transplant candidates. *BMC Nephrol*. 2019 May 17;20(1):176. doi: 10.1186/s12882-019-1360-8.
32. Silva RM, Leal R, Marques MG, Rodrigues L, Santos L, Romãozinho C, Alves R, Figueiredo A. Factors Influencing Short-Term Patient Survival in Elderly Kidney Transplant Recipients. *Transplant Proc*. 2023 Jul-Aug;55(6):1400-1403. doi: 10.1016/j.transproceed.2023.05.006. Epub 2023 Jun 7. PMID: 37295992.
33. Hanna RM, Streja E, Kalantar-Zadeh K. Burden of Anemia in Chronic Kidney Disease: Beyond Erythropoietin. *Adv Ther*. 2021 Jan;38(1):52-75. doi: 10.1007/s12325-020-01524-6.
34. Mima A. Hypoxia-inducible factor-prolyl hydroxylase inhibitors for renal anemia in chronic kidney disease: Advantages and disadvantages. *Eur J Pharmacol*. 2021 Dec 5;912:174583. doi: 10.1016/j.ejphar.2021.174583.
35. Farag YM, Keithi-Reddy SR, Mittal BV, Surana SP, Addabbo F, Goligorsky MS, Singh AK. Anemia, inflammation and health-related quality of life in chronic kidney disease patients. *Clin Nephrol*. 2011 Jun;75(6):524-33. doi: 10.5414/cnp75524.
36. Conley MM, McFarlane CM, Johnson DW, Kelly JT, Campbell KL, MacLaughlin HL. Interventions for weight loss in people with chronic kidney disease who are overweight or obese. *Cochrane Database Syst Rev*. 2021 Mar 30;3(3):CD013119. doi: 10.1002/14651858.CD013119.pub2.

37. Yildirim A. The importance of patient satisfaction and health-related quality of life after renal transplantation. *Transplant Proc.* 2006 Nov;38(9):2831-4. doi: 10.1016/j.transproceed.2006.08.162.

Prediktori kvaliteta života kod bolesnika s terminalnom bubrežnom insuficijencijom na hemodijalizi i transplantaciji bubrega

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KRATAK SADRŽAJ

Uvod: Cilj istraživanja bio je da se ispita uticaj različitih faktora na kvalitet života bolesnika (HRQoL) sa hroničnom bubrežnom bolešću (HBB) liječenim hemodijalizom (HD) i transplantacijom bubrega (KT) u Specijalizovanom centru na Vojno Medicinskoj Akademiji (VMA).

Materijal i metode: Studija je dizajnirana kao studija preseka, a sprovedena je na uzorku od 144 ispitanika (67 HD i 77 KT) pacijenata. Procenili smo HRQOL koristeći 15D standardizovani upitnik. Podaci su prikupljeni ličnim kontaktom, fizičkim pregledom, antropometrijskim merenjem, analizom medicinske dokumentacije, analizom sprovedenih upitnika i laboratorijskim analizama.

Rezultati: Studijske grupe se nisu značajno razlikovale u pogledu pola, bračnog statusa i nivoa obrazovanja, dok je značajna razlika uočena u odnosu na godine, radon mesto, BMI, hemoglobin, albumin, ureu, glukozu i koncentraciju CRP. Rezultati korelacione analize između ukupnog 15D skora HRQoL i ispitivanih parametara pokazali su da su starost i nezaposlenost u značajnoj negativnoj korelaciji sa kvalitetom života u obe studijske grupe (HD: $p < 0,001$; KT $p < 0,005$ za obe korelacije). Pozitivna korelacija ukupnog 15D skora HRQoL.

Zaključak: Većina studija koje ispituju kvalitetu života pacijenata sa završnom stadijumom bubrežne bolesti su studije preseka i postoji značajno manje prospektivnih studija koje bi pratile pacijente u kraćim ili dužim periodima i upoređivale njihov HRCoL. Rezultati oba istraživanja pokazuju da je transplantacija povezana s boljim kvalitetom života u odnosu na hemodijalizu, što je u skladu s našim rezultatima.

Ključne reči: kvalitet života, prediktori, hemodijaliza, transplantacija bubrega

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