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## Perceived health status after kidney transplantation

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# Introduction

## 1.1. Chronic kidney disease

A substantial number of patients with end-stage renal disease require lifelong renal replacement therapy. In Europe as a whole, 70-150 incident patients per million inhabitants started renal replacement therapy in 2003, with an overall prevalence of 500-1200 patients per million inhabitants, causing a heavy burden to public health resources <sup>1</sup>. Two distinct approaches to patients with kidney failure are possible today: dialysis (hemodialysis and peritoneal dialysis) and transplantation either from a cadaver or a living donor. Hemodialysis was used for the first time by Kolff in 1943 for treatment of acute renal failure <sup>2</sup>. It is an intermittent extracorporeal elimination method in which blood is passed through a dialyser which contains a biocompatible artificial membrane where diffusion and convection of molecules from and to blood take effect. Patients in a chronic hemodialysis program usually undergo 4- to 5-hour long sessions three times a week. Peritoneal dialysis is a continuous intracorporeal elimination method which uses the patient's own peritoneal membrane as a dialyser. Diffusion and osmosis are the main principles of elimination in peritoneal dialysis. Dialysis fluid is usually exchanged four times a day by the patient or several times during the night by an automatic cycler. Both dialysis methods are equal in effectivity and thanks to them patients with kidney failure can survive for more than 20 years today. However, patients are dependent on dialysis throughout their lives and withdrawal from it causes the patients to die. On the other hand, kidney transplantation is a treatment method in which a kidney is transplanted into a patient, restoring all its functions. Patients are independent from any elimination method after a successful kidney transplantation, though lifelong use of immunosuppressive medication is necessary to prevent immunological rejection of the transplanted graft.

Kidney transplantation is the method of choice among renal replacement therapies due to its superior results in mortality, morbidity, cost utilization and quality of life in comparison to dialysis <sup>3,4</sup>. The research into graft and patient survival after transplantation is quite impressive and a wide range of factors is already known to influence mortality and morbidity of transplanted patients <sup>5,6</sup>. Less information is available about quality of life and variables that have an impact on it.

## 1.2. Quality of life and perceived health status

The World Health Organization Quality of Life assessment group has defined quality of life as ‘Individuals’ perception of their position in life in the context of the culture and the value system in which they live and in relation to their goals, expectations, standards and concerns’<sup>7</sup>. Quality of life according to the WHO definition is a multidimensional construct comprising physical, mental, social and economic components<sup>7-9</sup>. Spilker’s hierarchical model includes overall quality of life, separate domains of quality of life, as well as a third level covering more specific aspects of each domain<sup>9-11</sup>.

Health is defined by WHO as being not only the absence of disease and infirmity, but also the presence of physical, mental and social well-being<sup>12</sup>. It is evident that various medical parameters are important factors in some domains of quality of life. Instead of exploring quality of life, many researchers therefore study only the physical, mental and social domains of health and call it ‘health-related quality of life’<sup>13,14</sup>, while others decline this and prefer the term ‘perceived health status’<sup>15</sup>. The term quality of life covers much broader aspects than perceived health status, as it includes also environmental and economic factors as well as psychological well-being, with their combined impact on patients’ sense of well-being<sup>16</sup>. Despite the uncertainty in definitions, perceived health status is not a mere construct devoid of clinical relevance. Recent research has shown that it is a very important predictor of other outcomes, including survival, in patients with chronic diseases<sup>17,18</sup>. Therefore patients’ self-assessment of their health has become accepted as an important measure for evaluation and comparison of treatments as well as for the management of individual patients<sup>19</sup>.

## 1.3. Conceptual framework

### 1.3.1. The model of the disablement process

The International Classification of Functioning, Disability and Health (ICF)<sup>20</sup> is based on principles derived from the Disease-Handicap Model, which clarifies the consequences of diseases in terms of resulting impairments, disabilities and handicaps. The more elaborate version of this model was worked out by Verbrugge and Jette in 1994 and it was entitled ‘the disablement process’<sup>21</sup>. The simplified model of the disablement process based on Verbrugge’s and Jette’s model as well as the ICF is described in Figure 1.1 and consists of two parts interacting with each other; the first including functioning and disability and the second comprising contextual factors.

The first part of the ICF is based on body functions and structures. Any intrinsic pathology or disorder which results in significant deviation or loss of body functions or structures is called 'impairment'. Activities and participation form the second component of the first part of the ICF. The term 'activity limitations' refers to difficulty to perform a certain activity in normal manner as a result of impairment. 'Participation restrictions' are problems an individual may experience in involvement in life situations as the result of disability or impairments.

The second part of the ICF has two components as well – environmental and personal factors. Environmental factors make up the physical, social and attitudinal environment in which people live and conduct their lives. These factors are external to individuals and can have positive or negative influence on their performance as members of society, on their capacity to execute actions or tasks, or on their body functions or structure. Personal factors are the particular background of an individual's life and living, and comprises features of the individual that are not part of a health condition or health states <sup>20,21</sup>.

The disablement process may be seen as the link between pathology, impairments and activity limitations, and it ultimately leads to restrictions in participation. An individual with restrictions in participation (physical or social) may temporarily report a deterioration of quality of life. Because participation restrictions may be consequences of disease, alterations in perceived health status are reported as well. Any significant pathology therefore modifies perceived health status and quality of life.

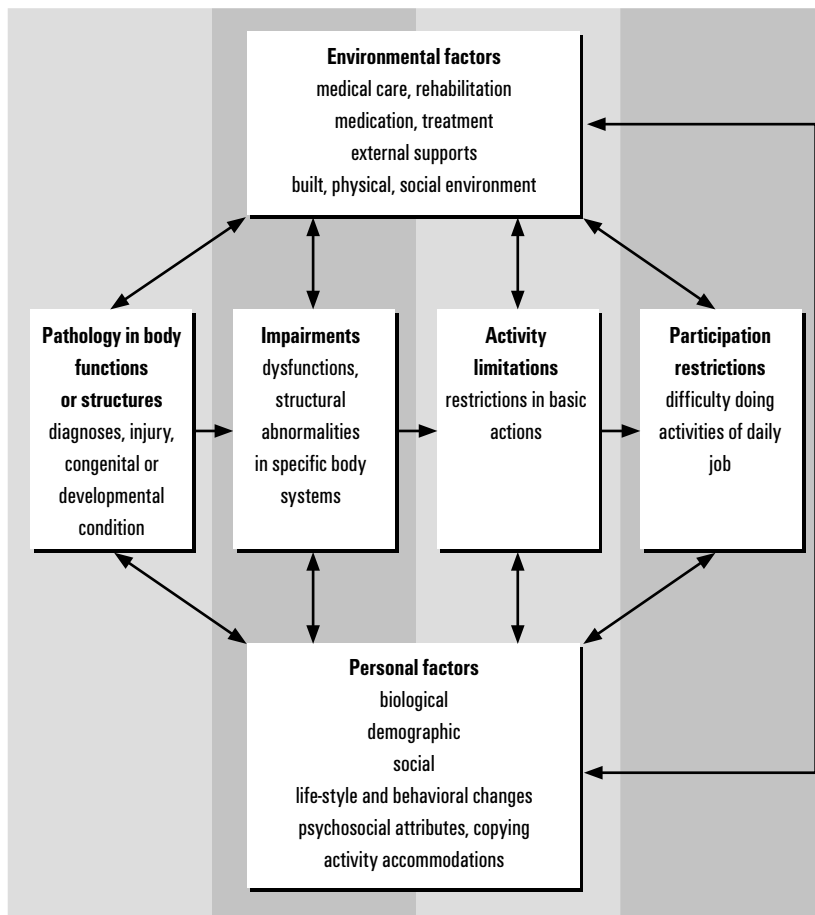
Contextual factors are important influences and mediators which aggravate or reduce the disablement process. These factors may interfere in any part of the disablement process, and vice versa, the disablement process may modify some contextual factors. In addition, environmental and personal factors may interact with each other. The individual's health status and quality of life are therefore the results of a wide range of interacting factors influencing various parts of the disablement process.

### **1.3.2. Perceived health status in patients with kidney diseases**

The research into perceived health status after kidney transplantation mostly focuses on the description of its determinants using univariate and bivariate statistics. A variety of medical and non-medical factors have been identified as characteristics of perceived health status in previous studies. However, research with more proper analysis of predictive variables is scarce.

Despite many studies in this field there are still doubts about the importance of medical factors for perceived health status after kidney transplantation. However, medical variables are at the center of nephrologists' attention. In the majority of studies in the field of chronic

**Figure 1.1.** The model of the disablement process



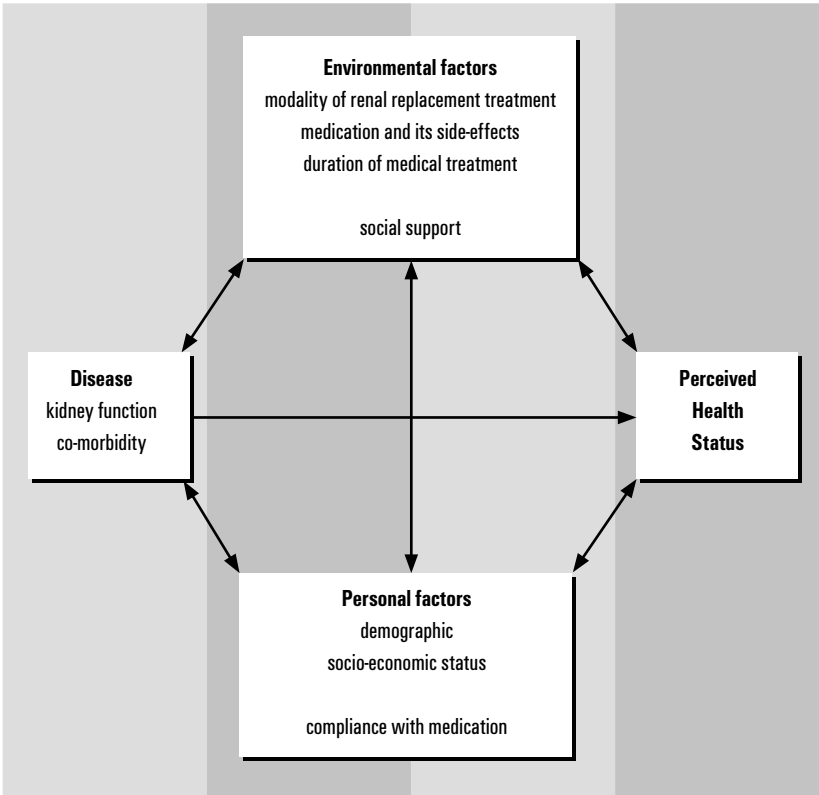
diseases, medical factors are believed to rank among the most important determinants of perceived health status in patients with chronic diseases, and thus also in kidney transplant recipients. On the other hand, research in this field also shows that patients can evaluate their health rather differently even when their medical variables are very similar or identical<sup>8</sup>. One possible explanation is that there are many possible confounders among non-medical variables, including age, gender, socio-economic status (education, occupational and employment status), social support or psychological characteristics. So, the interaction between environmental and personal factors, as well as their influence on various parts of the disablement process, may result in differing perceived health status<sup>22</sup>. Research aiming at comprehensive assessment of several predictors of perceived health status is lacking.

According to the model of the disablement process, a complex variety of environmental and personal factors exist with possible impact on perceived health status. The following model gives an overview of several medical and non-medical variables with possible influence on perceived health status in patients after kidney transplantation (Figure 1.2).

### 1.5. Research questions

The variables described in the model may be categorized into two groups – medical and non-medical. Variables directly related to kidney disease or connected to treatment are called ‘medical’. Other ‘non-medical’ variables are not related to the underlying disease or to treatment. Searching the literature, we found studies identifying some predictors of perceived health status <sup>4,22-30</sup>. Based on preliminary knowledge, the present research wants to address medical variables, to show their relationship to perceived health status, and to explore the combined influences of medical factors

**Figure 1.2.** Predictors of perceived health status in patients with end-stage renal disease



on each other. As the current knowledge lacks a comprehensive view of variables with possible impact on perceived health status, the main aim of this research is to create a comprehensive model of medical and non-medical predictors of perceived health status and to discuss their clinical importance. Therefore the following questions in the population of kidney transplant recipients are discussed.

- 1 What health status do successfully transplanted patients with end-stage renal diseases perceive?
- 2 Which medical and social-demographic factors influence their perceived health status?

These general research questions are specified as follows.

- 1 *Are the differences in perceived health status between transplant and dialysis populations based on modality of therapy or on selection bias?*
- 2a *Which medical variables (kidney function, adverse effects of immunosuppressive treatment, co-morbid diseases, duration of kidney disease, number of hospitalizations, period after transplantation) influence perceived health status?*
- 2b *What is the relation of adverse effects of treatment and noncompliance with the therapy to perceived health status? Is noncompliance related to adverse effects of treatment?*
- 2c *Are there non-medical confounders (age, gender, socio-economical status, social support) that are related to perceived health status in addition to medical variables?*

## **1.6. Research context of the study**

In May 2001, a proposal for co-operation in the project named Societal Reintegration After Kidney Transplantation was signed between the University Hospital Košice, P. J. Šafárik University Košice and the University of Groningen. The main goals of this research were to evaluate the possibilities and problems which people are confronted with after renal transplantation in the process of societal reintegration, and which factors increase or decrease the chance of societal reintegration after renal transplantation. Since 2001, research has been carried out by two independent teams, one in Košice and the other in Groningen. While the team in Košice has mostly focused on studying perceived health status and its determinants, the Groningen team has been interested in patient participation in society. After years of mutual international collaboration, data were collected and analyzed. Several presentations at international

and national conferences as well as articles in scientific journals have resulted from this study. This thesis is intended to give an overview of the research work done on this project during the period 2001-2006.

## **1.7. Study design and procedure**

Between the start of the transplant program in 1972 and the end of the year 2005, 1352 kidney transplantations were performed in Slovakia. The annual transplantation rates varied between 73 and 133 in the last five years. Today four kidney transplant centres exist in Slovakia (Bratislava, Košice, Banská Bystrica and Martin). The sample for the present research was recruited from the Košice and Bratislava transplant centres, which manage more than half of the Slovak transplant population.

A protocol was designed to examine 200 kidney transplant recipients with a functioning graft between one and seven years after their transplant surgery, with the aim of studying the perceived health status of these patients some time after their transplant surgery. A second group was meant to include 50 incident kidney transplant recipients with a functioning graft 3 months after their transplant surgery, with the aim of studying the perceived health status of patients shortly after their transplant surgery. A further group of dialysed patients was meant to contain 100 dialysis patients, with 50 of them on waiting lists for cadaveric kidney transplantation.

The local Ethical Committee approved the study. Only patients who signed informed consent prior to interview were included.

## **1.8. Outline of the thesis**

It is believed that perceived health status in patients after transplantation is higher than in those on dialysis <sup>4</sup>. But before a patient is transplanted, two processes of selection are applied. Any comparison of perceived health status of transplant recipients to patients on dialysis is therefore doubly biased, resulting in comparison of young and relatively healthy transplanted to older and more ill dialysis patients <sup>31</sup>. The differences in perceived health status between two renal replacement modalities are explored in Chapter 2. The differences in socio-demographic variables, social support and medical factors are presented as well.

In Chapter 3 medical predictors of perceived health status are evaluated in a sample of 128 kidney transplant recipients. Stepwise linear regression analysis of 17 demographic, dialysis-, transplantation- and co-morbidity-related factors was performed in order to explore medical predictors of worse perceived health status controlled for basic demographic variables.



Chapter 4 describes the adverse effects of immunosuppressive treatment as an important transplant-specific medical factor. Adverse effects can have little or no direct effect on morbidity or survival, but can be perceived by the patient as highly disturbing<sup>8,32</sup>. Factors which can modify stress from adverse effects are explored in this chapter as well.

Noncompliance with the therapy is the subject of Chapter 5. The consequences of noncompliant behaviour are very negative in terms of the final clinical outcome. The detection of noncompliers is a permanent concern of the transplant team, because noncompliance is associated with higher frequency of late graft dysfunction, which is directly related to graft loss<sup>8</sup>. In addition, noncompliance is associated with significantly decreased quality of life<sup>32</sup>.

Chapter 6 makes a synthesis of medical and non-medical factors and analyses their impact on perceived health status. Out of 218 patients after kidney transplantation, 138 participated in the study. Linear regression analysis was performed to predict perceived health status, with the patients divided into three age categories (<40, 40-59, ≥60 years). Independent variables included socio-demographic variables (age, gender, education, employment status, house-keeping activities), social support, dialysis and transplantation related variables, co-morbidity, side-effects of treatment and compliance with immunosuppression.

In the last chapter we discuss the theoretical and clinical consequences of our research and we recommend possible interventions which can improve perceived health status in kidney transplant recipients. In addition, suggestions aimed at future research on this topic are given in this final chapter.

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