Master thesis

The association between worrying, self-efficacy and quality of life in renal patients on dialysis

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Master's thesis Health Psychology
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June, 2015

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Abstract

Introduction. Chronic kidney disease patients on dialysis report a worse quality of life as compared to the general population due to limitations in daily functioning. Worrying and self-efficacy may influence a patient's quality of life. The aim of the study was to clarify the association between worrying, self-efficacy and quality of life in renal patients on dialysis.

Method. 126 patients at baseline and 65 patients at half year follow-up completed questionnaire booklets about emotional functioning, social functioning, physical functioning, worrying and self-efficacy.

Results. No differences in quality of life at baseline and after six months were found. Patients with higher levels of worrying experienced higher levels of fatigue, depression and anxiety, and lower levels of emotional wellbeing and perceived support. Patients with higher levels of self-efficacy experienced higher levels of emotional wellbeing and perceived support, and lower levels of symptoms/problems, fatigue, depression and anxiety. Worrying predicted a decrease in emotional functioning over a period of six months.

Discussion. Treatments focused on worrying and self-efficacy can lead to an increase in the quality of life. Future research can be focused on other changeable predictors for the quality of life.

Introduction

In the Netherlands, the prevalence of chronic kidney disease (CKD) in adults is 6.7 percent with an incidence rate of 1,213 per 100,000 person-years (van Blijderveen et al., 2014). CKD refers to difficulties in kidney function or kidney damage for at least three months (Eknoyan, & Levin, 2002; Levey et al., 2003). By determining the glomerular filtration rate (GFR) the severity of the disease can be measured, indicated by different stages, in which a lower GFR indicates less functioning of the kidneys. The last stage of CKD is end stage renal disease (ESRD), in which the GFR is the lowest. After receiving the diagnosis of ESRD, the best option for treatment is renal transplantation, because ESRD is not curable without transplantation (Levey et al., 2003). Because often this is not a possible option due to the lack of organ donors, patients can be treated with hemodialysis or peritoneal dialysis. Hemodialysis means that the blood is purified in a dialyzer outside the body where a partially permeable membrane is located (Ahmad, Misra, Hoenich, & Daugirdas, 2008). That membrane separates the blood from water and wastes, whereafter the purified blood is pumped back into the body. Usually, this process is repeated three to five times a week and takes about four hours each time. This treatment mostly takes place in hospital or in a dialysis center, and sometimes at home (Ahmad et al., 2008). Peritoneal dialysis is when a glucose solution is inserted into the abdominal cavity through a catheter (Blake & Daugirdas, 2008). The fluid takes up wastes and redundant fluid and have to be replaced when it is saturated. This should be done four or five times a day and usually takes place at home. Although dialysis leads to a decrease in physical fluid levels and toxins, it also leads to adjustment problems in many cases (Mohr et al., 2001). These problems can consist of a modified daily schedule, need for extra help, sleep disturbances, emotional problems, isolation and symptoms like itch, fluid accumulation and nausea. These negative consequences of the dialysis can cause a decreased quality of life.

Quality of life

Quality of life refers to people's own experience of their functioning in terms of physical, psychological and social wellbeing (Cella, 1994). Research has found that CKD patients on dialysis report a worse quality of life as compared to the general population due to limitations in daily functioning (Evans et al., 1985; Merkus et al., 1997; Mittal et al., 2001). In patients who underwent pre-dialysis treatment, it was found that all symptoms increased and the physical and mental health decreased over time already (de Goeij et al., 2014). Prospective studies regarding the changeability of quality of life in renal patients on dialysis found inconsistent results. During a period of two years follow-up, it was found that the quality of life deteriorated slowly in terms of general health, symptoms/problems, burden of kidney disease, emotional wellbeing, and patient satisfaction, which may be (partly) due to increased hospital admissions (Bakewell, Higgins, & Edmunds, 2002).

However, Mazairac et al. (2010) found an improvement in the quality of life in hemodialysis patients over an 11-year period of time, in terms of bodily pain, vitality, role-emotional and mental health, which may be partly due to improved haemoglobin and phosphate levels. Two other studies also found an improvement in quality of life in patients with hemodialysis or peritoneal dialysis during a period of one and two years of follow-up (Santos, Daher, Silva Jr, Libório, & Kerr, 2009; Wu et al., 2004). Some studies found changes in different quality of life factors. Merkus et al. (1999) found a decrease in physical quality of life and no change in mental quality of life over a period of 18 months and a study of Gabbay, Meyer, Griffith, Richardson and Miskulin (2010) found no difference in quality of life in hemodialysis patients, only an improvement in role-emotional health. Other studies found no differences in quality of life in renal patients over time (Manns et al., 2003; Mittal et al., 2001). Because of the different results, more research is required to draw a clear conclusion about the changeability of the quality of life in renal patients on dialysis. If more knowledge about the changeability is available, specific treatments for specific areas of the quality of life can be implemented (preventively) to improve the quality of life as well as possible.

Worrying & self-efficacy

According to the bio-psycho-social model (Engel, 1977), the combination of biological factors (in this case ESRD), psychological factors (for example depression, anxiety and worrying, or a lack of self-efficacy) and social factors (for example, decreased social life) can cause a decreased quality of life.

One of the psychological factors that may influence a patient's quality of life is worrying. Worrying is defined as an unwanted, uncontrollable, aversive cognitive activity associated with negative thoughts and some sense of emotional discomfort (Borkovec, 1994; Borkovec & Lyonfields, 1992). In the general population, it was found that worrying is negatively associated with quality of life, and positively associated with depression and symptom reporting (Golden et al., 2011; Rief et al., 2012). In renal patients, worrying can be caused by, for example, a lack of knowledge about the disease, treatments and coping, fear of complications, progression or death, less perceived personal control and avoidance (Davey, Hampton, Farrell, & Davidson, 1992; Finkelstein et al., 2008). Little information is available with regard to worrying in renal patients. Available studies found an association between worrying and quality of life (especially social functioning and mental health) in renal patients on dialysis (Kao et al., 2009) and found that a decrease in worrying led to an improvement of the quality of life (Augusto, Krzesinski, Warling, Smelten, & Etienne, 2011). Studies in other chronic diseases found also a negative association between worrying and quality of life in patients with cancer (Deimling, Bowman, Sterns, Wagner, & Kahana, 2006), breast cancer (Waters, Liu, Schootman, & Jeffe, 2013), epilepsy (Barahmand & Haji, 2014) and hepatitis C (Häuser, Zimmer, Schiedermaier, & Grandt, 2004). All studies showed a consistently negative association between worrying and quality of life, but more research in renal patients is needed to clarify its predictive role for quality of life.

Another factor that can influence the quality of life of patients is self-efficacy. Self-efficacy refers to the belief in one's ability to successfully influence events in his or her environment (Bandura, 1997). According to Bandura's self-efficacy theory people are more able to manage their disease when they are educated about it and feel strong to cope with it in a positive way (Bandura, 1997). People with high self-efficacy stay to their goals and recover more quickly after negative events. In addition, self-efficacy would lead to adherence, health behavior, effective pain management, disease management, more positive emotions and the expansion of satisfying social relations. These factors may contribute to an improved quality of life (Bandura, 1997; Cramm et al., 2013). Most studies found a positive relationship between self-efficacy and quality of life in renal patients on dialysis (Cramm, Strating, Roebroeck, & Nieboer, 2013; Han, Lee, Lee, & Park, 2003; Lev & Owen, 1998; Perales-Montilla, García-León, & Reyes-del Paso, 2012; Tsay & Healstead, 2002), except for the study of Curtin et al. (2008), which found a correlation between self-efficacy and increased communication, partnership, self-care and medication-adherence behaviors, but no correlation with physical and mental health. Two studies found that self-efficacy was a significant predictor of a better quality of life in renal patients on dialysis (Cramm et al., 2013; Tsay & Healstead, 2002), but more research about the predictive role of self-efficacy for quality of life is required.

Although the quality of life in association with the psychological factors worrying and self-efficacy have to a limited extent been previously studied in renal patients on dialysis, research about ESRD and potential predictors for (changes in) the quality of life can be extended. These factors are relevant for study because of the importance of improving the quality of life in renal patients. If more knowledge about the quality of life and its potential predictors in renal patients on dialysis is available, doctors and psychologists can develop and evaluate treatments aimed at improving quality of life, for example by means of these targeting predictors, enabling patients to live a better life.

This study will focus on three research questions. The first question concerns the stability versus change in quality of life (in terms of social functioning, emotional functioning and physical functioning) in renal patients over a period of six months during long-term dialysis treatment. The second question is focused on the association of worrying and self-efficacy with quality of life in renal patients on dialysis. The last research question concerns the prediction of worrying and self-efficacy for a change in quality of life in renal patients over a period of six months during long-term dialysis treatment. The literature with regard to the changeability of the quality of life was inconclusive. Six months is a relatively short period of time for detecting changes over time. In addition, several studies with a longer period of follow-up observed no changes over time. Therefore, it is expected that there will be no change in quality of life in renal patients over a period of six months during long-term dialysis treatment.

Corresponding with the literature, worrying will be negatively and self-efficacy will be positively associated with quality of life in renal patients on dialysis, and lastly, worrying will be a predictor of a deterioration and self-efficacy of an improvement in quality of life in renal patients over a period of six months during long-term dialysis treatment.

Method

Design

The study was a prospective population study focused on adjustment problems and risk/resilience factors in renal patients on dialysis. This thesis is focused on worrying and self-efficacy related to social functioning, emotional functioning and physical functioning in renal patients on dialysis. These factors were measured two times by means of two questionnaire booklets six months apart.

Participants

The research population consisted of patients with end stage renal disease. Participants were acquired from the dialysis department of the Radboud university medical center in Nijmegen, Canisius-Wilhelmina hospital in Nijmegen, VieCuri (Medical Center for Noord-Limburg), Bernhoven in Uden and dialysis center Ravenstein, in the Netherlands. The inclusion criteria were that the patients were older than eighteen years and received either hemodialysis or peritoneal dialysis. Patients were excluded from this study when they did not speak Dutch, had severe comorbid physical problems with a life expectancy of less than six months, had severe comorbid psychiatric problems or when they had experienced a major life event in the recent past. Medical files were screened to select patients for participation.

Procedure

Participants were approached by the research nurse or nephrologist of the dialysis department of the Radboud university medical center. When the patients were interested in the study, they received oral information about the background and goals of the study, the questionnaire and advantages and disadvantages of participating. After patients had decided to participate in the study, the participants received an envelope with further information, an informed consent form and the coded questionnaire. The participants could read the information at home, fill in the questionnaire and send back the signed informed consent form and filled out questionnaire booklet to the coordinating research nurse in the Radboud university medical center. Completing both questionnaires took about one hour each. The participants could stop filling in the questionnaire at every moment. The study did not need approval of the Medical Research Ethics Committee of the CMO region Arnhem-Nijmegen.

Instruments

The patients received two questionnaire booklets, one at baseline and one at six months follow up. The questionnaires that are used to test the hypotheses were part of a larger set of questionnaires. The questionnaires of the constructs that were measured for the current study will be described below.

Sociodemographic and clinical characteristics. The first part of the first questionnaire consisted of questions about the personal situation. These questions were about sex, age, education, marital status, children, ethnicity, religion, work status, dialysis (frequency and last time), comorbid conditions, negative life event(s), influence on the choice of the treatment, and about kidney transplantation. The questions were open or answered on Likert scales with space for comments.

Quality of life.

Emotional functioning. Emotional functioning was assessed by means of the emotional wellbeing scale of the Kidney Disease Quality of Life Short Form, the KDQOL-SF (Korevaar et al., 2002) and the Hospital Anxiety and Depression Scale, the HADS (Zigmond & Snaith, 1983).

The KDQOL-SF measures the quality of life in renal patients on dialysis, and consists of 80 items about symptom/problems, effects of kidney disease on daily life, burden of kidney disease, work status, cognitive functioning, quality of social interaction, sexual functioning, sleep, social support, dialysis staff encouragement, patient satisfaction, physical functioning, role limitations caused by physical health problems, role limitations caused by emotional health problems, social functioning, emotional wellbeing, pain, energy/fatigue, general health perceptions and overall health. The emotional wellbeing scale consists of five items with a six-point Likert scale ranging from ‘all of the time’ to ‘none of the time’ with questions like “Have you been a very nervous person?” and “Have you been a happy person?”, in the last four weeks. The items are recoded into items ranging from 0 to 100, in which high scores mean high emotional functioning. The validity of de KDQOL-SF in renal patients is good (Korevaar et al., 2002). The internal consistency of the emotional wellbeing scale in our sample was .829.

The HADS is mostly used in hospital setting and measures anxiety and depression in patients. The questionnaire consists of fourteen questions with seven questions about anxiety. For example: “I get a sort of frightened feeling as if something awful is about to happen”) and seven questions about depression. For example: “I look forward with enjoyment to things”. Answers are given by means of a four-point Likert scale. Patients could have a score from zero to three on each question, so their scores varied from zero to twenty-one for anxiety and depression, in which a high scores mean more anxiety and depression. It was found that the HADS is a valid screening instrument in renal patients (Loosman, Siegert, Korzec, & Honig, 2010). In our sample, the internal consistency of the HADS was .883.

Social functioning. Social functioning was measured through the social functioning scale of the KDQOL-SF (Korevaar et al., 2002) and the perceived support scale of the social dimension of the Impact of Rheumatic diseases on General Health and Lifestyle, the IRGL (Huiskes, Kraaimaat, & Bijlsma, 1990).

The social functioning scale of the KDQOL-SF consists of two items on a four-point Likert scale ranging from ‘very dissatisfied’ to ‘very satisfied’ with the questions “How satisfied are you with the amount of time you are able to spend with your family and friends?” and “How satisfied are you with the support you receive from your family and friends?”. The items are recoded into items ranging from 0 to 100, in which high scores mean high social functioning. In our sample, the internal consistency of the social functioning scale was .828.

The IRGL measures the health status in rheumatic patients. The perceived support scale of the social dimension of the IRGL consists of five items with a four-point Likert scale ranging from ‘almost never’ to ‘almost always’ including questions like “When I am sad, there is someone to share it with me” and “When I am tense or under pressure, there is somebody to help me”. With regard to this scale, a higher score means higher perceived support. The validity of the questionnaire in rheumatic patients is good (Huiskes et al., 1990). The internal consistency of the perceived support scale in our sample was .870.

Physical functioning. Physical functioning was assessed by means of the physical functioning scale and the symptom/problems scale of the KDQOL-SF (Korevaar et al., 2002), and the subjective fatigue scale of the Checklist Individual Strength, the CIS (Vercoulen, Alberts, & Bleijenberg, 1999).

The physical functioning scale of the KDQOL-SF consists of ten items on a three-point Likert scale ranging from ‘yes, limited a lot’ to ‘no, not limited at all’ with statements like “Climbing several flights of stairs” and “Bathing or dressing yourself”. The items are recoded into items ranging from 0 to 100, in which high scores mean high physical functioning. The internal consistency of this scale in our sample was .957. The symptom/problems scale of the KDQOL-SF consists of twelve items on a five-point Likert scale ranging from ‘not at all bothered’ to ‘extremely bothered’. Examples of questions in this scale are: “Chest pain” and “Washed out or drained”. The items are recoded into items ranging from 0 to 100, in which a high score means more wellbeing or less symptoms. The internal consistency of the symptoms/problems scale in our sample was .853.

The CIS measures fatigue and behaviors related to fatigue by using four dimensions: subjective fatigue, concentration, motivation and physical activity (Vercoulen et al., 1999). The subjective fatigue scale consists of eight statements about fatigue in the last two weeks with a seven-point scale ranging from ‘yes, that is correct’ to ‘no, that is not correct’, for example “I feel tired” and “Physically I feel I am in bad form”, in which a high score means more fatigue. The validity of the CIS is good in the working population and CVS patients (Beurskens et al., 2000; Vercoulen et al., 1994) and the internal consistency of the subjective fatigue in our sample was .921.

Psychological factors.

Worrying. Worrying was measured by means of the Penn State Worry Questionnaire, the PSWQ (Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ consists of sixteen items about the tendency, severity and uncontrollability of worrying that can be scored on a five-point scale ranging from ‘not at all typical of me’ to ‘very typical of me’ with questions like “If I do not have enough time to do everything, I do not worry about it” and “I have been a worrier all my life”, in which a high score means more worrying.

The validity of this questionnaire is good in the general population (Meyer et al., 1990). The internal consistency of the PSWQ in our sample was .716.

Self-efficacy. Self-efficacy was assessed by means of the Generalized Self-Efficacy Scale, the GSES (Sherer & Maddux, 1982). The GSES measures self-efficacy, the confidence in patients own ability to cope with new or difficult situations or obstacles. The questionnaire consists of ten items and the answers are scaled on a four-point Likert scale ranging from ‘completely false’ to ‘completely true’, with statements like “I can always manage to solve difficult problems if I try hard enough” and “Thanks to my resourcefulness, I know how to handle unforeseen situations”. A higher score means higher self-efficacy. The validity of the GSES is good in the general population (Sherer & Maddux, 1982) and the internal consistency in our sample was .816.

Data analysis

First, all variables of the questionnaires described above were checked on possible values on item level, internal consistency, kurtosis, skewness and outliers. Outliers on all variables assessed were defined as scores that differed more than three standard deviations from the mean score in the sample. Analyses with and without outliers were compared. Also the patients characteristics were explored and described in terms of mean and standard deviation or number and percentage. Before running the analyses the necessary assumptions were checked. Because data about the quality of life are missing at follow-up, the mean of the baseline data of the quality of life measures between the participants who filled in only the first questionnaire booklet and the participants who filled in both booklets were compared with independent samples t-tests.

To examine the stability of the quality of life across six months of dialysis, the scores of social functioning, emotional functioning and physical symptoms at the first and second assessment were compared by means of paired sample t-tests for each variable separately. To examine the association between worrying and self-effiacy and the quality of life at baseline, Pearson correlational analyses were performed. To examine the predictive value of worrying and self-efficacy on a change in quality of life over a period of six months dialysis treatment, multiple regression analyses were performed. Worrying and self-efficacy of the first assessment were the independent variables and social functioning, emotional functioning and physical functioning of the measure after six months were the dependent variables.

These variables were performed in separate analyses for each measure of quality of life. In these analyses, we controlled for the first assessment of social functioning, emotional functioning and physical functioning separately to assess the improvement or deterioration of the quality of life. If necessary, the dependent and independent variables were corrected by covariates like age, sex and education level, because of the impact that these factors can have on quality of life. The influence of the covariates on the clinical variables was explored through correlation analyses and the covariates were added when the correlations with the clinical variables were significant with several variables. The analyses described were performed by using IBM SPSS statistics for Windows, version 21.0. In all analyses, scores were mentioned as significant if $p < .05$.

Results

Participants

The data consisted of 126 participants for the first assessment and 65 for the second assessment. No participants were excluded because of not meeting the inclusion criteria. Outliers were explored through boxplots and the analyses with outliers were compared with the analyses without outliers. Because no significant differences were found, the outliers were retained. The descriptive statistics of the demographic information of the participants are described in *table 1*. The majority of the participants consisted of men with an age ranging from 28 to 91 years. Most participants had a secondary education level, hemodialysis during the day and several comorbidities.

Because data about the quality of life of 61 participants are missing at follow-up, the mean of the baseline data of the quality of life measures between the participants who filled in only the first questionnaire booklet and the participants who filled in both booklets were compared with independent samples t-tests. No significant results were found (symptoms/problems: $p = .925$; fatigue: $p = .729$; emotional wellbeing: $p = .662$; depression: $p = .176$; anxiety: $p = .683$; social functioning: $p = .171$; and perceived support: $p = .239$), but a trend was found in physical functioning in both groups ($p = .051$). That means that both groups of participants scored not significantly different on quality of life at baseline, making that the participants at follow-up are generalizable for the total group of participants.

Table 1

Patient characteristics

Age – M (SD)	69.03 (15.11)
Sex – N (%)	
Women	48 (38.10)
Men	77 (61.10)
Unknown	1 (.80)
Education – N (%)	
Primary	27 (21.40)
Secondary	73 (57.90)
Tertiary	18 (14.30)
Unknown	8 (6.30)
Religion – N (%)	
Yes	85 (67.50)
No	36 (28.60)
Unknown	5 (4.00)
Type of dialysis – N (%)	
Hemodialysis day	99 (78.60)
Hemodialysis night	3 (2.40)
Peritoneal dialysis	9 (7.10)
Hemodialysis at home	15 (11.90)
Comorbidity – N (%)	
Yes	95 (75.40)
No	25 (19.80)
Unknown	6 (4.80)
Comorbidity: yes – N (%)	
High blood pressure	56 (44.40)
Heart disease	34 (27.00)
Diabetes	22 (17.5)
Cancer	6 (4.80)
Lung disease	14 (11.10)
Liver disease	1 (.80)
Gastrointestinal disease	5 (4.00)
Blood disease	1 (.80)
ME	7 (5.60)
Rheumatic disease	7 (5.60)
Other physical disease	29 (23.00)
Psychological symptoms (eating problems, alcohol problems, drugs abuse, depressive symptoms, anxiety symptoms, psychotic episodes or different)	11 (8.70)

Children – N (%)	
Yes	97 (77.00)
No	26 (20.60)
Unknown	3 (2.40)
Waiting list transplantation – N (%)	
Yes	22 (17.50)
No	102 (81.00)
Unknown	2 (1.60)
Ever transplanted – N (%)	
Yes	24 (19.00)
No	102 (81.00)

Note. M=mean. SD=standard deviation. N=number of participants.

Quality of life

In *table 2*, the descriptive statistics of the variables that measure quality of life at baseline and follow-up and the predictors worrying and self-efficacy are described, as well as the outcomes of the paired samples t-tests comparing baseline and follow-up scores. In the paired samples t-tests to test whether quality of life changed over time, no significant differences were found with regard to physical functioning, emotional functioning and social functioning at baseline and after six months during dialysis treatment. The first hypothesis is adopted.

Table 2

Descriptive statistics QoL-variables and predictors with analysis

Variables	Assessment 1		Assessment 2		Analysis		
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
Physical functioning							
Physical functioning	46.36	29.42	48.63	29.39	.974	61	.334
Symptoms/problems	77.41	14.91	77.63	14.19	-.146	61	.884
Fatigue	34.80	13.13	34.65	11.80	-.141	60	.889
Emotional functioning							
Emotional wellbeing	76.03	16.51	75.63	16.00	.010	59	.992
Depression	5.72	3.82	5.53	3.89	-1.174	60	.245
Anxiety	4.17	3.78	4.17	3.21	-1.100	60	.276
Social functioning							
Social functioning	67.90	26.63	69.23	24.61	.701	63	.486
Perceived support	15.98	3.61	16.08	3.66	.858	64	.394
Predictors							
Worrying	38.72	10.46					
Self-efficacy	30.35	4.86					

Note. M=mean. SD=standard deviation. N=number of participants.

Worrying & self-efficacy

Table 3 shows the results of the correlational analyses between worrying and self-efficacy and physical functioning, emotional functioning and social functioning at baseline. In the correlational and regression analyses, the covariates sex (man/woman), age, education (primary/secondary/tertiary) and children (yes/no) were added because of the significant association with several quality of life measures. Being a woman was associated with higher levels of anxiety and being a man was associated with higher levels of social functioning, higher age was associated with lower levels of physical functioning, a higher education level was associated with higher levels of physical functioning, and having children was associated with higher levels of depression.

The correlations between worrying and fatigue, emotional wellbeing, depression, anxiety and perceived support were found significant, in which higher levels of fatigue, depression and anxiety were associated with higher levels of worry, whereas lower levels of emotional wellbeing and perceived support were associated with higher levels of worrying.

Also the correlations between self-efficacy and symptoms/problems, fatigue, emotional wellbeing, depression, anxiety and perceived support were found significant, in which higher levels of symptoms/problems, emotional wellbeing and perceived support were associated with higher levels of self-efficacy, whereas lower levels of fatigue, depression and anxiety were associated with higher levels of self-efficacy. With regard to the covariates, higher age was associated with lower levels of worrying. A negative trend was found with regard to worrying and symptoms/problems. This means that higher levels of worrying were (not significantly) associated with more symptoms. Physical and social functioning were not associated with both worrying or self-efficacy. With regard to the quality of life domains physical functioning, emotional functioning and social functioning in total, physical functioning and social functioning were partially associated with worrying and self-efficacy and emotional functioning was associated with worrying and self-efficacy as a whole. The second hypothesis was adopted with regard to the relationship between worrying and fatigue, emotional wellbeing, depression, anxiety and perceived support, and self-efficacy and symptoms/problems, fatigue, emotional wellbeing, depression, anxiety and perceived support. The hypothesis was rejected with regard to the relationship between worrying and physical functioning, symptoms/problems and social functioning and self-efficacy and physical functioning and social functioning.

Table 3

Correlations predictors and quality of life factors

Variables	Worrying		Self-efficacy	
	r	*p*	*r*	*p*
Physical functioning				
Physical functioning	-.002	.984	.102	.274
Symptoms/problems	-.170	.065	.269*	.004
Fatigue	.335*	.000	-.258*	.005
Emotional functioning				
Emotional wellbeing	-.590*	.000	.491*	.000
Depression	.472*	.000	-.341*	.000
Anxiety	.673*	.000	-.324*	.000
Social functioning				
Social functioning	-.144	.118	.155	.096
Perceived support	-.256*	.005	.312*	.001
Covariates				
Sex	-.152	.097	.130	.162
Age	-.189*	.044	.000	1.000
Education	.026	.782	.069	.474
Children	-.103	.269	-.118	.208

Note. r=Pearson correlation. * $p < .05$

Prediction of quality of life

Table 4 to *10* shows the multiple regression analyses of worrying and self-efficacy and the quality of life factors at baseline and after six months, including covariates. *Table 4* shows the prediction of physical functioning during six months dialysis treatment. In model 1 the influence of physical functioning at baseline and the covariates on physical functioning after six months were examined. Model 1 was significant, F (5, 47) = 18.713, $p < .001$ and $R^2 = .666$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 45) = 13.027, $p < .001$. However, only physical functioning at baseline and sex were found significant with physical functioning after six months. That means that physical functioning at baseline and being a man predict physical functioning after six months of dialysis treatment. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in physical functioning over a period of six months during dialysis treatment, $\Delta R^2 = .004$.

Table 4

Predictors of physical functioning after six months dialysis treatment

Model		*B*	SE^a	β^b	*t*	*p*
1	Physical functioning baseline	.578	.098	.591	5.900	.000*
	Sex	14.334	5.036	.251	2.846	.007*
	Age	-.103	.212	-.053	-.484	.631
	Education	4.589	4.245	.099	1.081	.285
	Children	-10.191	6.610	-.155	-1.542	.130
2	Physical functioning baseline	.559	.104	.572	5.398	.000*
	Sex	13.459	5.255	.236	2.561	.014*
	Age	-.122	.218	-.062	-.559	.579
	Education	5.429	4.463	.118	1.217	.230
	Children	-9.421	6.801	-.143	-1.385	.173
	Worrying	-.097	.272	-.032	-.356	.724
	Self-efficacy	.373	.636	.056	.587	.560

Notitie. * $p < .05$

^{a} SE = standard error

^{b} β = standardized beta

Table 5 shows the prediction of symptoms during six months dialysis treatment. In model 1 the influence of symptoms at baseline and the covariates on symptoms after six months were examined. Model 1 was significant, F (5, 47) = 14.629, $p < .001$ and $R^2 = .609$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 45) = 10.952, $p < .001$. However, only symptoms at baseline were found significant with symptoms after six months. That means that symptoms at baseline predict symptoms after six months of dialysis treatment. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in symptoms over a period of six months during dialysis treatment, $\Delta R^2 = .021$.

Table 5

Predictors of symptoms after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Symptoms baseline	.740	.096	.750	7.734	.000*
	Sex	3.686	2.701	.129	1.365	.179
	Age	.095	.112	.096	.849	.400
	Education	3.108	2.277	.135	1.365	.179
	Children	-.730	3.736	-.022	-.195	.846
2	Symptoms baseline	.737	.102	.747	7.203	.000*
	Sex	3.880	2.743	.135	1.414	.164
	Age	.077	.111	.078	.692	.492
	Education	3.160	2.331	.137	1.356	.182
	Children	-1.046	3.720	-.032	-.281	.780
	Worrying	-.196	.148	-.127	-1.321	.193
	Self-efficacy	-.338	.343	-.099	-.986	.329

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 6 shows the prediction of fatigue during six months dialysis treatment. In model 1 the influence of fatigue at baseline and the covariates on fatigue after six months were examined. Model 1 was significant, F (5, 47) = 14.241, $p < .001$ and $R^2 = .602$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 45) = 11.368, $p < .001$. However, only fatigue at baseline and education were found significant with fatigue after six months. That means that fatigue at baseline and education predict fatigue after six months of dialysis treatment. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in fatigue over a period of six months during dialysis treatment, $\Delta R^2 = .036$.

Table 6

Predictors of fatigue after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Fatigue baseline	.654	.091	.710	7.149	.000*
	Sex	-1.425	2.069	-.066	-.689	.494
	Age	-.131	.083	-.171	-1.582	.120
	Education	-3.942	1.784	-.219	-2.209	.032*
	Children	3.853	2.879	.150	1.338	.187
2	Fatigue baseline	.632	.100	.686	6.315	.000*
	Sex	-1.720	2.058	-.079	-.836	.408
	Age	-.113	.081	-.147	-1.391	.171
	Education	-3.970	1.767	-.221	-2.247	.030*
	Children	4.369	2.815	.170	1.552	.128
	Worrying	.199	.115	.172	1.725	.091
	Self-efficacy	.331	.254	.131	1.304	.199

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 7 shows the prediction of emotional wellbeing during six months dialysis treatment. In model 1 the influence of emotional wellbeing at baseline and the covariates on emotional wellbeing after six months were examined. Model 1 was significant, F (5, 45) = 7.899, $p < .001$ and $R^2 = .467$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 43) = 9.336, $p < .001$. However, only emotional wellbeing at baseline was found significant with emotional wellbeing after six months, as well as education in model 2. That means that emotional wellbeing at baseline and education predict emotional wellbeing after six months of dialysis treatment. Worrying was a significant negative predictor of emotional functioning. That means that worrying at baseline predicts a decrease in emotional functioning over a period of six months during dialysis treatment, $\Delta R^2 = .136$.

Table 7

Predictors of emotional wellbeing after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Emotional wellbeing baseline	.721	.135	.598	5.318	.000*
	Sex	4.645	3.866	.136	1.202	.236
	Age	-.090	.157	-.078	-.577	.567
	Education	5.501	3.291	.196	1.671	.102
	Children	-.248	5.311	-.006	-.047	.963
2	Emotional wellbeing baseline	.333	.159	.277	2.100	.042*
	Sex	3.250	3.488	.095	.932	.357
	Age	-.109	.139	-.094	-.787	.436
	Education	8.175	3.012	.291	2.714	.010*
	Children	-1.010	4.725	-.025	-.214	.832
	Worrying	-.835	.224	-.460	-3.732	.001*
	Self-efficacy	.554	.437	.141	1.269	.211

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 8 shows the prediction of depression during six months dialysis treatment. In model 1 the influence of depression at baseline and the covariates on depression after six months were examined. Model 1 was significant, F (5, 46) = 14.772, $p < .001$ and $R^2 = .616$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 44) = 11.441, $p < .001$. However, only depression at baseline was found significant with depression after six months. That means that depression at baseline predicts depression after six months of dialysis treatment. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in depression over a period of six months during dialysis treatment, $\Delta R^2 = .029$.

Table 8

Predictors of depression after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Depression baseline	.796	.107	.751	7.417	.000*
	Sex	.136	.734	.017	.185	.854
	Age	-.008	.030	-.030	-.280	.781
	Education	-.467	.650	-.070	-.718	.476
	Children	.718	1.063	.080	.675	.503
2	Depression baseline	.682	.122	.644	5.609	.000*
	Sex	.528	.754	.067	.701	.487
	Age	-.005	.029	-.018	-.172	.864
	Education	-.708	.653	-.107	-1.084	.284
	Children	.847	1.055	.094	.802	.427
	Worrying	.066	.044	.156	1.493	.143
	Self-efficacy	-.103	.091	-.113	-1.136	.262

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 9 shows the prediction of anxiety during six months dialysis treatment. In model 1 the influence of anxiety at baseline and the covariates on anxiety after six months were examined. Model 1 was significant, F (5, 46) = 11.372, $p < .001$ and $R^2 = .553$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 44) = 9.650, $p < .001$. However, only anxiety at baseline was found significant with anxiety after six months. That means that anxiety at baseline predicts anxiety after six months of dialysis treatment. A trend was found in the prediction of anxiety through self-efficacy. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in anxiety over a period of six months during dialysis treatment, $\Delta R^2 = .053$.

Table 9

Predictors of anxiety after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Anxiety baseline	.720	.101	.772	7.124	.000*
	Sex	.649	.709	.097	.915	.365
	Age	-.038	.027	-.166	-1.409	.166
	Education	-.726	.604	-.130	-1.202	.236
	Children	.958	.896	.126	1.068	.291
2	Anxiety baseline	.507	.157	.544	3.224	.002*
	Sex	.776	.699	.116	1.111	.273
	Age	-.029	.027	-.128	-1.100	.277
	Education	-.879	.588	-.157	-1.495	.142
	Children	.751	.871	.099	.862	.394
	Worrying	.079	.056	.224	1.419	.163
	Self-efficacy	-.158	.079	-.206	-1.995	.052

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 10 shows the prediction of social functioning during six months dialysis treatment. In model 1 the influence of social functioning at baseline and the covariates on social functioning after six months were examined. Model 1 was significant, F (5, 47) = 11.282, $p < .001$ and $R^2 = .546$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 45) = 8.597, $p < .001$. However, only social functioning at baseline was found significant with social functioning after six months. That means that social functioning at baseline predicts social functioning after six months of dialysis treatment. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in social functioning over a period of six months during dialysis treatment, $\Delta R^2 = .027$

Table 10

Predictors of social functioning after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Social functioning baseline	.734	.114	.677	6.447	.000*
	Sex	-1.550	5.262	-.031	-.295	.770
	Age	-.035	.208	-.020	-.166	.869
	Education	5.797	4.350	.142	1.333	.189
	Children	-10.773	6.989	-.186	-1.541	.130
2	Social functioning baseline	.650	.123	.599	5.267	.000*
	Sex	-2.840	5.316	-.056	-.534	.596
	Age	-.035	.207	-.020	-.167	.868
	Education	7.301	4.415	.179	1.654	.105
	Children	-10.265	6.978	-.177	-1.471	.148
	Worrying	-.396	.291	-.147	-1.360	.181
	Self-efficacy	.560	.630	.096	.889	.378

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

Table 11 shows the prediction of perceived support during six months dialysis treatment. In model 1 the influence of perceived support at baseline and the covariates on perceived support after six months were examined. Model 1 was significant, F (5, 48) = 20.242, $p < .001$ and $R^2 = .678$. In model 2 also worrying and self-efficacy were examined. Model 2 was significant, F (7, 46) = 14.672, $p < .001$. However, only perceived support at baseline and education were found significant with perceived support after six months. That means that perceived support at baseline and education predict perceived support after six months of dialysis treatment. In model 2, sex and education were found significant with perceived support after six months. That means that sex and education predict perceived support at six months of dialysis treatment. A trend was found in the prediction of perceived support through children. No significant results were found with regard to worrying and self-efficacy. That means that worrying and self-efficacy at baseline do not predict changes in perceived support over a period of six months during dialysis treatment, $\Delta R^2 = .012$.

Table 11

Predictors of perceived support after six months dialysis treatment

Model		*B*	*SE*[a]	β[b]	*t*	*p*
1	Perceived support baseline	.834	.089	.770	9.367	.000*
	Sex	-1.190	.598	-.165	-1.988	.053
	Age	.007	.024	.028	.280	.781
	Education	1.256	.521	.214	2.412	.020*
	Children	1.452	.812	.174	1.787	.080
2	Perceived support baseline	.775	.100	.715	7.772	.000*
	Sex	-1.374	.626	-.191	-2.195	.033*
	Age	.004	.025	.015	.154	.879
	Education	1.441	.544	.246	2.651	.011*
	Children	1.597	.828	.192	1.928	.060
	Worrying	-.045	.036	-.117	-1.262	.213
	Self-efficacy	.033	.076	.039	.430	.669

Notitie. * $p < .05$

[a] SE = standard error

[b] β = standardized beta

The last hypothesis, that is that's higher levels of worry and lower levels of self-efficacy predict a deterioration of quality of life over a period of six months during long-term dialysis treatment, is adopted for the relation between worrying and emotional functioning. Worrying at baseline predicts a decrease in emotional functioning over a period of six months during dialysis treatment. Worrying was not found as a predictor of a deterioration of other quality of life measures and self-efficacy was not found as a predictor of an improvement of all quality of life measures in renal patients over a period of six months during long-term dialysis treatment. For this reason, the hypothesis is rejected.

Discussion

The aim of the current study was to clarify the association between worrying, self-efficacy and quality of life in renal patients on dialysis. It was found that patients remained stable in terms of physical functioning, emotional functioning and social functioning over a period of half a year during dialysis treatment. Associations were found between worrying and fatigue, emotional wellbeing, depression, anxiety and perceived support, in which higher levels of worrying were associated with higher levels of fatigue, depression and anxiety, and lower levels of emotional wellbeing and perceived support. Also associations were found between self-efficacy and symptoms/problems, fatigue, emotional wellbeing, depression, anxiety and perceived support, in which higher levels of self-efficacy were associated with higher levels of emotional wellbeing and perceived support, and lower levels of fatigue, depression, anxiety and symptoms/problems. In addition, worrying predicted a decrease in emotional functioning in patients over a period of six months during dialysis treatment.

In accordance with the literature, the patients in this sample had deteriorated scores on the quality of life factors compared to the general population, in which the general population scored 83.0 on physical functioning, 84.0 on social functioning (Aaronson et al., 1998), 29.72 on subjective fatigue (Beurskens et al., 2000) and 4.75 on depression (Hinz & Brähler, 2011). However, with regard to anxiety, the general population scored 4.7 (Hinz & Brähler, 2011), which is higher than the patient population. In another population of renal patients, the mean score of symptoms/problems was 71.21, which means that that population had less symptoms and problems than the current population (Kallich et al., 1997). No information about emotional wellbeing and perceived support of the corresponding questionnaires was found.

The finding that patients remained stable in the quality of life at baseline and after six months during dialysis treatment, led to the adoption of the hypothesis and partly corresponded to previous literature (Gabbay et al., 2010; Manns et al., 2003; Merkus, 1997; Mittal et al., 2001). This literature describes short-term studies, as well as the current study. A reason for the result that the quality of life remained stable can be that the ESRD fluctuates not much in a period of half a year, as well as the quality of life. Merkus et al. (1997) found a decrease in physical functioning and Gabbay et al. (2010) found an improvement in role-emotional health. Other studies found an improvement (Mazairac et al., 2010; Santos et al., 2009; Wu et al., 2004) or a decrease in quality of life (Bakewell, Higgins, & Edmunds, 2002). The finding that the quality of life improved in other studies may be due to survival bias, in which the patients with the worst health died and the patients with the best health remain in the participant sample (Santos et al., 2009). Also it could be that patients adjust their standards when they are chronically ill, whereby they report a worse quality of life in the first stages of the disease and report a improved quality of life at later stages after adjusting their standards (de Ridder, Geenen, Kuijer, & van Middendorp, 2008). The period in the current study may be too short to observe this difference. In addition, there might be a difference in the results of the changeability of the quality of life due to the period when the participants received the questionnaire booklets.

For example, in the first months of dialysis, patients can experience the ‘honeymoon stage’, in which patients feel physically and mentally better due to physical improvement and trust in the treatment (Challinor & Sedgewick, 1998). Contrary to this stage, patients can feel worse immediately after a dialysis session, known as ‘post-dialysis hangover’ (Curtin & Mapes, 2001). This hangover can occur when fluid is removed in too large amounts or too quickly, where after symptoms like low blood pressure, fatigue or headaches occur or worsen. Different conditions, like the honeymoon stage or a post-dialysis hangover, can cause differences in participant populations and answers on the questions. Because of the different results with regard to the changeability of the quality of life, more research is required. The second hypothesis was adopted with regard to the relationship between worrying and fatigue, emotional wellbeing, depression, anxiety and perceived support, and self-efficacy and symptoms/problems, fatigue, emotional wellbeing, depression, anxiety and perceived support, and rejected with regard to the relationship between worrying and physical functioning, symptoms/problems and social functioning and self-efficacy and physical functioning and social functioning. These results partly corresponded to the literature in which a negative association was found between worrying and quality of life in the general population and renal patients (Davey et al., 1992; Finkelstein et al., 2008; Golden et al., 2011; Kao et al., 2009; Rief et al., 2012), and most studies found a positive association between self-efficacy and quality of life in renal patients (Cramm et al., 2013; Han et al., 2003; Lev & Owen, 1998; Perales-Montilla et al., 2012; Tsay & Healstead, 2002). In the current study, no association was found between worrying and physical functioning, symptoms/problems, and social functioning and between self-efficacy, physical functioning and social functioning, which also were expected due to the mechanisms of the bio-psycho-social model (Engel, 1977). The lack of correlations with worrying and self-efficacy, may be due to the fact that worrying and self-efficacy are more psychological factors, so no correlation was found with physical functioning, symptoms/problems and social functioning. Another explanation could be that this patient population are not worrying a lot, so not all associations were found. In the current study, a mean score of 38.72 was found on the PSWG, but a mean score of 42.2 was found in the general Dutch population (van der Heiden, Muris, Bos, van der Molen, & Oostra, 2009). An explanation for the finding that the patient population worries less than the general population, may be due to good education about the disease, acceptance of the disease, and enjoyment of the most important things in life (de Ridder, Geenen, Kuijer, & van Middendorp, 2008). The last hypothesis was adopted regarding the association between worrying and emotional functioning and rejected in terms of the other quality of life measures in relation to worrying and self-efficacy. These results partly corresponded to the literature in which worrying (Augusto et al., 2011) and self-efficacy (Cramm et al., 2013; Tsay & Healstead, 2002) were found as predictors of quality of life.

The current study has several limitations. The participant population consisted of 126 patients at baseline and 65 at follow-up. Unfortunately, almost half of the participants is missing at follow-up, for unknown reasons.

However, the analysis in which the means of the baseline measures of the participants who filled in only the first questionnaires and the participants who filled in both questionnaires were compared showed no differences in quality of life. Furthermore, a lot of questionnaires were questioned, but not all questionnaires were focused on renal patients. It would be better that all patient groups have their own questionnaires, to focus on specific aspects or symptoms in which specific patients experience difficulties.

However, the study consists of several strong points. The study has a broad focus on a lot of aspects of quality of life and other measures, questioned by lots of questionnaires. Furthermore, the study consists of participants from different hospitals and medical centers, whereby a large, heterogeneous group was developed. Another strong point, is that the study is prospective, so a possible change in quality of life could be measured. Last, the population of renal patients is an important group for study because of the severity of the disease. More research can provide more information and treatments for renal patients and the quality of life.

The current study was done to clarify the association between worrying, self-efficacy and quality of life in renal patients on dialysis. Different associations and predictions, with regard to the quality of life, were found. With specific treatments for these findings, patients can be treated more focused on these aspects. For example, previous research focused on dialysis treatment with interventions including exercise, hormonal therapy and carnitine treatment (Mazairac et al., 2010). Treatment like this can lead to an increase in the quality of life in renal patients.

Further research can be focused on other changeable predictors for the quality of life. If these factors become more clear, treatments can be more focused on these factors, which can cause further increase of the quality of life.

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