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## Psychosocial and medical determinants of long-term patient outcomes

Prihodová, Lucia

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# Chapter 6

## SOCIAL PARTICIPATION AFTER KIDNEY TRANSPLANTATION AS A PREDICTOR OF GRAFT LOSS AND MORTALITY OVER 10 YEARS: A LONGITUDINAL STUDY

Lucia Prihodova, Iveta Nagyova, Jaroslav Rosenberger, Robert Roland,  
Maria Majernikova, Johan W Groothoff, Jitse P van Dijk

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**ABSTRACT**

*AIM*

This study explores the association between post-transplant factors (kidney function, side-effects of immunosuppressive treatment, comorbidity, physical and mental HRQoL) and social participation in patients 3 months – 6 years after kidney transplantation (baseline) and their impact on graft loss and mortality for up to 10 years (follow-up).

*METHODS*

At baseline 331 patients provided their socioeconomic and medical (comorbidity, kidney function) data and completed the End-Stage Renal Disease Symptom Checklist (perceived side-effects), the SF-36 and the Participation Scale. At follow-up, patients' health status was noted. Binary logistical regression exploring the main effects of the independent variables on social participation was performed; furthermore, Cox regression analysis was performed to determine whether social participation predicted graft loss and mortality.

*RESULTS*

Restrictions in social participation were associated with living alone, poorer kidney function, lower levels of reported side-effects of corticosteroids (ESRD-SCL-TM), higher levels of reported cardiac and renal dysfunction (ESRD-SCL-TM), higher levels of transplantation related distress (ESRD-SCL-TM), lower physical HRQoL and lower number of hours of work. Patients reporting restrictions in social participation had 2.29 times higher risk of graft loss and 11.94 times higher risk of mortality than patients with no restrictions in social participation during follow-up. Education, kidney function and comorbidity also increased the risk for poor patient outcome.

*CONCLUSIONS*

Kidney function, comorbidities and HRQoL effect social participation and long-term outcomes in patients after kidney transplantation. Special attention should be paid to the side-effects of immunosuppressive treatment due to their link with restrictions in social participation.

*KEYWORDS*

graft loss, health-related quality of life, kidney transplantation, mortality, side-effects, social participation

## **INTRODUCTION**

Kidney transplantation (KT) is established as the best treatment modality for patients with end-stage renal disease due to its superior effect on mortality, cost and quality of life in comparison with other renal replacement therapies.<sup>1,2</sup> When compared to patients on dialysis, patients after KT also report greater independence, engagement in social and recreational activities and better ability to work.<sup>3</sup> In recent years, the level of social participation<sup>4</sup> – the level of involvement in life situations such as self-care, learning and applying knowledge, domestic, community and social life<sup>5</sup> – has become one of the goals and objective parameters for evaluating the success of transplantation. Among solid organ recipients, KT recipients have the highest likelihood to return to work after transplantation<sup>4</sup> and thereby contribute to society as well as further improve their own quality of life. Previous studies linked social participation with age and education<sup>6</sup>, clinical factors, such as comorbidity or time from KT<sup>7,8</sup> and previous level of social participation.<sup>4</sup>

In the process of preventing graft rejection and improving long term survival immunosuppression plays an essential role. Its side-effects can however compromise the health-related quality of life (HRQoL) of KT recipients<sup>9</sup> and potentially also their social participation.<sup>10</sup> Kidney function is a vital indicator of the proficiency of the transplantation and immunosuppressive treatment. Loss of kidney function was found to be associated with deteriorated HRQoL and poorer allograft survival<sup>11–14</sup>, however its effect on social participation was not confirmed<sup>7</sup> unlike comorbidity, which was found to negatively influence social participation.<sup>8</sup>

Although there is a number of studies exploring the determinants of social participation in patients after KT, to our knowledge no study investigates the association of social participation and long-term patient outcomes, such as graft loss or mortality. The aim of this study was to explore the association between post-KT factors such as kidney function, side-effects of immunosuppressive treatment, comorbidity, physical and mental HRQoL and social participation at baseline. Furthermore we explored the impact of social participation when controlled for relevant sociodemographic and medical factors at baseline on future graft loss and mortality for up to 10 years.

## **METHODS**

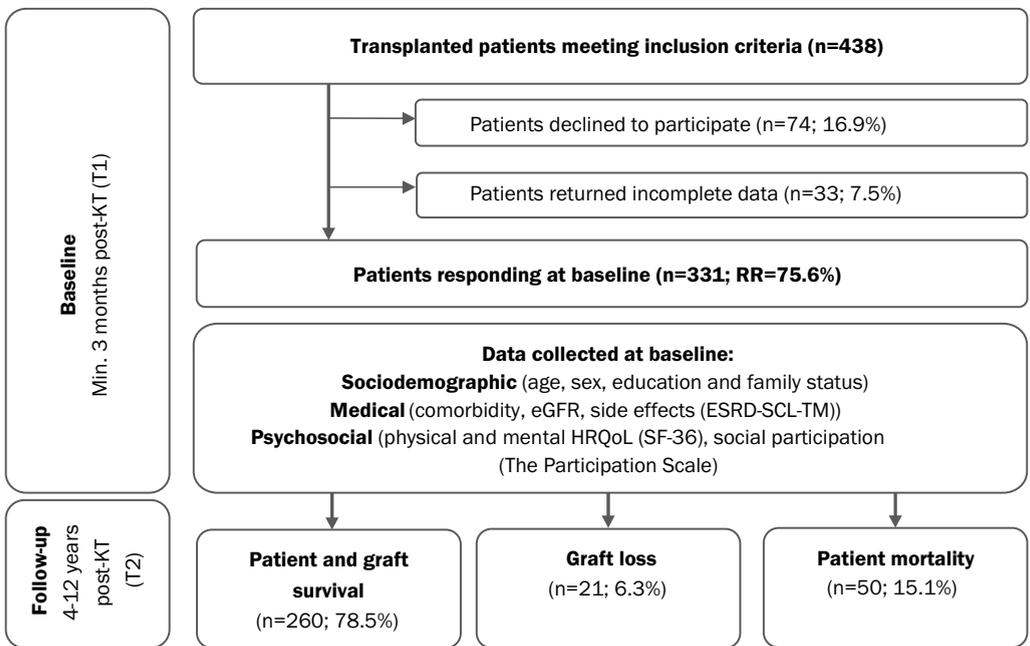
### *SAMPLE*

All consecutive patients from the Louis Pasteur University Hospital Transplantation centre in Kosice, Slovakia (catchment area: about 1.5 million inhabitants), who underwent a kidney transplant in the years 2003–2009 and met the inclusion criteria, were asked to participate. To be included in the study, patients had to fulfil following criteria: to be minimum 3 months and maximum 6 years

after kidney transplantation, to have a functioning graft, and to have no psychiatric disease including severe dementia and mental retardation listed in their medical records. At follow-up in the year 2013 data on patient status (patient and graft survival) was collected.

Out of the total number of patients visiting the Transplantation Centre in Kosice, 438 met the inclusion criteria and were asked to participate. Out of these, 74 (16.9%) patients declined to participate and additional 33 returned incomplete data (7.5%) resulting in 331 patients (response rate 75.6%) who provided their data at baseline (Figure 6.1). The local Ethics Committee approved the study. All participants were provided with information about the study and signed an informed consent statement prior to the study. Participation in the study was fully voluntary and anonymous, with no incentives provided for participation.

**Figure 6.1** Flow-chart of the participants



eGFR – kidney function, ESRD-SCL TM - End-Stage Renal Disease Symptom Checklist – Transplantation Module; SF-36 - Short Form Health Survey

**MEASURES**

*SOCIODEMOGRAPHIC DATA*

The sociodemographic variables - age, sex, education, average income and marital status – were obtained in a structured interview by a trained interviewer. Educational background was catego-

rized into 3 groups: primary, secondary and university education, depending on the level of education completed. Average income was first evaluated by dividing the household budget by the number of persons in the household and then categorized based on the legal minimum wage in the Slovak Republic as follows: low (lower than 1.5 times the minimum wage); average (1.5 times to 2 times the minimum wage) and high (higher than 2 times the minimum wage). Family status was represented by 2 options: living alone (single, divorced, widowed) and cohabitating (married/living in a cohabitating relationship). All of the sociodemographic variables were used for group comparison; however, only sex, education and marital status were used in the analysis.

#### *MEDICAL DATA*

Information about kidney function was taken from patient medical records. The estimated glomerular filtration rate (eGFR) to assess kidney function at baseline was calculated using the CKD-EPI formula (ml/min/1.73m<sup>2</sup>).<sup>15, 16</sup>

Comorbidity was assessed by the Charlson Comorbidity Index (CCI)<sup>17</sup> which uses a simple weighted scoring system based on the presence or absence of 19 comorbid conditions. Each comorbid condition is assigned a score ranging from 1 to 6 depending on the risk of dying associated with each one. Scores are then summed to provide a total score. The CCI has been validated as a predictor of survival and health status in numerous patient groups, including the chronic kidney disease population.<sup>18</sup>

#### *ALL-CAUSE GRAFT LOSS AND ALL-CAUSE MORTALITY*

At follow-up in 2013 (4–10 years after the first data collection) information about all-cause mortality and all-cause graft loss was obtained from medical records. No patients were re-transplanted during the follow-up period.

#### *SIDE-EFFECTS*

To assess the perceived side-effects of immunosuppressive treatment at baseline patients completed the End-Stage Renal Disease Symptom Checklist – Transplantation Module (ESRD SCL-TM).<sup>19</sup> This questionnaire was developed to assess disease-specific distress and consists of 6 subscales: 1. limited physical capacity, 2. limited cognitive capacity, 3. cardiac and renal dysfunction, 4. side effects of corticosteroids, 5. increased growth of gum and hair, and 6. transplantation-associated psychological distress. The number of items for each subscale varied from 5 to 10, and for each item patients estimated the severity of the symptom on a scale from 0 (not at all) to 5 (extremely). Afterwards, a severity index for each symptom and the whole scale was computed by dividing the severity index score by the number of items in the subscales.<sup>19</sup> In our sample Cronbachs'  $\alpha$  for the

total scale was 0.96 and for the subscales ranged from 0.89 (limited physical capacity) to 0.81 (side effects of corticosteroids).

#### *HEALTH-RELATED QUALITY OF LIFE*

Health-related quality of life was evaluated using the Short Form Health Survey (SF-36), which consists of 8 sub-scales: Physical functioning (PF), Role limitation attributable to physical problems (RP), Bodily pain (BP), Perception of general health (GH), Social functioning (SF), Vitality (VIT), Role limitation attributable to emotional problems (RE) and Mental health (MH). The first four subscales (PF, RP, BP, GH) comprise the Physical Component Summary (PCS), and the other four subscales (SF, VIT, RE, MH) comprise the Mental Component Summary (MCS).<sup>20</sup> The component summary scores are normalized to a general population mean of 50 and a standard deviation of 10, where higher scores indicate better health status.<sup>21</sup> In this study the summary component scores were used. The validity and reliability of the SF-36 have been confirmed in patients after KT.<sup>22, 23</sup> Cronbach's  $\alpha$  in our sample ranged from 0.83 (RP) to 0.90 (PF) for the subscales, and for PCS and MCS Cronbach's  $\alpha$  was 0.90 and 0.91 respectively.

#### *SOCIAL PARTICIPATION*

Social participation was assessed by the number of hours of work per week and by completing the Participation Scale.<sup>24</sup> Information on the number of hours of work per week was obtained in a structured interview by a trained interviewer. Patients who were full-time/part-time students were considered as full-time/part-time working and for patients who were retired, the hours of housework were recorded instead.

The Participation Scale was developed according to the International Classification of Functioning, Disability and Health.<sup>5</sup> This scale consists of 18 items in which the responders are asked to identify whether they perceive themselves to have the same opportunities as their healthy peers or not to take part in life situations related to mobility, self-care, domestic life, community life etc. Once the areas of perceived restrictions are identified, the extent to which they see each restriction as a problem in their life is indicated on a scale from 1 (no problem) to 5 (large problem). Depending on the total score, patients were then split in 4 groups: SP1 'No restrictions' (0–12), SP2 'mild restrictions' (13–22), SP3 'moderate restrictions' (23–32) and SP4 'high restrictions' (over 33).<sup>24</sup> In this study, last three groups were combined due to the low number of patients in groups SP3 and SP4. The Cronbach's  $\alpha$  in our sample was 0.93.

#### *STATISTICAL ANALYSIS*

Frequencies, means and standard deviations were calculated for the sample description. The Mann-

Whitney U-test and Chi-square test were used to examine the differences between respondents and non-respondents as well as between the SP groups. Then, binary logistical regression analysis was performed to identify the determinants of restrictions in social participation (SP2-4). 'Restrictions in social participation' was set as the dependent variable, with the 'no restrictions' group set as a reference. Following variables were entered in the analysis: socio-demographic variables (age, sex, family status, education), medical variables (eGFR, CCI, time since KT), side-effects of immunosuppressive treatment (ESRD-SCL-TM subscales), physical and mental HRQoL (PCS, MCS) and work hours per week. Finally, two Cox regression analyses were performed to determine the association between social participation and graft loss and mortality. Following variables were entered in the analysis: socio-demographic variables were entered (age, sex, family status, education), medical variables (eGFR, CCI, time since KT), social participation and work hours were entered. IBM SPSS 20 for Windows was used to analyse the data (IBM company, Chicago, Illinois, USA).

## **RESULTS**

The basic characteristics of the sample are shown in Table 6.1. The analyses did not indicate any significant differences between respondents and non-respondents regarding age and sex. The significant differences between the SP groups are displayed in Table 6.2.

**Table 6.1** Characteristics of the sample

<b>Sociodemographic variables (T1)</b>	<b>N(%) or Mean (±SD)</b>
Sex	
Men/Women	187 (56.5%)/144 (43.5%)
Age	49.64 (±11.99)
Education	
Primary/ Secondary/ University	62 (18.7%)/152 (45.9%)/117 (35.3%)
Income	
Low (≤1.5 x min. wage)/Average (1.5-2 x min. wage)/High (≥2 x min. wage)	190 (57.4%)/64 (19.3%)/77 (23.3%)
Family status	
Living alone/ Cohabiting	102 (30.8%)/229 (69.2%)
<b>Medical variables</b>	
Kidney function (Estimated Glomerular Filtration Rate (ml/min/1.73m <sup>2</sup> ))	54.74 (±19.29)
Time since transplantation at baseline (years)	1.63 (±1.43)
Charlson Comorbidity Index	2.76 (±1.16)
Organ donor	
Deceased/ Living	311 (94%)/20 (6%)
Duration of dialysis (years)	3.63 (±3)
Primary kidney disease	
Glomerulonephritis/Tubointerstitial nephritis/Polycystic kidneys	134 (40.5%)/49 (14.8%)/24 (7.3%)
Diabetes mellitus/Other or unknown causes	28 (8.5%)/96 (29%)
Current immunosuppressive protocol (T1)	
Pred + CsA + MMF/Pred + MMF + Tac5/CsA + MMF/Other	185 (55.9%)/79 (23.9%)/23 (7%)/ 44 (13.2%)
<b>Side-effects, Coping and Health Related Quality of Life</b>	
Perceived side-effects of immunosuppressive treatment (ESRD-SCL TM)	1.14 (±0.76)
Limited physical capacity/Limited cognitive capacity/Side effects of corticosteroids/Cardiac and renal dysfunction/Increased growth of gums and hair/KT-related psychological distress	1.52 (±0.89)/1.17 (±0.87)/1.05 (±0.8)/1.07 (±0.83)/0.76 (±0.81)/1.27 (±0.76)
Physical and Mental Health-related quality of life (SF-36)	
Physical Component Summary (PCS)/Mental Component Summary (MCS)	39.52 (±9.47)/47.58 (±9.67)
<b>The Participation Scale</b>	
No Restriction (SP1)/Restrictions (SP2-SP4)	49 (14.8%)/282 (85.2%)
Hours of work per week	6.88 (±10.37)
Patient and graft survival	
Average follow-up (years)	7.09 (±2.3)
Patient and graft survival/Patient mortality/Graft loss	260 (78.5%)/ 21 (6.3%)/ 50 (15.1%)

Pred – prednisone; CsA – cyclosporine A; MMF – mycophenolate mofetil; Tac – tacrolimus; ESRD-SCL TM - End-Stage Renal Disease Symptom Checklist – Transplantation Module; SF-36 – Short Form (36) Health Survey

**Table 6.2** Significant results of Mann-Whitney U-Test comparison of social participation groups

	No restrictions in SP (SP1)	Some restrictions in SP (SP2-4)	Group comparison
	Mean ( $\pm$ SD)	Mean ( $\pm$ SD)	
<b>Age</b>	46.45 ( $\pm$ 12.49)	50.2 ( $\pm$ 11.8)	*
<b>Kidney function (Estimated Glomerular Filtration Rate (ml/min/ 1.73m<sup>2</sup>))</b>	64.44 ( $\pm$ 16.73)	53.08 ( $\pm$ 19.27)	***
<b>Physical Component Summary (SF-36)</b>	44.12 ( $\pm$ 9.21)	38.72 ( $\pm$ 9.31)	***
<b>Limited cognitive capacity (ESRD-SCL-TM)</b>	0.94 ( $\pm$ 0.87)	1.13 ( $\pm$ 0.86)	*
<b>Cardiac and renal dysfunction (ESRD-SCL-TM)</b>	0.74 ( $\pm$ 0.77)	1.13 ( $\pm$ 0.82)	***
<b>Increased growth of gums and hair (ESRD-SCL-TM)</b>	0.57 ( $\pm$ 0.74)	0.79 ( $\pm$ 0.82)	*
<b>KT-related psychological distress (ESRD-SCL-TM)</b>	0.96 ( $\pm$ 0.66)	1.32 ( $\pm$ 0.77)	**
<b>Hours of work per week</b>	12.87 ( $\pm$ 12.25)	5.86 ( $\pm$ 9.67)	***

ESRD-SCL TM - End-Stage Renal Disease Symptom Checklist – Transplantation Module; SF-36 – Short Form (36) Health Survey; \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$ ;

### SOCIAL PARTICIPATION

When analysing the factors associated with restrictions in SP, the model produced by binary logistical regression explained 34.2% of variance. Patients with restrictions in SP had a higher chance of living alone, poorer kidney function, lower levels of reported side-effects of corticosteroids (ESRD-SCL-TM), higher levels of reported cardiac and renal dysfunction (ESRD-SCL-TM), higher reported transplantation related distress (ESRD-SCL-TM), lower physical HRQoL and lower number of hours of work (Table 6.3).

**Table 6.3** Factors associated with restrictions in social participation

		Factors associated with restrictions in social participation (SP2-SP4) <sup>†</sup>		
		Wald	Exp (B)	95%CI
Age		0.3	0.99	0.95-1.03
Sex <sup>1</sup>		2.13	2	0.79-5.1
Family status <sup>2</sup>		<b>7.12**</b>	<b>3.97</b>	<b>1.44-10.93</b>
Education <sup>3</sup>	Primary	1.5	0.46	0.13-1.6
	Secondary	0.05	1.1	0.46-2.64
Time since KT (years)		0.62	1.15	0.81-1.63
Kidney function (eGFR)		<b>18.35***</b>	<b>0.95</b>	<b>0.92-0.97</b>
Charlson comorbidity index		0.33	0.89	0.-1.32
Limited physical capacity	(ESRD-SCL-TM)	1.98	0.54	0.23-1.28
Limited cognitive capacity	(ESRD-SCL-TM)	1.09	0.64	0.27-1.49
Side effects of corticosteroids	(ESRD-SCL-TM)	<b>5.46*</b>	<b>0.39</b>	<b>0.18-0.86</b>
Cardiac and renal dysfunction	(ESRD-SCL-TM)	<b>4.88*</b>	<b>2.64</b>	<b>1.12-6.26</b>
Increased gum and hair growth	(ESRD-SCL-TM)	1.39	1.54	0.75-3.18
KT-related psychological distress	(ESRD-SCL-TM)	<b>5.92*</b>	<b>2.87</b>	<b>1.23-6.7</b>
PCS		<b>5.69*</b>	<b>0.93</b>	<b>0.89-0.99</b>
MCS		0.33	1.02	0.96-1.07
Work hours per week		<b>10.74***</b>	<b>0.95</b>	<b>0.92-0.98</b>
<b>Nagelkerke R<sup>2</sup></b>			<b>34.2%</b>	

<sup>†</sup>Reference category: No restrictions in social participation (SP1); <sup>1</sup>Male sex; <sup>2</sup>Married; <sup>3</sup>University education; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001; R<sup>2</sup>: Total variance explained by the model.

### GRAFT LOSS AND MORTALITY

Information on patient and graft survival was collected 4-10 years after the first data collection, with an average follow-up period of 7.1 (±2.3) years.

The  $\chi^2$  of the Cox regression model for all-cause graft loss was 71.07 (p<0.001) and only two variables contributed significantly to the model: decreased kidney function (HR 0.97, p<0.01) and restrictions in social participation – the risk of graft loss was significantly higher for patients perceiving restrictions in their SP (HR 2.29, p<0.01) (Table 6.4).

The  $\chi^2$  of the Cox regression model for all-cause mortality was 50.3 (p<0.001). The risk of dying during follow-up were increased for patients with primary (HR 3.48, p<0.01) and secondary education (HR 2.32, p<0.05) as opposed to university education, for patients with higher number of comorbidity (HR 1.28, p<0.05) and for those perceiving restrictions in their SP (HR 11.94,

$p \leq 0.001$ ). The risk of dying during follow-up decreased for patients with better kidney function (HR 0.98,  $p \leq 0.05$ ) (Table 6.4).

**Table 6.4** Cox regression models containing predictors of graft loss and all-cause mortality

	All-cause graft loss (21 events) Score			All-cause mortality (50 events) Score		
	2Log Likelihood 142.23***		$\chi^2$ 71.07	2Log Likelihood 419.4***		$\chi^2$ 50.26
	Wald	HR	95%CI for HR	Wald	HR	95%CI for HR
Age	0.29	0.97	0.94-1.04	0.92	1.02	0.98-1.05
Sex <sup>1</sup>	0.68	0.64	0.22-1.87	0.02	0.96	0.48-1.9
Family status <sup>2</sup>	0.00	1	0.31-3.26	2.03	1.63	0.83-3.18
Education <sup>3</sup>	2.8			7.9*		
Primary	2.42	0.18	0.02-1.57	7.59**	3.48	1.43-8.43
Secondary	0.83	0.62	0.22-1.73	4.12*	2.32	1.03-5.24
Time since KT (years)	0.00	1	0.69-1.45	3.1	0.84	0.69-1.02
Kidney function (eGFR)	4.99**	0.97	0.94-0.99	4.4*	0.98	0.96-0.99
Charlson comorbidity index (CCI)	2.41	0.43	0.15-1.25	5.7*	1.28	1.05-1.57
Work hours per week	0.04	1	0.97-1.04	0.5	0.98	0.94-1.03
Restrictions in SP (SP2-4) <sup>4</sup>	14.9**	2.29	1.51-3.5	11.55***	11.94	2.86-49.92

Reference category: <sup>1</sup>Male sex; <sup>2</sup>Married; <sup>3</sup>University education; <sup>4</sup>No restrictions in SP (SP1); \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

## DISCUSSION

With the improvements in survival and morbidity in KT, one of the goals and objective parameters to evaluate the success of transplantation became the level of return to an active lifestyle and contribution to a meaningful and productive life.<sup>4, 25, 26</sup> Therefore this study explored the association between relevant post-KT medical factors, physical and mental HRQoL and social participation in patients 3 months to 6 years post-KT as well as the impact of social participation on future graft loss and patient mortality for up to 10 years. When compared to patients who reported 'no restrictions in SP', patients with 'restrictions in SP' had poorer kidney function, lower levels of reported side-effects of corticosteroids (ESRD-SCL-TM), higher levels of reported cardiac and renal dysfunction (ESRD-SCL-TM) and higher levels of transplantation related distress (ESRD-SCL-TM). Additionally, patients with 'restrictions' had also higher chance of living alone, lower physical HRQoL and lower number of hours of work than patients with 'no restrictions'.

Unlike the previous study of Van der Mei, who found no association between kidney function and social participation<sup>8</sup>, poor kidney function was identified as one of the most significant factors associated with restrictions in SP. Higher levels of perceived side-effects of immunosuppressive treatment were previously linked with lower perceived HRQoL<sup>27, 28</sup>, however study on their effect on social participation is still lacking.<sup>10</sup> Our results indicate that not all perceived side-effects are negatively associated with restrictions in SP – patients who perceive their cardiac and renal function as worse and are reporting increased anxiety about uncertainty of how long the transplanted graft will function, are brooding about kidney donor, etc. also tend to report restrictions in SP. Patients with no restrictions in SP on the other hand were more likely to report more side-effects of corticosteroids. This could indicate that if the KT recipients perceive their immunosuppressive treatment as effective in maintaining good kidney function, the presence of side effects, such as changes to their appearance, do not deter them from being actively involved in their lives and community. It is also possible that other factors, such as age, sex or time from transplantation, have an underlying role in the way side effects determine HRQoL and SP.

When it comes to SP and HRQoL, our results linking restrictions in social participation and lower physical HRQoL are similar to previous study conducted by Levasseur et al. (2004), who found a weak relationship between total scores of quality of life and social participation in a sample of older persons.<sup>29</sup> Thraen-Borowski et al. (2013) on the other hand found that engaging in any social participation, vs. none, was associated with higher MCS but not PCS in older, long-term colorectal cancer survivors.<sup>30</sup> In our sample, belonging to the group reporting 'restrictions in SP' was not only associated with significantly lower physical HRQoL, but also with a higher chance of living alone. When compared to 'no restrictions' group, this group was also significantly older and with a lower number of work hours, factors that might have been affecting their level of SP even before the transplantation. The 'restrictions group' also had higher presence of more severe, however possibly temporary factors such as side-effects and perhaps by managing these, the perception of one's restrictions would change as well. Unfortunately in this study we were not able to further explore this hypothesis.

When analysing the impact of social participation on future patient outcomes, we found that decreased kidney function and restrictions in SP increased the risk of future graft loss. In addition, lower education, worse kidney function, higher comorbidity and restrictions in SP increased the risk for mortality. Although to our knowledge to date no study explored SP as determinant of survival/ mortality, studies in the general population support these findings. Hsu (2007) found that having paid or unpaid work could lower future risk of mortality for the elderly in Taiwan, concluding that activities that accompany economic security or spiritual well-being may be related to longevity.<sup>31</sup> Similarly, Dalgard et al. (1998) in their study with 17 years long follow-up found that

social participation had a strong direct effect on mortality arguing that social participation is related to inner, psychological resources and life style and has a rather stable effect on the control over one's own life, and thereby health.<sup>32</sup> To certain extent, this may explain why number of hours spent at work/study/ housework was not associated with either graft loss or mortality. According to Van der Mei work status of patients after KT improved after the surgery, but it did not necessarily lead to 'normal' work outcomes.<sup>10</sup> The participation scale used in this study captures more than ability to work, as it includes the perceptions of equal opportunities in part-taking in life situations related to self-care, domestic life, community life<sup>24</sup>, all of which are associated to the control over one's own life mentioned by Dalgard et al. 1998.<sup>32</sup>

### *STRENGTHS AND LIMITATIONS*

The main strength of this study is the combination of sociodemographic, medical and psychosocial variables in a prospective follow-up for an average of 6.8 years. The Louis Pasteur University Hospital Transplantation centre in Kosice, Slovakia, where during the observation period, the average number of patients undergoing kidney transplant was 31.4 per year – about one quarter or all kidney transplantations carried out in Slovakia. Therefore, our cohort explained a relevant number of national transplanted recipients and for this study all consecutive patients fitting the inclusion criteria were asked to participate to prevent selection bias. However, this may also be considered as one of the limitations of the study – all of our patients were enrolled from a single centre. Since social participation was previously found to differ depending on culture and ethnicity<sup>33</sup> and our sample consisted of predominantly white Caucasian patients, our findings cannot be generalized without further consideration. We have limited information on patients who dropped out prior to the start of this study due to graft loss or mortality. Finally, causal associations between predictors and outcomes cannot be definitely confirmed.

It is also important to mention the potential limitations of the scales used in this study. The ESRD-SCL\_TM scale was originally developed with a specific input from KT recipients in the era of predominantly prednisone and cyclosporine based immunosuppressive protocols, and therefore some of its items may not be relevant. We compared the results of ESRD-SCL-TM in our patients depending on their protocol, but no differences were found. The Participation Scale was previously used in a large number of chronic disease populations; however to our knowledge, this was the first study that uses it in KT recipients. Finally, causal associations between predictors and outcomes cannot be definitely confirmed.

### *IMPLICATIONS*

Patients reporting no restrictions in social participation, better kidney function, lower number of

comorbidities and higher education had higher odds of surviving with a functioning graft. These results show the importance of close monitoring of post-transplantation SP along with kidney function and comorbidities, due to their effect on long-term patient outcomes. Although time spent at work was associated with higher SP, it did not directly affect future outcomes and therefore monitoring SP should include all factors outlined by the ICF.

Special attention should be paid to the management of the side-effects of immunosuppressive treatment as poor management of anti-rejection medication seems to have a strong link to restrictions in SP. Although some of these effects may not seem as severe, they can cause a high level of distress in the patient and lead to decreased SP and possibly even to breaking the immunosuppressive regimen. However, in order to confirm this relationship, pathways between perceived side-effects, SP and adherence should be examined. The multi-disciplinary team at a transplantation unit could assist their patients in improving their future social participation by providing information on opportunities to get involved in various interest groups to increase their skills and level of participation or in patient groups which could provide peer support from others experiencing similar situation to their own. In other cohorts, interventions using problem-solving approach, delivering a combination of services and providing skills-training were previously used to increase social participation, with the strongest evidence supporting a problem-solving approach.<sup>34</sup> Future research should also consider additional factors, such as physical activity, adherence and depression, as well as the level of pretransplant SP. Furthermore, the effect of improvement/deterioration of post-transplantation SP on long-term patient outcomes should be explored.

## *CONCLUSIONS*

We found that restrictions in social participation were associated with living alone, worse kidney function, more severe side-effects of immunosuppressive treatment and lower PCS. No restrictions in SP at baseline was associated with decreased odds of graft loss or dying at follow-up, along with higher education, better kidney function and lower number of comorbidities. Our findings show the importance of closely monitoring not only kidney function, but also of SP. To further unravel these relationships pathways between perceived side-effects, SP and HRQoL should be examined.

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Part



QUALITY OF LIFE AND ACCESS  
TO TREATMENT IN PATIENTS  
WITH HAEMOPHILIA

## **PART II**

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In Part II we explored differences regarding some aspects of the care for haemophilia across nineteen, thirty-five, six and four European countries. We found differences across all levels of care, from home treatment to access to specialist care, despite the recent promulgation of consensus guidelines designed to standardize the care for haemophilia throughout the European continent.