Adjustment to kidney transplantation

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2018

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

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Download date: 09-12-2018
Chapter 8

General discussion
As outlined in the introduction, research for this thesis was undertaken to shed light on a number of issues in regards to the process of adjustment to kidney transplantation which were yet poorly understood. Accordingly, during the course of the preceding chapters, the objective to identify factors associated with successful adjustment to kidney transplantation, operationalized as favourable levels and changes of perceived health and psychological distress, was pursued. In this final chapter the results will be summarized and organized, starting from an overview of the main findings and followed by a description of the course of perceived health and psychological distress after kidney transplantation as it emerges from this research. Next, a number of methodological considerations will be discussed to provide a context enabling the evaluation of the strength of the evidence presented. This chapter will conclude with some suggestions for further research, as well as potential implications for clinical practice.

**Main findings**

This thesis described perceived health and psychological distress as indicators of adjustment after kidney transplantation using a cross-sectional and prospective design. In addition, factors associated with perceived health and psychological distress were identified in an attempt to explain individual differences in adjustment.

Little is known about perceived health among long-term kidney transplant recipients, as most studies have been conducted among patients with relatively short post-transplant intervals (Dobbels, De Bleser, De Geest, & Fine, 2007). To advance knowledge on this subject, differences in disease burden and perceived health between short-term and long-term kidney transplant recipients were examined in Chapter 2. Long-term kidney transplant recipients reported more symptoms and more comorbidities, but experienced similar levels of perceived health as patients with shorter post-transplant intervals. Results revealed that it was possible to predict short-term perceived health quite accurately based on a number of variables identified in preceding studies, most notably kidney function and symptoms. However, these previously identified variables were largely unable to predict long-term perceived health. While the number of symptoms was significantly associated with perceived health in short- and long-term cohorts, this relationship was weaker in cohorts with longer time since transplantation. Thus, long-term kidney transplant recipients
experienced more symptoms, but at the same time these symptoms affected their perceived health to a lesser degree. This finding could plausibly be attributed to selective survival. Seeing that previous research indicates that perceived health is associated with mortality (Majernikova et al., 2012; Nielsen et al., 2008; Thong et al., 2008), patients who are able to maintain relatively higher levels of perceived health despite a high symptom burden might have better odds of becoming long-term survivors. Alternatively, however, this finding could be interpreted as a sign of adjustment indicating that patients become accustomed to symptoms or learn to tolerate them better over time, as suggested in an earlier study (Peters et al., 2004). The higher number of comorbidities observed in the long-term cohort was in line with expectations. However, differences were relatively small, possibly due to a reduced probability of survival for patients with higher disease burden. Findings are in agreement with results of another prospective study concluding that perceived health of kidney transplant recipients remains relatively stable until six years after transplantation (Griva et al., 2011). Taken together, these findings suggest that long-term kidney transplant recipients are able to maintain high levels of perceived health, in spite of a greater burden in terms of symptoms and comorbidities.

Next, the tenability of a theoretical model explicating the relationship between health and psychological distress was evaluated in Chapter 3. The preliminary model was derived from the basic structure outlined in Wilson and Cleary’s model of patient outcomes (Wilson & Cleary, 1995) and subsequently modified to take recent research findings into account. More specifically, this model described the interrelationship between objective health, functional status, perceived health, personal characteristics, and psychological distress. Some of the hypothesised relationships were not supported by the data and the model under consideration was adjusted accordingly. In the final model, objective health influenced psychological distress indirectly. Its impact was mediated by perceived health and a factor combining the personal characteristics perceived control, optimism and self-esteem. These findings attenuate previous reports of modest associations between objective health and psychological distress (Paukert et al., 2010; Thygesen, Saevareid, Lindstrom, & Engedal, 2009) and instead suggest that objective health has a considerable, though indirect, effect on psychological distress. It further points to combined influences of perceived control, optimism and self-esteem as key elements in this interrelation between objective health and psychological distress. On the one hand, these personal characteristics
seem to protect patients from distressing effects of poor health. At the same time, however, these personal characteristics might possibly also be impaired by poor objective health, as suggested by previous research (Norton et al., 2005; Ranchor et al., 2010).

Previous studies found that patients overestimate the quality of life they will achieve after kidney transplantation (Cleemput, Kesteloot, De Geest, Dobbels, & Vanrenterghem, 2003; Smith et al., 2008). However, the relevance of these findings is unclear, as it remains unknown whether unmet expectations in regards to post-transplant quality of life have detrimental effects on patients’ well-being. To establish whether this is the case, Chapter 4 examined the association between quality of life overestimation and level of psychological distress after transplantation. For a large proportion of patients physical, psychological, and social quality of life after transplantation turned out to be lower than they had expected before transplantation. These overestimations were more pronounced for the physical than for the psychological and social dimension of quality of life. While pre-transplant characteristics, such as dialysis vintage, number of symptoms, perceived health or optimism were unrelated to quality of life overestimation, patients treated with haemodialysis demonstrated greater overestimation of physical quality of life than those treated with peritoneal dialysis. Findings revealed that quality of life overestimation was not independently associated with increased psychological distress. Amongst patients with low levels of optimism, however, overestimation of social quality of life resulted in higher short-term distress. In spite of this, quality of life overestimation was not significantly related to psychological distress in the long-term, regardless of the level of optimism. Outcomes support and expand on previous insights regarding quality of life overestimation among kidney transplant recipients (Cleemput et al., 2003; Smith et al., 2008). Results demonstrate that overestimations of treatment outcome do not affect psychological distress among kidney transplant recipients and are consistent with earlier findings among heart transplant recipients (Leedham, Meyerowitz, Muirhead, & Frist, 1995) and patients with cancer (Winterling, Glimelius, & Nordin, 2008). The short-lived influence of social quality of life overestimation on distress even when optimism is low further suggests that patients cope well in the long-term, possibly because they nevertheless experienced an improvement, albeit smaller than expected.
The occurrence of changes in perceived control and their influence on psychological distress after transplantation were investigated in Chapter 5. Looking at the entire group of participants, small and small to medium-sized improvements of perceived control and psychological distress respectively were observed after kidney transplantation. When individual patterns of change were examined it became apparent that roughly a third of patients experienced a meaningful improvement of perceived control, whereas more than one in ten reported a decrease. An increase of perceived control was associated with a considerable decrease of psychological distress. For patients reporting decreased or stable levels of perceived control, however, no significant changes of psychological distress were observed. Results complement earlier reports of declines in perceived control observed among patients with cancer (Bárez, Blasco, Fernández-Castro, & Viladrich, 2009; Henselmans, Sanderman, Baas, Smink, & Ranchor, 2009; Ranchor et al., 2010) and give the first account of pre- to post-transplant improvements of perceived control among kidney transplant recipients. Nevertheless, improvements are modest and levels of perceived control remain comparatively low even after kidney transplantation. Furthermore, findings are consistent with earlier reports that increasing levels of perceived control are associated with subsequent improvements of psychological distress (Barez, Blasco, Fernandez-Castro, & Viladrich, 2009) and that a decrease of perceived control by itself is insufficient to heighten psychological distress (Ranchor et al., 2010). Consequently, outcomes seem to suggest that interventions aiming to improve levels of perceived control could have beneficial effects on patient well-being.

Chapter 6 investigated pre- to post-transplant changes in goal disturbance and importance, as well as their prospective association with changes in psychological distress. In addition, the mediating role of changes in perceived control in this process was examined. Findings indicated that the ten most disturbed goals pre-transplant were endorsed by more than a quarter of participants and were mostly disease-specific, as opposed to higher order life goals. After transplantation, goal disturbance for the ten most disturbed goals pre-transplant decreased significantly and this decrease was associated with reduced psychological distress. Instead of the presumed mediating role of changes of perceived control, results suggested that decrease of goal disturbance and increase of perceived control were independently related to decrease of psychological distress. Remarkably, the
most disturbed and most important goals pre-transplant did not correspond. This observation might be interpreted as manifestation of reprioritizing, a process by which unattainable goals in one life domain are abandoned in favour of more attainable goals in a different life domain (Janse et al., 2016). Some tentative support for this interpretation came from the finding that the most important goals of patients belonged to the interpersonal domain, as this domain is less likely to be affected by illness than life goals pertaining to achievement and power. However, although plausible, this interpretation was not investigated and therefore has to be treated with caution. Results provide further evidence for the influence of goal disturbance (Boersma, Maes, & van Elderen, 2005; Janse, Sprangers, Ranchor, & Fleer, 2016) and perceived control on well-being outlined in previous studies (Barez et al., 2009; Gerstorf et al., 2014; Ranchor et al., 2010). Thus, findings might be interpreted as tentative evidence that interventions aiming to enhance goal adjustment strategies and increase levels of perceived control could improve patient well-being.

Finally, Chapter 7 explored the influence of the type of transplant received on trajectories of perceived health in a combined sample of kidney and liver transplant recipients. Four distinct trajectory classes of perceived health were identified. The vast majority of patients were assigned to one of three trajectory classes demonstrating improvements of perceived health. These trajectory classes were denoted as low, intermediate, and high increasing according to pre-transplant levels of perceived health. One in ten patients, however, experienced a deterioration of perceived health shortly after transplantation, despite intermediate levels of perceived control pre-transplant. In univariate analyses trajectory classes were found to differ by type of transplant, gender, pre-transplant comorbidities, and occurrence of complications. However, in a multivariate model to predict inclusion in the deteriorating trajectory class, type of transplant was not a significant predictor. Moreover, despite adequate model accuracy, the model was unable to distinguish patients in the intermediate deteriorating trajectory class from those in other trajectory classes. Previously it has been suggested that the course of health-related quality of life varies across different types of transplant including kidney and liver (Kugler et al., 2013). However, it appears that these differences should at least partially be ascribed to initial discrepancies between recipients of different types of transplants, for example, gender distribution and likelihood of complications instead of the type of transplant itself. Furthermore, results attenuate
findings of two previous studies according to which nearly half of all patients experience stable or deteriorating levels of health-related quality of life (Goetzmann et al., 2008; Villeneuve et al., 2016). Instead the vast majority of patients seem to report significant improvements, with only one in ten experiencing a decline of perceived health status. Unfortunately, it was not possible to identify at-risk patients in advance based exclusively on socio-demographic and medical variables. However, in clinical practice, lack of improvement of perceived health status shortly after transplantation might be a useful indicator for imminent deterioration.

CONCLUSIONS

In the following paragraphs some overall conclusions will be drawn based on the results presented in the preceding chapters. Successively, the course of perceived health and the course of psychological distress after kidney transplantation will be portrayed as they emerge from findings reported in this thesis. Where appropriate, factors associated with perceived health and psychological distress that explain individual differences will be discussed as well.

The course of perceived health after transplantation

Results of Chapter 4 suggest that improvements of physical quality of life are smaller than patients had expected before transplantation. Given the conceptual overlap between physical quality of life and perceived health it might therefore be hypothesised that improvements of perceived health might also fall short of patients’ expectations. At the same time, results described in Chapter 7 suggest that the vast majority of patients report considerable improvements and achieve satisfactory to excellent levels of perceived health post-transplantation. Moreover, the gap between those with the highest and lowest levels of perceived health before transplantation is noticeably reduced after transplantation. Only few patients seem not to benefit from transplantation and instead experience deteriorating levels of perceived health in the first year after transplantation. Beyond the first year post-transplant interpretation of the cross-sectional data analysed in Chapter 2 allows for two equally plausible scenarios: levels of perceived health among long-term survivors either remain stable over time or initially higher levels of perceived health in long-term survivors decrease over time to approach the level of kidney transplant recipients with shorter post-
transplant intervals. However, an earlier prospective study found that general health perceptions (i.e. perceived health) in this population are stable over a period of six years, although some decline was evident (Griva et al., 2011). Taken together, it might be hypothesised that kidney transplant recipients experience a negligible decline of perceived health in the long-term, therefore somewhat favouring the first scenario described above.

Findings of Chapter 2 further indicate that amidst several factors associated with perceived health (Bohlke et al., 2009; Prihodova et al., 2010; Rosenberger et al., 2006) better kidney function and fewer symptoms are particularly linked to better perceived health in the first year post-transplant. In addition, findings of Chapter 7 suggest that gender, pre-transplant comorbidities, and occurrence of complications might affect the trajectory of perceived health during the first year post-transplant. Kidney transplant recipients who are male, have fewer pre-transplant comorbidities, and do not experience complications tend to achieve higher levels of perceived health. Furthermore, as findings in Chapter 3 are based on a sample including patients in their first year post-transplant it might be hypothesised that perceived control, optimism and self-esteem are also related to perceived health in the first year after transplantation. Combining results of Chapters 2 and 3, it may further be speculated that compared to kidney function and symptoms, perceived control, optimism and self-esteem play a subordinate role for perceived health in the first year post-transplant. Findings discussed in Chapter 2 indicate that long-term kidney transplant recipients experience more symptoms, yet at the same time also suggest that symptoms exert less influence on long-term perceived health, possibly due to selective survival (Majernikova et al., 2012; Nielsen et al., 2008; Thong et al., 2008) or patient adjustment (Peters et al., 2004). In addition, Chapter 2 indicates that long-term kidney transplant recipients report more comorbidities and suggests that the association between comorbidities and perceived health is invariable. Thus, with other factors such as kidney function and symptoms being less important, comorbidities seem to exert relatively more influence on perceived health in the long-term. From findings of Chapter 3 it can be inferred that comorbidities influence long-term perceived health in various ways. On the one hand, more comorbidities are directly associated with lower perceived health. On the other hand, more comorbidities are indirectly related to perceived health through their association with functional impairments and lower levels of perceived control, optimism, and self-esteem.
However, these findings also imply a mediating relationship, that is, the negative influence of comorbidities on perceived health can partially be compensated by perceived control, optimism and self-esteem (Bowling, Seetai, Morris, & Ebrahim, 2007; Chipperfield, Campbell, & Perry, 2004; Cott, Gignac, & Badley, 1999; Kim & Evangelista, 2010; Krokavcova et al., 2008; Tovbin, Gidron, Jean, Granovsky, & Schnieder, 2003). At the same time, Chapter 2 revealed that factors associated with long-term perceived health are different from those associated with short-term perceived health and are largely unknown. Thus, combining the results of Chapters 2, 3, and 7 it might be speculated that whilst the influence of socio-demographic and medical variables, such as gender, kidney function and symptoms progressively declines, personal characteristics become increasingly important as determinants of perceived health in the long-term and may consequently assume a vital role in the maintenance of perceived health.

The course of psychological distress after transplantation

Results presented in Chapter 5 suggest that recipients of a kidney transplant experience a considerable decrease of psychological distress immediately after transplantation. However, findings of Chapter 4 indicate that with regards to psychological quality of life, post-transplant outcomes tend to be lower than patients had expected before transplantation. Given the conceptual overlap between psychological quality of life and psychological distress, it might thus be hypothesised that improvements of well-being also tend to be smaller than patients would have expected before transplantation. In addition, the initial decrease of psychological distress is not maintained throughout the first year, as psychological distress shows a slight increase from three months post-transplant onwards, albeit not to pre-transplant levels. While it remains unclear how psychological distress develops after the first year post-transplant, results presented in Chapter 3 provide some indication as the data is mostly derived from kidney transplant recipients with longer post-transplant intervals. According to these findings psychological distress is somewhat higher after the first year post-transplant and seems to approach pre-transplant levels. Assuming that the number of comorbidities increases with time, as suggested in Chapter 2 as well as by previous studies (AlBugami & Kiberd, 2014; McCaughan & Courtney, 2015; Sharif & Cohney, 2016; Stoumpos, Jardine, & Mark, 2015) and given the influence of comorbidities on psychological distress discussed in Chapter 3 and explained in more detail below, it might
further be speculated that higher levels of psychological distress in long-term cohorts could imply that psychological distress gradually increases over time.

Several factors have been identified that are associated with psychological distress in the first year after transplantation and beyond. Correlations presented in Chapters 4 suggest that patients who experience more symptoms report higher levels of psychological distress during the first year after transplantation. Overestimation of social quality of life seems to be another factor associated with short-term psychological distress when optimism is low. Nevertheless, this effect is transient and cannot be detected anymore by the end of the first year post-transplant, possibly as a result of patient adjustment. Furthermore, patients who reported an increase of perceived control after transplantation also experienced reduced psychological distress throughout the first year post-transplantation. These findings are consistent with results of earlier studies among patients with end stage renal disease, which found that higher levels of perceived control are beneficial and associated with increased well-being and reduced psychological distress (Griva, Jayasena, Davenport, Harrison, & Newman, 2009; Timmers et al., 2008). Observations reported in Chapter 6 further suggest that patients experience a reduction of goal disturbance after transplantation which has a beneficial influence on psychological distress. It seems that kidney transplantation brings goals which were previously unattainable within reach, most notably in the domain of disease-specific goals, for example, being able to eat and drink what one wants. These findings are in line with studies conducted among patients with cancer, in which it was repeatedly found that decrease of goal disturbance is related to improved well-being (Boersma et al., 2005; Janse et al., 2016). From the preceding chapters no further conclusions can be drawn with regards to the influence of symptoms on long-term psychological distress after kidney transplantation. However, given that distressing effects of symptoms were observed across samples with different post-transplant intervals (Kugler et al., 2009; Teng et al., 2015) it seems probable that a higher symptom burden will consistently be related to higher psychological distress even beyond the first year post-transplant. As discussed in Chapter 3, higher levels of perceived health, as well as higher levels of personal characteristics, such as perceived control, optimism and self-esteem are associated with lower long-term psychological distress. However, these personal characteristics might potentially also become increasingly strained by declines of health as
indicated by more comorbidities in long-term cohorts. More comorbidities are often associated with more severe functional impairments (Deimling et al., 2006; Deimling, Bowman, Sterns, Wagner, & Kahana, 2006; Norton et al., 2005), thus decreasing patients’ mobility, as well as their ability to care for themselves, and perform other daily activities. According to Chapter 3, more comorbidities and higher levels of functional impairment are also related to lower levels of perceived health, perceived control, optimism, and self-esteem, thereby indirectly increasing psychological distress. At the same time, results suggest that personal characteristics might compensate to some extent for the distressing impact of comorbidities. Consequently, it might be hypothesised that an increased number of comorbidities might partially explain slightly higher levels of psychological distress in long-term kidney transplant recipients. Following from this, it might also be inferred that patients with lower levels of perceived control, optimism and self-esteem could be particularly vulnerable to psychological distress as they might be more susceptible to distressing influences of comorbidity.

METHODOLOCIGAL CONSIDERATIONS

This section discusses specific aspects of the methodology of the studies described in this thesis to provide a context in which the strength of the evidence can be evaluated. Methodological aspects discussed include the designs of the studies, sample characteristics, and measurement tools, all of which will be considered in the following paragraphs.

Study design

Two independents studies were conducted for this thesis. Analyses and findings reported in Chapters 2 and 3 were based on data from the cross-sectional study, whereas those reported in Chapters 4 to 7 were derived from data of the prospective study. The main aim of Chapter 2 was the description of long-term outcomes after kidney transplantation, prompted by the reality of an increasing number of patients living with a transplanted kidney for long periods of time and the lack of knowledge in regards to long-term perceived health. Evidently, such a research question called for a prospective longitudinal design; however, time constraints for the completion of this study meant that a follow-up of fifteen years after transplantation was unfeasible. The cross-sectional quality of the data and the absence of a control group further imply that all of the reported
associations are correlational in nature and that causal relationships cannot be inferred. Given that it was not possible to observe changes over time it remains uncertain whether the differences observed between short-term and long-term cohorts should be attributed to differences in the time elapsed since transplantation or other factors, thus making it somewhat unclear whether perceived health of long-term kidney transplant recipients has increased, decreased or remained stable over the years. During a fifteen year window of time, ageing and other events not directly linked with or entirely unrelated to transplantation might have influenced outcomes. In addition, it seems likely that cohorts of patients who more recently received a transplant differ in regards to relevant variables, despite attempts to statistically control for some of the differences between short-term and long-term cohorts. Recent years have seen advances in medical care and changes in procedures some of which might be hypothesised to be associated with improved and some with reduced levels of perceived health in this population, potentially leading to selection bias. Levels of perceived health, as well as chances for long-term graft survival among patients transplanted more recently are expected to have increased through the use of more potent immunosuppressants with fewer side-effects, as well as through an increasing number of pre-emptive transplantations, and those involving organs from living donors. Conversely, other factors might be expected to negatively affect levels of perceived health and odds of long-term graft survival in this population. For example, restrictions applied to selection procedures for donor and recipient have been eased, leading to the inclusion of marginal donors and old-for-old programs. Thus, transplantations are performed with previously ineligible patients and organs associated with suboptimal outcomes. While a prospective design might have addressed some of these issues, it seems questionable whether all variables of interest could have been included and whether this would have effectively addressed the risk of selection bias. Overall, the pressing need for more information on long-term outcomes and concerns around the feasibility of a longitudinal study were deemed to outweigh the limitations imposed by the cross-sectional design. In regards to findings reported in Chapter 3, potential alternative explanations are to some extent discounted by the fact that the direction of causality was based on previous research and supported by a fitting model. Nevertheless, the relationships described are inherently correlational, as cross-sectional data do not allow the inference of causality with any degree of certainty.
Assessment of patients in the prospective study occurred once pre-transplant and three, six, and twelve months post-transplant. The annual recurrence of the pre-transplant assessment while patients were waiting for a suitable kidney to be allocated was conceived to address the issue of outdated information due to an average waiting time of four years. Although this procedure has alleviated problems around outdated information to some degree, it cannot be ruled out that important changes might still have taken place in patients’ lives in the interval between the last recorded assessment and the transplantation. As a result, the reliability of pre-transplant assessments involves some degree of uncertainty. Post-transplant assessment points were chosen to reflect short-term (three months), mid-term (six months) and long-term (twelve months) changes in outcomes in the first year after transplantation. Furthermore, these assessment points were selected to correspond with scheduled follow-up consultations and clinical assessments of kidney function. The use of fixed assessment points as opposed to event-related assessment seemed appropriate, as treatment and follow-up of patients are highly standardized and display little variation, whereas events like re-hospitalization or additional treatment do not occur with every patient.

Prospective designs enable the description of changes in outcome measure over time as well as the identification of variables associated with these changes. Nevertheless, causality cannot be inferred and alternative explanations cannot be ruled out. To infer causal relationships patients would have to be randomly allocated to ‘transplantation’ versus ‘no transplantation’ conditions, as would be the case in experimental designs. For obvious ethical and practical reasons this is impossible, as the allocation of organs cannot be manipulated or treatment withheld. Alternatively, a control group from the general population would have excluded the possibility that the changes observed in kidney transplant recipients might be the result of changes faced by the entire general population. Major developments in the health care system might be an example. However, even if such a change were to occur and affect health outcomes in the general population, it seems improbable that the effects would become apparent within the relatively short period of data collection. Nevertheless, it should be noted that these and other alternative explanation cannot be entirely ruled out.
Samples
Sample size and response rate of the cross-sectional study were considered satisfactory for a postal survey. A similar initial response rate of roughly sixty per cent was achieved in the prospective study; ultimately, however, participants completing all assessments corresponded to less than thirty per cent of all eligible transplant recipients. Despite an adequate response rate for the baseline assessment, some attrition occurred because participants withdrew, experienced chronic rejection of the kidney, or deceased. Further attrition was due to a considerable number of patients not yet having concluded the first year after transplantation when data collection ended and therefore being unable to complete all assessments. Finally, a significant number of patients missed one or more assessments because they did not return questionnaires. The reasons for this remain speculative, but it could be that patients deemed ongoing participation in the study as too demanding at a time likely to be marked by substantial changes in their lives. Concerning the representativeness of the samples in terms of socio-demographic and medical characteristics, it was found that in both studies, participants were on average roughly five years older than non-participants. As age is related to the outcome measures perceived health and psychological distress, this might somewhat restrict the generalisability of findings to younger kidney transplant recipients in this population. In terms of other available socio-demographic and medical variables such as gender, donor type and kidney function, however, both samples were representative of the population. Similarly, it is often suggested that patients who experience low levels of perceived health and high levels of psychological distress are underrepresented in research because they are less inclined to participate or, in case of prospective studies, more likely to drop out. For the cross-sectional study, this possibility cannot be ruled out as no data on these outcomes were available from non-participants. Consequently, findings of Chapter 2 and 3 might not entirely be applicable to patients with low levels of perceived health or high levels of psychological distress. With regards to the representativeness of the prospective sample, it was found that those who withdrew from further participation after transplantation had reported lower perceived health and higher psychological distress before transplantation. Therefore, it can be concluded that similar restrictions in regards to the external validity of findings as suspected for the cross-sectional study, apply to the prospective study. That is, it remains unclear if these findings are generalizable to patients with lower perceived health and higher
psychological distress before transplantation. Other details potentially affecting the external validity of results are that both studies were conducted among patients of a single transplant centre with a predominantly rural catchment area. This implies, that the validity of findings for patients of other transplant centres in the Netherlands strictly cannot be evaluated and that samples might not entirely represent and therefore findings not entirely apply to kidney transplant recipients residing in large urban areas. Similarly, due to economic and cultural differences between countries and their health care systems, conclusions drawn from these studies might only apply to kidney transplant recipients in the Netherlands. At the same time, it must however be emphasized that the variables under study are not specifically related to certain populations, nor health care systems, thus making the conclusions presented here potentially relevant and applicable to the wider population of kidney transplant recipients throughout the world.

Measures
The use of certain measurement tools could be another limitation. It was deemed necessary to develop a new checklist to assess the number of physical symptoms experienced by patients, as available questionnaires omitted relevant symptoms, were too demanding on patients or drew on a blend of physical and emotional symptoms. While this checklist possessed good face validity and included symptoms had been derived from well-established measures, certain clusters of symptoms may have been over- (e.g. pain) or underrepresented (e.g. skin disorders). Therefore, scores pertaining to the total number of symptoms and associations resulting from these might vary if other checklists had been employed.

Visual analogue scales (VAS-scales) used in analyses of Chapter 2, 3, and 7 are considered to have acceptable reliability and validity. However, while these measures demonstrated convergent validity with measures of related concepts, their potential susceptibility to transient states such as mood could have inadvertently compromised test-retest reliability in this research. Finally, with regards to the prospective study certain post-transplant events which could conceivably affect perceived health and psychological distress were not recorded. Examples are the occurrence of acute rejection episodes or infections which might be hypothesised to decrease perceived health and increase psychological
distress. Consequently, it cannot be excluded that the inclusion of such factors might to some degree have altered findings.

**THEORETICAL AND CLINICAL IMPLICATIONS**

Over many years medical progress has improved survival rates and the quality of life of kidney transplant recipients. Consequently, the identification of determinants of important outcomes such as perceived health and psychological distress has become increasingly relevant. Earlier research, however, has often focused on socio-demographic and medical factors, whereas personal characteristics of patients and the long-term perspective have received comparatively less attention. Therefore, the studies conducted for this thesis are among the few to describe perceived health and psychological distress after kidney transplantation, as well as identifying determinants of individual differences in these outcomes. Theoretical and clinical implications of the findings presented in this thesis will be discussed in the next sections.

*Managing threats to perceived health*

Research presented in this thesis has identified a number of factors that negatively affect perceived health among recipients of a kidney transplant. It follows that addressing these risk factors appropriately might reasonably be expected to result in improved levels of perceived health in this population.

In the short-term, patients with higher symptom burden are prone to experience lower levels of perceived health. Already, many consultant nephrologists routinely address symptom management with patients and sometimes the alleviation of symptoms by reducing the dose or altering the type of immunosuppressive medication is a viable option. Using standardized symptom checklists might further facilitate this process by specifying type and intensity of symptoms and thus making progress visible for patients and health professionals alike. However, despite their initial impact and the suggestion that the number of symptoms increases over time, it appears that symptoms become gradually less influential as determinants of perceived health. The increasing burden of comorbidities over time on the other hand seems to progressively exert more influence on patients’ perceived health, while a higher burden of pre-transplant comorbidities also seems to somewhat increase patients’ risk of experiencing a deterioration of perceived health after
transplantation. Therefore, prevention and adequate management of comorbidity before and after transplantation should be given high priority. Thus far, health professionals aim to manage existing and prevent additional comorbidity through prescription of medication and recommendation of lifestyle changes, for example, low-fat diets to counter negative effects of excessive weight gain on blood pressure. Alongside medical interventions, however, population-specific, evidence-based lifestyle interventions targeting health behaviours such as medication adherence, diet and exercise could have added value in the prevention and management of comorbidity. Accordingly, health behaviour change among kidney transplant recipients could be a productive area for forthcoming research, so that beneficial effects on quality of life and survival, as well as the feasibility and cost-effectiveness of such interventions can be established.

At present, it remains unclear why one in ten kidney transplant recipients report a decline of perceived health after transplantation. While more targeted interventions are devised and tested, regular screening of perceived health could be a prudent first step to enable the early identification of these patients. After an initial review by health professionals on a case-by-case basis to identify issues with and optimise the management of symptoms and comorbidity it might be indicated to refer patients for further support with lifestyle changes to specialists in behaviour change to tackle issues such as medication adherence, diet and exercise.

Besides reducing negative effects of the above-mentioned factors on perceived health it may also prove feasible to strengthen factors that are associated with higher perceived health and psychological well-being as discussed in the next section.

**Enhancing perceived health and psychological well-being**

Findings reported in this thesis also highlight a number of factors associated with increased perceived health and psychological well-being, the latter in this case being denoted as lower levels of psychological distress. According to the same line of reasoning as applied in the previous section, it might therefore be expected that enhancing these factors could prove effective to improve perceived health and psychological well-being of kidney transplant recipients.

Personal resources, such as perceived control, optimism, and self-esteem seem to play an important role in the maintenance and improvement of perceived health and
psychological well-being. However, given that optimism is considered to be a stable personality trait (Sharpe, Martin, & Roth, 2011), intervention studies targeting perceived control or self-esteem are more likely to provide a viable route to ameliorate perceived health and psychological well-being. Interventions to boost perceived control would be of particular interest, since its positive relationship with perceived health and psychological well-being has repeatedly been supported by findings in this thesis. It would thus appear that efforts to increase levels of perceived control are most likely to result in benefits to kidney transplant recipients’ perceived health and psychological well-being. An earlier study conducted among patients with coronary heart disease suggested that it might be possible to increase levels of perceived control by providing patients with information and suitable strategies for managing symptoms and adverse events (Moser et al., 2012). The question whether similar interventions might have comparable effects for recipients of a kidney transplant could be a promising point of departure for future studies. Previous research on interventions to boost self-esteem suggests a wider array of potentially viable options. Earlier studies describe beneficial effects on self-esteem achieved by interventions ranging from exercise (Gothe et al., 2011) to self-care (Leao et al., 2017), and finding meaning in the experience of chronic illness (Lee, Cohen, Edgar, Laizner, & Gagnon, 2006). If any of these interventions or elements thereof could successfully increase self-esteem among kidney transplant recipients remains to be investigated.

Concerning psychological well-being, self-regulation skills in regards to goal adjustment have additionally been proposed to exert a favourable influence. Based on the finding that a reduction of disturbance in important life goals is related to higher psychological well-being, it could be hypothesised that aiming to support patients in this process might result in better psychological well-being in this population. The simplest solution would be the removal of barriers that stand in the way of fulfilling disturbed goals; however, that may not always be possible. In such circumstances, it could be beneficial to help patients to disengage from unattainable goals and re-engage with more attainable ones. Unfortunately, at present there are no accounts of such interventions in any population, but tentative evidence reported in this thesis suggests that this could be an important area for further studies to improve psychological well-being among kidney transplant recipients.
Although findings indicate that average levels of psychological distress in this population are consistently below more stringent clinical cut-offs for psychological morbidity (Lundin, Hallgren, Theobald, Hellgren, & Torgen, 2016; Lundin et al., 2017), even after transplantation about 15 – 20 % of patients temporarily experience clinically significant levels of psychological distress. Mirroring recommendations previously made for physical well-being, it would seem most effective to screen patients on regular intervals for psychological distress, especially in the short-term after transplantation. While more comprehensive interventions are being developed it would make sense to offer more psychological support for patients who experience chronically heightened levels of distress and have been identified as such in the screening process. This support could be provided by clinical or health psychologists who are in the best position to help these patients to reduce their level of psychological distress or to enable them to deal with it more efficiently.

Based on the premise that current state-of-the-art medical science is operating at the edge of its capabilities, it would seem that interweaving psycho-social approaches to address issues around perceived health and psychological well-being in kidney transplant recipients could prove to be an effective supplement to currently available treatment options to further improve physical and psychological well-being after transplantation.

In summary, this thesis highlights the potential value of tailored, more individualized approaches as regards the care for kidney transplant recipients. At present, regular screening of patients’ perceived health and psychological distress, particularly shortly after transplantation, could help identify patients experiencing sub-optimal outcomes. Thereafter, any further possible optimisation of clinical management should be explored and implemented. If issues around medication adherence, diet, or exercise are expected to exacerbate existing or cause new health problems, lifestyle interventions with a focus on behaviour change should be considered. Where indicated, additional psychological support in the form of individual psychological treatment could also prove beneficial. In the future, the development of interventions targeting the preservation and improvement of personal resources such as perceived control and self-esteem, as well as self-regulation skills relating to goal adjustment could provide further options when it comes to enhancing the physical and psychological well-being of kidney transplant recipients.
It is to be hoped that research outlined in this thesis constitutes a valuable step in the exploration and identification of key variables for improving the care of kidney transplant recipients whilst highlighting avenues for further inquiry.
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CHAPTER 8


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SUMMARY

End-stage renal disease (ESRD) is a life-threatening condition with far-reaching consequences for patients’ lives. Kidney transplantation is widely regarded as the best treatment option in terms of patient survival and cost-effectiveness. Moreover, recipients of a kidney transplant not only live longer, but also experience a higher quality of life than those treated with dialysis. In spite of this, the process of adjustment to kidney transplantation remains poorly understood. Among the topics requiring further investigation are the underlying mechanisms of improvement, explanations for individual differences in outcomes, and long-term impact of kidney transplantation. Accordingly, this research was undertaken to fill a few of these gaps and identify determinants of adjustment to kidney transplantation, with particular focus on individual characteristics of patients. Two studies, one cross-sectional and one prospective, were conducted. For the purpose of this research, successful adjustment was articulated as favourable levels of perceived health and psychological distress.

Chapter 1 begins with a brief introduction to end-stage renal disease and its epidemiology, followed by a description of available treatment options. Next, the current body of knowledge in regards to the patient experience and the role individual characteristics may play in the adjustment process is discussed. Subsequently, setting, design, and aims of the two studies conducted for this research project are outlined. The chapter concludes with a brief preview of the individual scientific articles at the heart of this thesis.

It has frequently been suggested that recipients of a kidney transplant experience higher levels of perceived health than patients treated with dialysis. However, although the number of long-term kidney transplant recipients increases steadily, little is known about how their perceived health compares to the short-term. Chapter 2 examined differences in perceived health and the number of symptoms and comorbidities between short-term and long-term kidney transplant recipients. Findings revealed that long-term perceived health is similar to the short-term, despite a higher number of symptoms and comorbidities among long-term kidney transplant recipients. Kidney function and symptoms were strong predictors of short-term perceived health. Symptoms were associated with perceived health regardless of time since transplantation, but this association was smaller in long-term
recipients. The latter finding could be explained by selective survival or adjustment. On one hand, patients who maintain a high level of perceived health despite a high symptom burden might be more likely to survive long-term, given that perceived health is associated with mortality. On the other hand patients might adjust to symptoms, thus having less impact on their perceive health. Results suggest that long-term kidney transplant recipients experience similar levels of perceived health to the short-term, in spite of a greater burden in terms of symptoms and comorbidities.

The next topic considered in this thesis was the association between objective health, measured as the number of comorbidities, and psychological distress. Contrary to what might be expected, previous studies have found that poor objective health is not necessarily associated with psychological distress. To investigate this further, Chapter 3 evaluated the tenability of a theoretical model explicating the relationship between objective health and psychological distress. The preliminary model was developed from Wilson and Cleary’s model of patient outcomes and subsequently modified to account for recent research findings. This model described the interrelationship of objective health, functional status, perceived health, personal characteristics, and psychological distress. Some of the specified relationships were not supported by the data and the preliminary model was adjusted accordingly. In the final model, objective health influenced psychological distress indirectly. Its impact was mediated by perceived health and a factor combining the personal characteristics perceived control, optimism and self-esteem. The indirect nature of the influence of objective health on psychological distress might explain the modest associations between objective health and psychological distress in earlier reports. Furthermore, combined influences of perceived control, optimism and self-esteem may play a key role in the interrelation between objective health and psychological distress. While protecting patients from distressing effects of poor objective health, they may simultaneously be negatively affected by it. Accordingly, poor objective health might erode the protective influence of personal characteristics, possibly resulting in higher levels of psychological distress.

Longstanding dialysis has numerous negative consequences for patients’ health and well-being and patients often have high expectations from a kidney transplantation. However,
although quality of life improvements after kidney transplantation are well-established, previous research suggests this improvement to be smaller than patients expect. The relevance of these findings is still unclear, as it remains unknown whether unmet quality of life expectations affect patients’ well-being. Therefore, Chapter 4 examined whether overestimations of quality of life are associated with psychological distress. Overestimations of physical, psychological, and social quality of life were common and more pronounced for the physical dimension of quality of life. Haemodialysis treatment was related to greater overestimation of physical quality of life than peritoneal dialysis, but other pre-transplant characteristics did not affect the level of overestimation. Moreover, quality of life overestimation was not associated with increased psychological distress. However, when optimism was low, overestimation of social quality of life resulted in higher short-term distress. In spite of this, quality of life overestimation was not associated with long-term psychological distress, regardless of optimism. Results demonstrate that quality of life overestimations are largely irrelevant to psychological distress among kidney transplant recipients. The short-lived influence of social quality of life overestimation on distress even when optimism is low further suggests that patients cope well in the long-term, possibly because they nevertheless experienced an improvement, albeit smaller than expected.

Previous research suggests that levels of perceived control may decline in response to diagnosis or treatment of cancer. This finding is of importance, as a loss of perceived control is associated with increased psychological distress. However, contrary to cancer, kidney transplantation involves mostly positive changes for the patient. Therefore, Chapter 5 investigated if levels of perceived control change after kidney transplantation and if these changes are associated with subsequent psychological distress. On average, small and small to medium-sized improvements of perceived control and psychological distress respectively were observed after kidney transplantation. Examining individual patterns of change, roughly a third of patients experienced a meaningful improvement of perceived control, whereas more than one in ten reported a decrease. Increasing levels of perceived control were associated with subsequent improvements of psychological distress. However, the reverse did not hold true, as decreasing or stable levels of perceived control were not associated with an increase of psychological distress. Findings support the occurrence of pre-to post-transplant improvements of perceived control among kidney transplant recipients,
an effect opposite to declines in perceived control observed among patients with cancer. Nevertheless, improvements are modest and levels remain low even after kidney transplantation. Findings suggest that efforts to increase levels of perceived control in this population could be a constructive way to decrease psychological distress.

According to self-regulation theory, severe medical conditions such as end stage renal disease are likely to involve disturbances in the attainment of goals and therefore may affect psychological well-being. Transplantation may reverse some of these disturbances and thereby positively influence well-being. Consequently, Chapter 6 investigated pre- to post-transplant changes in goal disturbance and importance, as well as their prospective association with changes in psychological distress. In addition, the mediating role of changes in perceived control in this process was examined. Commonly disturbed goals pre-transplant were mostly disease-specific, as opposed to higher order life goals. After transplantation, goal disturbance for these goals decreased and this decrease was associated with reduced psychological distress. Instead of the hypothesised mediating role of changes of perceived control, results suggested that decrease of goal disturbance and increase of perceived control were independently associated with reduced psychological distress. The observation that the most disturbed and most important goals pre-transplant did not correspond could be explained as an instance of reprioritizing. In this process, unattainable goals in one life domain are abandoned in favour of more attainable goals in a different life domain. The finding that the most important goals belonged to the interpersonal domain, which is less likely to be affected by illness, may serve as tentative evidence for this explanation. Results provide further evidence for the influence of goal disturbance and perceived control on well-being.

Although the majority of kidney transplant recipients experience an improvement of perceived health, mean scores may obscure the detection of those with less favourable outcomes. In addition, it has been suggested that the course of perceived health varies across different types of transplants. Therefore, Chapter 7 explored the influence of the type of transplant received on trajectories of perceived health in a combined sample of kidney and liver transplant recipients. Four distinct trajectory classes of perceived health were identified. Most patients were assigned to one of three trajectory classes
demonstrating improvements of perceived health. These trajectory classes were denoted as low, intermediate, and high increasing according to pre-transplant levels of perceived health. One in ten patients, however, experienced a deterioration of perceived health shortly after transplantation, despite intermediate levels of perceived control pre-transplant. Trajectory classes differed by type of transplant, gender, pre-transplant comorbidities, and occurrence of complications. However, when these factors were combined to predict membership in the deteriorating trajectory class, type of transplant was no longer a significant predictor. Findings suggest that earlier reports of differences in the course of perceived health between kidney and liver transplant recipients may at least partially be due to differences in case mix, rather than the type of transplant itself. Thus, variables such as gender and the occurrence of complications may be more important in determining the course of perceived health than the type of transplant received.

Finally, Chapter 8 of this thesis discusses the main findings and draws a picture of the development of perceived health and psychological distress in the short- and long-term after kidney transplantation as it emerges from these studies. In addition, the strengths and weaknesses of this research are considered. This chapter concludes with suggestions for further research and a discussion of potential implications for clinical practice. In summary, findings reported in this thesis point to the potential value of tailored, individualised approaches to the care for kidney transplant recipients. Presently, regular screening of patients’ perceived health and psychological distress, particularly shortly after transplantation, could help to identify patients experiencing unfavourable outcomes. As a next step, any further optimisation of clinical management should be explored and implemented. If issues around medication adherence, diet, or exercise are expected to exacerbate existing or cause new health problems, lifestyle interventions with a focus on behaviour change might be considered. Where indicated, additional psychological support in the form of individual psychological treatment could also prove to be sensible. In the future, the development of interventions targeting the improvement of personal resources such as perceived control and self-esteem, as well as self-regulation skills relating to goal adjustment could provide additional avenues to enhancing the physical and psychological well-being of kidney transplant recipients.
SAMENVATTING

Nierfalen is een levensbedreigende aandoening met verstrekkende gevolgen voor de levens van patiënten. Niertransplantatie wordt over het algemeen beschouwd als de beste behandelingsoptie wat betreft overleving en kosteneffectiviteit. Bovendien leven ontvangers van een niertransplantatie niet alleen langer, maar ervaren zij ook een hogere kwaliteit van leven dan diegenen die worden behandeld met dialyse. Desondanks is het proces van aanpassing aan een niertransplantatie nog niet goed begrepen. Onderwerpen die verder onderzoek vereisen zijn onderliggende mechanismen van verbetering, verklaringen voor individuele verschillen in uitkomsten en lange termijn effecten van niertransplantatie. Dienovereenkomstig werd dit onderzoek ondernomen om enkele van deze hiaten te vullen en determinanten van aanpassing aan een niertransplantatie te identificeren, met bijzondere aandacht voor individuele kenmerken van patiënten. Twee studies, één cross-sectioneel en een prospectief, werden uitgevoerd. Ten behoeve van dit onderzoek werd een geslaagde aanpassing begrepen als gunstige niveaus van ervaren gezondheid en psychische klachten.

Hoofdstuk 1 begint met een korte inleiding tot nierziekte en nierfalen en de epidemiologie ervan, gevolgd door een beschrijving van beschikbare behandelmogelijkheden. Daarna wordt de huidige stand van kennis besproken met betrekking tot de ervaringen van patiënten en de rol die individuele kenmerken mogelijk spelen in het aanpassingsproces. Vervolgens worden de opzet, het ontwerp en de doelen van de twee onderzoeken die voor dit onderzoeksproject zijn uitgevoerd, geschetst. Het hoofdstuk eindigt met een korte vooruitblik op de afzonderlijke wetenschappelijke artikelen die de kern vormen van dit proefschrift.

Er is herhaaldelijk aangetoond dat ontvangers van een niertransplantatie een hoger niveau van ervaren gezondheid beleven dan patiënten die worden behandeld met dialyse. Hoewel het aantal ontvangers van niertransplantaten op lange termijn gestaag toeneemt, is er echter weinig bekend over hoe hun ervaren gezondheid zich verhoudt tot de korte termijn. Hoofdstuk 2 onderzocht de verschillen in ervaren gezondheid, alsmede het aantal symptomen en comorbiditeiten tussen ontvangers van niertransplantaten op de korte en lange termijn. Uit de bevindingen bleek dat de ervaren gezondheid op de lange termijn
vergelijkbaar is met de korte termijn, ondanks een groter aantal symptomen en comorbiditeiten op het lange termijn. Nierfunctie en symptomen bleken sterke voorspellers van de ervaren gezondheid op de korte termijn. Symptomen waren geassocieerd met ervaren gezondheid ongeacht de tijd sinds transplantatie, maar op de lange termijn bleek deze associatie kleiner. De laatste bevinding kan worden verklaard door selectieve overleving of aanpassing. Patiënten die ondanks vele symptomen een hoge mate van ervaren gezondheid behouden, hebben waarschijnlijk een grotere kans om op lange termijn te overleven, aangezien ervaren gezondheid samenhangt met mortaliteit. Aan de andere kant zouden patiënten zich mogelijk kunnen aanpassen aan de symptomen, waardoor ze minder invloed hebben op hun ervaren gezondheid. De resultaten suggereren dat ontvangers van een niertransplantatie op lange termijn vergelijkbare niveaus van ervaren gezondheid beleven dan op de korte termijn, ondanks een grotere belasting wat betreft symptomen en comorbiditeit.

Het volgende onderwerp dat in dit proefschrift aan de orde kwam, was de samenhang tussen objectieve gezondheid, gemeten als het aantal comorbiditeiten, en psychische klachten. In tegenstelling tot wat zou kunnen worden verwacht, hebben eerdere studies aangetoond dat een slechte objectieve gezondheid niet noodzakelijkerwijs gepaard gaat met psychische klachten. Om dit verder te onderzoeken, evaluateerde Hoofdstuk 3 de houdbaarheid van een theoretisch model dat de relatie beschrijft tussen objectieve gezondheid en psychische klachten. Het voorlopige model werd ontwikkeld op basis van het model van patiëntuitkomsten van Wilson en Cleary en vervolgens aangepast om rekening te houden met recente onderzoeksresultaten. Dit model beschreef de onderlinge relatie tussen objectieve gezondheid, functionele status, ervaren gezondheid, persoonlijke kenmerken en psychische klachten. Sommige van de gespecificeerde relaties werden niet door de gegevens ondersteund en het voorlopige model werd dienovereenkomstig aangepast. In het uiteindelijke model beïnvloedde objectieve gezondheid indirect de psychische klachten. De invloed ervan werd gemedieerd door ervaren gezondheid en een factor die de persoonlijke kenmerken waargenomen controle, optimisme en zelfrespect combineerde. Het indirecte karakter van de invloed van objectieve gezondheid op psychische klachten zou de matige samenhang tussen objectieve gezondheid en psychische klachten in eerdere rapporten kunnen verklaren. Bovendien zouden gecombineerde
invloeden van waargenomen controle, optimisme en zelfrespect een sleutelrol kunnen spelen in de wisselwerking tussen objectieve gezondheid en psychische klachten. Terwijl ze patiënten beschermen tegen de negatieve invloed van een slechte ervaren gezondheid, zouden zij tegelijkertijd ook negatief kunnen worden beïnvloed door deze. Dienovereenkomstig zou een slechte objectieve gezondheid de beschermende invloed van persoonlijke kenmerken uit kunnen hollen, wat mogelijk kan leiden tot een verergering van psychische klachten.

Langdurige dialyse heeft talloze negatieve gevolgen voor de gezondheid en het welzijn van patiënten en deze hebben vaak hoge verwachtingen van een niertransplantatie. Hoewel verbeteringen van de kwaliteit van leven na niertransplantatie herhaaldelijk werden bevestigd, suggereert eerder onderzoek dat deze verbetering kleiner is dan patiënten verwachtten. De relevantie van deze bevindingen is nog steeds onduidelijk, omdat onbekend is of onvervulde verwachtingen ten aanzien van de kwaliteit van leven het welzijn van patiënten beïnvloedden. Daarom is in Hoofdstuk 4 onderzocht of overschattingen van de kwaliteit van leven geassocieerd zijn met psychische klachten. Overschattingen van fysieke, psychologische en sociale kwaliteit van leven waren gebruikelijk en duidelijker voor de fysieke dimensie van kwaliteit van leven. Behandeling met hemodialyse ging samen met een hogere overschatting van de fysieke kwaliteit van leven dan peritoneale dialyse, maar andere karakteristieken vóór transplantatie hadden geen invloed op de mate van overschatting. Bovendien was de overschatting van de kwaliteit van leven niet geassocieerd met meer psychische klachten. Echter, wanneer optimisme laag was, had een overschatting van de sociale kwaliteit van leven op de korte termijn meer psychische klachten tot gevolg. Desondanks ging de overschatting van de kwaliteit van leven niet gepaard met langdurige psychische klachten, ongeacht de mate van optimisme. De resultaten tonen aan dat de overschatting van de kwaliteit van leven grotendeels irrelevant is voor psychische klachten bij ontvangers van een niertransplantaat. De kortstondige invloed van een overschatting van de sociale kwaliteit van leven op klachten, zelfs wanneer optimisme laag is, suggereert dat patiënten er op lange termijn goed mee omgaan, mogelijk omdat ze toch een verbetering hebben ervaren, ook al was het kleiner dan verwacht.
Eerder onderzoek toonde aan dat het niveau van waargenomen controle kan afnemen in reactie op een diagnose of behandeling van kanker. Deze bevinding is van belang, omdat een verlies van waargenomen controle geassocieerd is met een toename van psychische klachten. Echter, in tegenstelling tot kanker, heeft een niertransplantatie voornamelijk positieve veranderingen voor de patiënt tot gevolg. Daarom werd in Hoofdstuk 5 onderzocht of het niveau van waargenomen controle na niertransplantatie veranderd en of deze verandering gepaard gaan met een verandering van psychische klachten. Over de gehele groep waren de veranderingen van waargenomen controle en psychische klachten na niertransplantatie klein tot middelgroot. Uit onderzoek van individuele patronen van verandering bleek dat ongeveer een derde van de patiënten een betekenisvolle verbetering van waargenomen controle rapporteerde, terwijl meer dan één op de tien een afname meldde. Toenemende niveaus van waargenomen controle waren geassocieerd met een latere verbetering van psychische klachten. Het omgekeerde bleek echter niet het geval, omdat afnemende of stabiele niveaus van waargenomen controle niet gerelateerd waren aan een toename van psychische klachten. De bevindingen ondersteunen het vóórkomende van verbeteringen van waargenomen controle na niertransplantatie, een tegenovergesteld effect vergeleken met de afnames in waargenomen controle welke werden gerapporteerd door patiënten met kanker. Niettemin zijn deze verbeteringen bescheiden en blijft het niveau laag, zelfs na een niertransplantatie. Deze bevindingen doen vermoeden dat inspanningen om het niveau van waargenomen controle in deze populatie te verhogen een constructieve manier zouden kunnen zijn om psychische klachten te verminderen.

Volgens de zelfregulatie-theorie lijkt het waarschijnlijk dat ernstige medische aandoeningen zoals nierfalen verstoringen veroorzaken in het bereiken van doelen en op die manier het psychologische welbevinden kunnen beïnvloeden. Transplantatie kan sommige van deze verstoringen ongedaan maken en daardoor mogelijk het welzijn positief beïnvloeden. Om deze reden werden in Hoofdstuk 6 veranderingen in verstoring en belangrijkheid van doelen vóór en na transplantatie onderzocht, alsmede hun prospectieve relatie met veranderingen in psychische klachten. Bovendien werd de mediciërende rol van veranderingen in waargenomen controle in dit proces onderzocht. De meest voorkomende verstoorde doelen vóór transplantatie waren ziektespecifieke doelen eerder dan hogere levensdoelen. Na transplantatie nam de doelverstoring voor deze doelen af en deze daling ging gepaard met
een vermindering van psychische klachten. In plaats van de veronderstelde mediërende rol van veranderingen van waargenomen controle, suggereerden de resultaten dat een afname van doelverstoring en een toename van waargenomen controle onafhankelijk geassocieerd waren met een vermindering van psychische klachten. De observatie dat de meest verstoorde en belangrijkste doelen vóór transplantatie niet overeenkwamen, kan worden uitgelegd als een geval van herprioritering. In dit proces worden onbereikbare doelen in één levensdomein verlaten ten gunste van meer haalbare doelen in een ander levensdomein. De bevinding dat de belangrijkste doelen tot het interpersoonlijke domein behoorden, waarin verstoringen door ziekte minder waarschijnlijk zijn zouden kunnen dienen als voorlopig bewijs voor deze verklaring. Resultaten leveren verder bewijs voor de invloed van doelverstoringen en waargenomen controle op het welzijn.

Hoewel de meerderheid van de ontvangers van een niertransplantatie een verbetering van de ervaren gezondheid beleefd, kunnen gemiddelde scores de detectie van mensen met minder gunstige uitkomsten verbergen. Daarnaast suggereerd eerder onderzoek dat het beloop van ervaren gezondheid verschilt tussen verschillende soorten transplantaties. Daarom onderzocht Hoofdstuk 7 de invloed van het type transplantatie op trajecten van ervaren gezondheid in een gecombineerde steekproef van nier- en levertransplantatiepatiënten. Vier verschillende trajectklassen van ervaren gezondheid werden geïdentificeerd. De meeste patiënten werden ingedeeld in een van de drie trajectklassen die een verbetering van ervaren gezondheid vertonen. Deze trajectklassen werden aangeduid als laag, intermediair en hoog toenemend in overeenstemming met de niveaus van ervaren gezondheid van vóór de transplantatie. Eén op de tien patiënten ervoer echter een verslechtering van ervaren gezondheid kort na de transplantatie, ondanks intermediaire niveaus van waargenomen controle vóór transplantatie. Trajectklassen verschillen per type transplantatie, geslacht, comorbiditeit vóór transplantatie en het optreden van complicaties. Toen deze factoren echter werden gecombineerd om het lidmaatschap te voorspellen van de verslechterende trajectklasse, was het type transplantatie niet langer een significante voorspeller. Bevindingen suggereren dat eerdere meldingen van verschillen in het beloop van ervaren gezondheid tussen nier- en levertransplantatiepatiënten ten minste gedeeltelijk te wijten kunnen zijn aan verschillen in de samenstelling van de patiëntgroepen, in plaats van het type transplantatie zelf.
Variabelen zoals geslacht en het optreden van complicaties zouden dientengevolge belangrijker kunnen zijn bij het bepalen van het beloop van ervaren gezondheid dan het type transplantaat.

Tot slot worden in **Hoofdstuk 8** van dit proefschrift de belangrijkste bevindingen besproken en wordt een beeld geschetst van de ontwikkeling van ervaren gezondheid en psychische klachten op korte en lange termijn na niertransplantatie, zoals deze uit deze onderzoeken naar voren komt. Daarnaast worden de sterke en zwakke punten van dit onderzoek overwogen. Dit hoofdstuk wordt afgesloten met suggesties voor verder onderzoek en een bespreking van mogelijke implicaties voor de klinische praktijk. Samenvattend wijzen bevindingen in dit proefschrift op de potentiële waarde van op maat gesneden, geïndividualiseerde benaderingen van de zorg voor ontvangers van niertransplantaten. Op dit moment zou een regelmatige screening van de ervaren gezondheid en psychische klachten van patiënten, in het bijzonder kort na de transplantatie, kunnen helpen om patiënten te identifieren die ongunstige uitkomsten ervaren. In een volgende stap zou elke verdere optimalisatie van het klinische management moeten worden overwogen en geïmplementeerd. Als er een verwachting is dat problemen rond therapietrouw, dieet of lichaamsbeweging bestaande gezondheidsproblemen zouden kunnen verergeren of nieuwe doen ontstaan, kunnen interventies op het levensstijl met een focus op gedragsverandering mogelijk een oplossing bieden. Waar het noodzakelijk blijkt, kan aanvullende psychologische ondersteuning in de vorm van een individuele psychologische behandeling zinvol zijn. In de toekomst zou de ontwikkeling van interventies gericht op de verbetering van persoonlijke hulpbronnen zoals waargenomen controle en zelfwaardering, evenals vaardigheden omtrent zelfregulering met betrekking tot doelaanpassing, aanvullende mogelijkheden kunnen bieden om het fysieke en psychologische welzijn van de ontvangers van een niertransplantatie te verbeteren.
ACKNOWLEDGEMENTS

I would like to start by expressing my sincere gratitude to the participants for dedicating some of their valuable time to take part in the studies that formed the foundation of this thesis. Without them, this thesis would undoubtedly not exist.

Furthermore, I am truly indebted to my team of supervisors. Adelita, your guidance, advice, and ongoing engagement in this project have been pivotal to the successful completion of this thesis. Thank you for sharing your expertise, I have certainly learned a lot in this process. Rutger, Jaap, and Jan, I am immensely grateful to you for contributing your clinical and methodological expertise, which has been invaluable in facilitating the conception and logistics of this project. Similarly, I owe great thanks to Ralf Westerhuis, whose advice and support were very much appreciated throughout. To all of you I need to say thank you as well for your constructive contributions to the publications which have sprung from the studies underpinning this thesis.

In addition, I would like to thank the members of the reading commission. Prof. dr. Ute Bültmann, Prof. dr. Andrea Evers, and Prof. dr. Frederike Bemelman for the prompt and thorough evaluation of the manuscript.

I would further like to express my gratitude to the secretaries from the departments of transplantation immunology and kidney transplantation, especially Liesbeth Dertien-Haandrikman and Geertien von Duelmen-Krumpelmann for their ongoing help and support with the logistics and day-to-day running of the study. It is difficult to imagine this project having come to fruition without their support.

Thanks are also due to Mariët Hagedoorn for her contributions as co-author. To Alicia de Vries I am grateful for competently drawing on some of the data from this project, resulting in further high-quality scientific output. Conversely, I would like to thank Coby Annema and her team of supervisors for allowing me to use some of their data to attempt an interesting comparison of recipients of kidney and liver transplants.

Ans Smink I would like to thank for helping with the administration of the studies, especially in the later stages of the project, including everything from sending out questionnaires to keeping track of participants. For the former I also owe thanks to Franziska Hein. I am further indebted to Roy Stewart and Marike Schokker for their assistance with some of the more challenging statistical and methodological matters I encountered in the course of this project. I would also like to thank Truus van Ittersum for
her help with literature searches and the retrieval of articles, particularly in the early stages when I still had to find my feet. I also owe thanks to the late Willem Lok for designing the fieldwork program which allowed me to keep track of the flow of participants in the studies and Feijkje Groenhof for modifying it at a later stage to accommodate some of the changes which had taken place during the course of the project. Furthermore, I want to thank Annemieke Brouwers for her support in preparing the defence.

Thanks also to Klaas van Slooten for his help in designing the striking cover for the questionnaires and Julia Gernaat for her help in producing the outstanding information booklet for patient recruitment. Furthermore, I would like to thank Renate Kroese and Tineke van der Wees for their advice and assistance regarding daily matters arising within, around, and beyond the studies.

To my parents, Mama, Papa, your encouragement and support have been vital in this process. Thank you for keeping the faith. Finally, to my beloved family, Clio, agapi mou, your patience, support, and unwavering belief have accompanied and carried me throughout the ups and downs of this experience. I owe much of my sanity to you and so much else that would be hard for me to put in words. Thank you for being there. Phevos, my little treasure, your arrival has put many things into perspective and given a new meaning to my life. Thank you for inspiring me.
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