



Religiousness and Symptoms of Depression in Native and Immigrant Chronic Dialysis Patients in the Netherlands

G. L. G. Haverkamp^{1,2} · A. W. Braam³ · W. L. Loosman^{1,2} · T. O. van den Beukel⁴ · M. van Diepen⁵ · F. W. Dekker⁵ · C. E. H. Siegert¹ · A. Honig^{2,6}

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Abstract

For immigrant chronic dialysis patients, religious behavior and religious coping may have a different impact on depressive symptoms compared to native patients. This study aims to describe both cross-sectional and longitudinal associations between religious behavior and coping with symptoms of depression for 281 native and 277 immigrant dialysis patients in the Netherlands. A higher prevalence of depressive symptoms was found in immigrant compared to native patients (49% vs. 36%). No significant cross-sectional or longitudinal associations were found in both groups between religious behavior and positive religious coping with depressive symptoms. Strong significant cross-sectional associations were found between negative religious coping items and depressive symptoms in both groups, while no longitudinal associations were found. So, similar impact of religiousness on the presence of depressive symptoms was found for both native and immigrant dialysis patients. Therefore, these results do not explain the higher prevalence of depressive symptoms found in immigrant chronic dialysis patients compared to native patients.

Keywords Depressive symptoms · Immigrant chronic dialysis patients · Native chronic dialysis patients · Religious coping · Religious behavior

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✉ G. L. G. Haverkamp
g.haverkamp@olvg.nl

¹ Department of Nephrology, OLVG West, Jan Tooropstraat 164, 1061 AE Amsterdam, The Netherlands

² Department of Psychiatry, OLVG West, Amsterdam, The Netherlands

³ Department of Globalization and Dialogue Studies, University of Humanistic Studies, Utrecht, The Netherlands

⁴ Department of Internal Medicine, Amsterdam University Medical Centres, Amsterdam, The Netherlands

⁵ Department of Clinical Epidemiology, Leiden University Medical Centre, Leiden, The Netherlands

⁶ Department of Psychiatry, Amsterdam University Medical Centres, Amsterdam, The Netherlands

Introduction

Dialysis treatment is a life-sustaining treatment for patients with end-stage renal disease, and is known as an intensive and time-consuming treatment (Weisbord et al., 2007). It has a significant impact on the mental and physical health status of patients (Al Zaben et al., 2015; Patel, Shah, Peterson, & Kimmel, 2002). The prevalence of depressive symptoms has been found to be 39% (Palmer et al., 2013). When people are coping with stressful events, such as a chronic disease and burdensome treatment, they often turn to religion or intensify their already present religious behavior, which may both positively and negatively influence mental health (Ano & Vasconcelles, 2005; Kalampos & Roussi, 2015).

Religion can be measured in various ways and is most commonly assessed as religious behavior, intrinsic religious motivation, and religious coping. Most studies focused on religious behavior or intrinsic religious motivation (Al Zaben et al., 2015; Berman et al., 2004; Bertolacini Martínez & Pereira Custódio, 2014; Chen, Wu, Wang, & Jaw, 2003; Chiang, Livneh, Yen, Li, & Tsai, 2013; Ko et al., 2007; Kutner, Bliwise, & Zhang, 2004; Lucchetti, de

Almeida, & Lucchetti, 2012; Patel et al., 2002; Weisbord et al., 2007), and found that more religious behavior and more intrinsic religious motivation are associated with lower levels of depressive symptoms (Al Zaben et al., 2015; Berman et al., 2004; Chiang et al., 2013; Kutner et al., 2004; Lucette, Ironson, Pargament, & Krause, 2016; Patel et al., 2002). Religious coping can be conceived as a measure of how an individual is utilizing religion in order to deal and cope with stressors (Ano & Vasconcelles, 2005). It can be divided into positive (supportive coping elements) and negative religious coping (religious struggle). Various studies already examined the effect of religion on mental health in dialysis patients (Al Zaben et al., 2015; Berman et al., 2004; Bertolaccini Martínez & Pereira Custódio, 2014; Chen et al., 2003; Chiang et al., 2013; Ko et al., 2007; Kutner et al., 2004; Lucchetti et al., 2012; Patel et al., 2002; Weisbord et al., 2007). Ramirez et al. examined the effect of religious coping on psychological distress in Christian Brazilian dialysis patients (Ramirez et al., 2012). They found that negative religious coping was independently associated with greater psychological distress and found no association between positive religious coping and psychological distress.

However, most of these results are not applicable in the Western European setting, because secularization in Europe progresses (Braam, Deeg, Poppelaars, Beekman, & van Tilburg, 2007) and continuing migration brings different religions, predominantly Islam, but also Hinduism and Buddhism, to Western European countries (Cipriani, 2009). In the Netherlands migration has been high since the 1960s (Boswell, 2005) and as a result there is increasing interest in the mental health status of immigrants. In general population studies and in medically ill patients, a higher prevalence of depressive symptoms has been found in immigrant compared to native individuals/patients (Haverkamp, Torensma, Vergouwen, & Honig, 2015; Levecque, Lodewyckx, & Vranken, 2007; Missinne & Bracke, 2012). Religion may help immigrants to cope with the stressful burden of dialysis treatment, but negative religious coping may also cause more psychological distress.

It is not clear whether differences exist in the associations between religious behavior and religious coping with depressive symptoms in native and immigrant chronic dialysis patients. Furthermore, longitudinal associations between religious behavior and religious coping with depressive symptoms have not been examined yet in chronic dialysis patients. Therefore, we aimed to examine both the cross-sectional and longitudinal associations of religious behavior and positive and negative religious coping with depressive symptoms in a Dutch dialysis population stratified for native and immigrant chronic dialysis patients. We hypothesized that higher rates of religious behavior and religious coping will be found in immigrant chronic dialysis patients compared to native patients and

that stronger associations will be found between positive and negative religious coping and depressive symptoms in immigrant patients.

Method

Study Design

We used data of the DIVERS study (depression-related factors and outcomes In dialysis patients with Various Ethnicities and Races Study). DIVERS is an observational, prospective cohort study of prevalent and incident chronic dialysis patients in four urban teaching hospitals and one university hospital in the Netherlands. Prevalent patients underwent dialysis treatment for more than 6 months and incident patients for a duration of three to 6 months. Inclusion of prevalent dialysis patients was conducted between June 2012 and December 2013 and inclusion of incident dialysis patients between June 2012 and August 2015. Patients were approached for study participation during dialysis treatment or an outpatient appointment. Included patients completed a questionnaire every 6 months till death, kidney transplantation, a transfer to a non-participating center, or discontinuation because of motivational reasons.

Patients were eligible for study participation if they were at least 18 years of age, were on dialysis therapy for at least 90 days, and were able to complete questionnaires in Dutch, English, Turkish, or Moroccan Arabic, with help if necessary. Patients with cognitive impairments interfering with completing the questionnaires were excluded. All patients gave written informed consent before inclusion. The DIVERS study was approved by the medical ethics committee of the VU University Medical Center (Approval Number: 2010/064).

Demographic and Clinical Characteristics

The following demographic and clinical data were collected at baseline from the medical records: age, gender, dialysis modality, dialysis vintage, body mass index (BMI), primary cause of kidney disease [using the European Renal Association-European Dialysis and Transplant Association (ERA-EDTA) coding system (van Dijk et al., 2001)], and level of comorbidity [according to the Davies comorbidity index, indicating no, intermediate, or severe comorbidity (Davies, Russell, Bryan, Phillips, & Russell, 1995)]. Data on immigrant status, marital status, having children (yes or no), employment (yes or no), and educational level were collected through a self-reported questionnaire.

Immigrant Status

Immigrant status was determined based on country of birth of the patients and of their parents. In line with criteria of Statistics Netherlands, an individual was considered immigrant if at least one parent was born abroad, regardless of the individual's own country of birth (Statistics Netherlands, 2015). A subdivision can be made in first- and second-generation immigrants. First-generation immigrants are patients who are born abroad with at least one parent also born abroad. Second-generation immigrants are born in the Netherlands, while at least one parent is born abroad.

Religious Behavior and Religious Coping

Religious behavior and religious coping was assessed at baseline only. Religion was determined by asking patients with which faith, church, or religious denomination they were affiliated (“None,” “Christian,” “Islam,” “Hinduism,” or “Other”). Religious behavior was determined by the frequency of prayer and the frequency of attendance of religious services (Braam et al., 2010). Both were assessed by asking how many times a week the respondent practiced these behaviors and transformed to dichotomous variables for the baseline table: praying daily or more (1) versus less than once a day (0) and weekly attendance or more (1) versus less than once a week (0).

The 10-item brief RCOPE (Pargament, 1999), a validated shortened version of the RCOPE (Pargament, Koenig, & Perez, 2000) was used to assess religious coping. The RCOPE measures the role of religious coping in dealing with major life stressors and consists of 105 items divided over 21 subscales (Pargament, Feuille, & Burdzy, 2011). The brief RCOPE was developed to obtain a more useful method for both research and practice. Through factor analysis it was found that many of the items of the RCOPE could be categorized in two subscales consisting of positive and negative religious coping items. For the 10-item brief RCOPE, both subscales consist of 5 items, rated on a 4-point Likert scale from 1 (‘never’) to 4 (‘very often’), providing sum scores for both subscales ranging from 5 to 20. Appendix A shows a listing of statements from the brief RCOPE.

Depressive Symptoms

Depressive symptoms were assessed at baseline, 6-month, and 12-month follow-up using the Beck Depression Inventory-II (BDI-II) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, Steer, & Brown, 1996). This questionnaire consists of 21 questions, rating severity from 0 to 3. Summed scores of the BDI-II thus range from 0 to 63. The BDI-II has been validated at the dialysis department of one of the participating centers of the DIVERS study (Loosman,

Siegert, Korzec, & Honig, 2010). A cut-off point of 13 was found for the detection of depression, with a sensitivity of 0.75 and specificity of 0.90. Scores of ≥ 13 on the BDI-II are referred to as present depressive symptoms.

Statistical Analysis

Descriptive statistics are presented as mean with standard deviation to describe continuous variables and median with interquartile range in case of skewed distributions. Categorical variables are presented as percentages. Differences in baseline characteristics and mean scores on religious coping between immigrant and native chronic dialysis patients were analyzed with t tests and Chi-squared tests where appropriate.

Psychometric characteristics of the Brief RCOPE were computed. Exploratory principal component analysis of the brief RCOPE items was applied to examine whether the hypothesized positive and negative religious coping composite constructs of the multiple item measures could be constructed. Using reliability analysis, the internal consistency of the positive and negative religious coping subscales was calculated both in the total group and in the native and immigrant groups. Cronbach α was considered sufficient when 0.70 or higher (Nunnally, 1978). Positive and negative religious coping constructs were constructed by summing the positive and negative coping items, respectively. In case of low reliability or lack of unidimensionality, items were analyzed as separate religious coping strategies (Braam et al., 2010). For reasons of comparison with other research, the total score of both the positive and negative religious coping subscale will be explored in the main analysis in any case.

First, the cross-sectional association of religious behavior and religious coping with presence of depressive symptoms was assessed using univariate and multivariate logistic regression analysis. We adjusted for the following confounders: age, gender, level of comorbidity, primary cause of renal failure, marital status, children, education, and employment. We stratified for native and immigrant. In the immigrant patient group, we also adjusted for generation status (first-generation immigrant or second-generation immigrant). Bivariate Pearson correlations between all variables were calculated.

Second, the longitudinal relationship between religious behavior and religious coping with depressive symptoms was assessed by using a linear mixed model, adjusted for depressive symptoms at baseline and baseline confounders. This model accounts for correlations in the repeated measures in one subject over time and all three measurements are included in the model. The mixed models were fitted with a random intercept for participant and a repeated time effect. Models included the determinant under study, time, and the interaction

between the determinant under study and time as fixed effects. Compound symmetry was used as the covariance structure.

Third, a moderation analysis was performed by including interaction terms between religious behavior/coping and immigrant status (e.g., positive coping \times immigrant status) in our logistic regression analysis and linear mixed model of depressive symptoms to be able to directly compare the effect between native and immigrant patients.

Missing covariates and missing questions on the Brief RCOPE and Beck Depression Inventory (BDI-II) were imputed at item level to obtain correct standard errors for our effect estimates. Missing values were imputed with standard multiple imputation methods in SPSS (using 10 repetitions) (de Goeij et al., 2013), whereby missing values are imputed using multiple predictions based on other known patient characteristics in order to maintain power and avoid bias. All variables entering the multiple imputation model were normally distributed. The average number of missings on the BDI-II questions at baseline is 1.9%, on the brief RCOPE 8.4% and on the covariates 1.4%. Data on kind of religion and immigrant status were complete. Both the cross-sectional and longitudinal analyses were performed on the imputed dataset.

Analyses were performed in SPSS 21.0 for Windows statistical software. *p* values $< .05$ were considered significant.

Sensitivity Analyses

First, we also examined the longitudinal association between religious behavior and religious coping at baseline with the presence of depressive symptoms at 6- and 12-month follow-up by using logistic regression models. This regression model was adjusted for depressive symptoms at baseline and baseline confounders. Second, we assessed the cross-sectional and longitudinal association (linear mixed model) between religious behavior and coping and depressive symptoms stratified for different religions (“No religion,” “Christian,” “Islamic,” and “Other”). Third, we excluded the non-religious patients from the total patient group and examined the cross-sectional and longitudinal association between religious behavior and coping and depressive symptoms. Fourth, we made a subdivision in incident and prevalent chronic dialysis patients. Finally, we also examined the cross-sectional association between religious behavior and coping with depressive symptoms by using a linear regression model for both native and immigrant chronic dialysis patients.

Results

Patient Characteristics

In total, 591 chronic dialysis patients were included in the DIVERS study until August 2015. Religion was unknown

for 32 patients and ethnicity for one patient, who were subsequently excluded from the analyses, leaving 558 participating patients (281 native and 277 immigrant patients).

Baseline characteristics of the native and immigrant patients are shown in Table 1. Hindu patients were combined with the “Other” religious group, because of the relatively small numbers of patients in these groups, 43 and 14, respectively. Native patients were significantly older, more often married, had a shorter dialysis vintage and different causes of renal failure compared to immigrant patients. In the native patient group, most patients had a Christian affiliation (39%) or no religious affiliation (58%). In the immigrant group, most patients had a Christian affiliation (34%) or an Islamic affiliation (32%). Native compared to immigrant patients showed significantly lower rates of daily prayer (21% vs. 56%, respectively) and weekly religious attendance (13% vs. 38%, respectively). The mean score on the positive religious coping subscale, and negative coping items “the punishment reappraisal” item and “abandonment interpretation” item was significantly higher in immigrant patients compared to native patients. The presence of depressive symptoms was significantly higher in immigrant patients than in native patients (49% vs. 36%). Bivariate correlations for all the variables in the analyses are reported in Supplementary Table 1.

Psychometric Characteristics of the Brief RCOPE

Principal component analysis showed an unidimensional positive coping construct, of which the internal consistency in our sample was good (Cronbach $\alpha = 0.91$). The internal consistency was similar in the native and immigrant patient groups (Cronbach $\alpha = 0.89$ and 0.89 , respectively). The internal consistency of the negative religious coping subscale was insufficient both overall (Cronbach $\alpha = 0.54$), and in the native and immigrant patients separately (Cronbach $\alpha = 0.55$ and 0.55 , respectively). The factor analysis showed that three items of the negative religious coping subscale loaded on one factor (“I wonder whether God has abandoned me,” “I question whether God really exists,” and “I express anger at God for letting terrible things happen”), respectively, with factor loadings 0.608, 0.756, and 0.716. The Cronbach α of the three-item negative religious coping subscale was 0.60. We decided to treat the negative coping items as independent negative coping strategies and to explore both the total score on the negative religious coping subscale and the three-item negative religious coping subscale in our analyses.

Cross-sectional Association of Religious Behavior and Religious Coping with Depressive Symptoms

Table 2 shows adjusted cross-sectional associations of religious behavior and religious coping with depressive

Table 1 Baseline characteristics of 558 native and immigrant chronic dialysis patients

	Total N=558	Native N=281 (50%)	Immigrant N=277 (50%)	p value
Socio-demographic characteristics				
Age, mean (SD)	64 (15)	69 (14)	60 (15)	≤.01**
Gender, male (%)	63	63	63	.83
Partnership, partner (%)	53	57	49	≤.01**
Children, yes (%)	78	76	80	.23
Education, low (%)	56	54	58	.45
Employment, unemployed (%)	88	89	88	.56
First-generation immigrant (%)	42	–	85	–
Religion				≤.01**
Christian (%)	36	39	34	
Islamic (%)	16	0	32	
Other (%)	10	3	18	
No religion (%)	38	58	17	
Clinical characteristics				
Dialysis modality, hemodialysis (%)	88	88	88	.94
Incident, yes (%)	36	38	34	.35
Months on dialysis, median (IQ)	15 (5-48)	14 (5-43)	22 (4-60)	.11
Body mass index kg/m ² , mean (SD)	27 (6)	27 (6)	27 (6)	.30
Primary cause of renal failure (%)				≤.01**
Diabetes mellitus	25	15	35	
Glomerulonephritis	10	12	9	
Renal vascular disease	27	29	24	
Other	38	44	32	
Davies comorbidity (%)				.15
No	26	29	23	
Intermediate	56	53	60	
Severe	18	18	17	
Religion				
Daily prayer (%)	40	21	56	≤.01**
Weekly religious attendance (%)	26	13	38	≤.01**
Positive coping (5–20)	9.8 (5.1)	7.1 (3.4)	12.4 (5.0)	≤.01**
Negative coping (5–20)	7.4 (2.4)	7.1 (2.2)	7.6 (2.6)	≤.01**
Negative coping, 3 items	4.2 (1.7)	4.2 (1.6)	4.2 (1.7)	.87
Negative coping, separate items				
Punishment reappraisal (1–4)	1.4 (0.8)	1.1 (0.4)	1.6 (0.9)	≤.01**
Abandonment interpretation (1–4)	1.2 (0.6)	1.2 (0.5)	1.3 (0.6)	≤.01**
Coping without god (1–4)	1.8 (1.1)	1.8 (1.2)	1.9 (1.1)	.58
Question whether god exists (1–4)	1.7 (1.0)	1.7 (0.9)	1.6 (1.0)	.48
Express anger at god (1–4)	1.2 (0.7)	1.3 (0.7)	1.2 (0.7)	.09
BDI > 13(%)	43	36	49	≤.01**

Data presented as mean (\pm standard deviation) or median (Interquartile range) for continuous variables

symptoms. No significant associations of religious behavior and positive religious coping with depressive symptoms were found in either native or immigrant patients. The “abandonment interpretation” and “express anger at god” item were significantly associated with present depressive symptoms in both native [OR 1.7 (CI 1.0–2.7) and OR 1.4 (CI 1.0–1.8), respectively] and immigrant patients [OR 1.4

(CI 1.0–2.9) and OR 1.7 (CI 1.0–2.6), respectively]. The “punishment reappraisal” item was only significantly associated with depressive symptoms in the immigrant patient group (OR 1.6 (CI 1.2–2.1). Overall, the negative religious coping subscale and three-item negative religious coping subscale were significantly associated with depressive symptoms in both groups. The moderation analysis showed

Table 2 Adjusted cross-sectional association between religious behavior and religious coping and depressive symptoms in 558 native and immigrant chronic dialysis patients

	Presence of depressive symptoms	
	Native OR (95% CI)	Immigrant OR (95% CI)
Daily prayer	1.0 (0.9–1.0)	1.0 (0.9–1.0)
Weekly religious attendance	1.0 (0.9–1.1)	1.0 (0.9–1.0)
Positive coping	1.1 (0.8–1.5)	1.0 (0.7–1.3)
Negative coping	1.7 (1.1–2.9)*	2.2 (1.3–3.7)**
Negative coping, 3 items	1.2 (1.1–1.4)**	1.3 (1.1–1.5)**
Negative coping, separate items		
Punishment reappraisal	1.3 (0.8–2.1)	1.6 (1.2–2.1)**
Abandonment interpretation	1.7 (1.0–2.7)*	1.7 (1.0–2.9)*
Coping without god	1.0 (0.9–1.6)	0.9 (0.7–1.2)
Question whether god exists	1.3 (0.9–1.6)	1.2 (0.9–1.6)
Express anger at god	1.4 (1.0–1.8)*	1.7 (1.1–2.6)*

Sequentially adjusted for age, gender, marital status, children, education, employment, comorbidity, and primary cause of renal failure. In immigrant patients also for generation status

* $p \leq .05$

** $p \leq .01$

cross-sectionally no significant interaction between religion and immigrant status (Table 3). Confirming the cross-sectional relationships between religion and depressive symptoms are similar for native and immigrant patients.

Longitudinal Association Between Religious Behavior and Coping with Depressive Symptoms

Table 4 presents the longitudinal association between baseline religious behavior and coping and subsequent depressive symptoms in both native and immigrant dialysis patients. There were no significant associations between religious behavior and coping at baseline and depressive symptoms at follow-up in both groups. The moderation analysis shows that the effect of “coping without God” on depressive symptoms at follow-up is significantly different for native and immigrant patients (Table 5). This refers to the effect of $b - 0.5$ (-1.1 – 0.1) for native patients and the effect of $b 0.5$ (-0.3 – 1.2) for immigrant patients in the linear mixed model (Table 4).

Sensitivity Analysis

First, by examining the longitudinal association between baseline religious behavior and coping with depressive symptoms by using an logistic regression model we found comparable results (Supplementary Table 2). Baseline religious behavior and negative religious coping (items) were not associated with depressive symptoms at 6- and 12-month

follow-up in both groups. However, positive religious coping was significantly associated with the presence of depressive symptoms at 12-month follow-up [OR 1.5 (CI 1.1–2.1)] in immigrant dialysis patients. Second, stratifying the cross-sectional association for different religions, most significant cross-sectional associations were found in the Christian patient group (Supplementary Table 3). The overall negative religious coping scale, the three-item negative religious coping scale, and the items “abandonment interpretation,” “question whether god exists,” and “express anger at god” were significantly associated with presence of depressive symptoms in this group. No significant associations were found in the no-religion and Islamic group. No longitudinal associations were found in the four religious groups (Supplementary Table 4). Third, when excluding the non-religious patients we found stronger cross-sectional associations between the negative religious coping subscale and negative religious coping items and depressive symptoms (Supplementary Table 5). No longitudinal associations were found (Supplementary Table 6). Fourth, the subdivision in incident and prevalent patients showed significant associations between the overall negative religious coping scale and three-item negative religious coping scale and depressive symptoms in both groups (Supplementary Table 7). However, the “punishment reappraisal,” “abandonment interpretation,” and “express anger at god” items were only significantly associated with depressive symptoms in prevalent patients. No longitudinal associations between negative religious coping and depressive symptoms at follow-up were found in both groups (Supplementary Table 8). Fifth, Supplementary Table 9 shows the linear regression analysis in both native and immigrant patients between both religious behavior and religious coping with depressive symptoms. The results are comparable to the logistic regression analysis.

Discussion

In this European study, we found a similar impact of religiousness on the presence of depressive symptoms for both native and immigrant chronic dialysis patients. We found no benefit of religious behavior or positive religious coping on depressive symptoms in both native and immigrant chronic dialysis patients. Strong significant cross-sectional associations between negative religious coping (items) and depressive symptoms were found in both groups. It is remarkable that no longitudinal associations were found between negative religious coping items at baseline and depressive symptoms at follow-up.

As expected, we found more intensive religious behavior and positive religious coping for immigrant patients compared to native patients. With respect to the negative

Table 3 Moderation analysis for interaction term religious behavior/religious coping and immigrant status with depressive symptoms in logistic regression analysis

	Presence of depressive symptoms Total group OR (95% confidence interval)
Daily prayer	1.0 (0.9–1.1)
Immigrant status	1.9 (1.3–2.9)*
Daily prayer × immigrant status	1.0 (0.9–1.1)
Weekly religious attendance	1.2 (0.7–2.3)
Immigrant status	1.9 (1.2–3.0)*
Weekly religious attendance × immigrant status	0.8 (0.3–1.6)
Positive coping	1.1 (0.8–1.5)
Immigrant status	1.7 (0.7–4.0)
Positive coping × immigrant status	1.0 (0.6–1.5)
Negative coping	1.7 (1.0–2.7)*
Immigrant status	1.1 (0.3–3.1)
Negative coping × immigrant status	1.3 (0.7–2.6)
Negative coping, 3 items	1.2 (1.1–1.4)*
Immigrant status	1.4 (0.5–3.4)
Negative coping, 3 items × immigrant status	1.1 (0.9–1.3)
Negative coping, separate items	
Punishment reappraisal	1.3 (0.8–2.0)
Immigrant status	1.1 (0.5–2.4)
Punishment reappraisal × immigrant status	1.2 (0.7–2.1)
Abandonment interpretation	1.7 (1.0–2.7)*
Immigrant status	1.5 (0.7–3.2)
Abandonment interpretation × immigrant status	1.1 (0.6–1.9)
Coping without god	1.0 (0.8–1.2)
Immigrant status	1.8 (0.9–3.4)
Coping without god × immigrant status	1.0 (0.7–1.4)
Question whether god exists	1.3 (0.9–3.6)
Immigrant status	1.8 (0.9–3.5)
Question whether god exists × immigrant status	1.0 (0.7–1.4)
Express anger at god	1.3 (1.0–1.8)
Immigrant status	1.2 (0.6–2.6)
Express anger at god × immigrant status	1.3 (0.8–2.2)

* $p \leq .05$ ** $p \leq .01$

religious coping items, only the “punishment reappraisal” and “abandonment interpretation” items were more prevalent among immigrant patients. These findings are similar to a study in the general population in Amsterdam (the Netherlands) (Braam et al., 2010), which also described significantly higher daily prayer, weekly religious attendance, and positive religious coping among non-western immigrants compared to native Dutch. Also the “punishment reappraisal” item was significantly higher in the non-western immigrants compared to the native Dutch. Although dialysis patients may experience more stress due to being chronically ill, we did not find higher religious behavior or mean scores on either the positive or the negative religious coping items compared to the general population.

Our cross-sectional results indicate that for both native and immigrant dialysis patients negative religious coping (items) are strongly associated with depressive symptoms, while no apparent benefit of positive religious coping was found. A similar result was found in another study among mainly Christian (98%) chronic dialysis patients (Ramirez et al., 2012). Also in other clinical populations, an association between negative religious coping and depressive symptoms was found (Bosworth, Park, McQuoid, Hays, & Steffens, 2003; Burker, Evon, Sedway, & Egan, 2004; Fitchett et al., 2004; Koenig, Pargament, & Nielsen, 1998; Pargament, Koenig, Tarakeshwar, & Hahn, 2004; Park, Wortmann, & Edmondson, 2011; Sherman, Simonton, Latif, Spohn, & Tricot, 2005; Trevino et al., 2010), and

Table 4 Linear mixed model between religious behavior and religious coping at baseline and depressive symptoms at follow-up in 558 native and immigrant chronic dialysis patients

	Native	Immigrant
Predictor	b (95% CI) Adjusted for depressive symptoms at baseline and confounding factors	b (95% CI) Adjusted for depressive symptoms at baseline and confounding factors
Daily prayer	−0.02 (−0.1–0.1)	0.02 (−0.04–0.1)
Weekly religious attendance	−0.1 (−0.3–0.2)	−0.1 (−0.2–0.1)
Positive coping	−0.1 (−1.0–0.8)	0.7 (−0.2–1.7)
Negative coping	0.1 (−1.4–1.7)	0.4 (−1.1–1.8)
Negative coping, 3 items	0.2 (−0.2–0.6)	0.02 (−0.4–0.4)
Negative coping, separate items		
Punishment reappraisal	0.3 (−1.2–1.9)	−0.1 (−0.5–0.3)
Abandonment interpretation	0.4 (−1.0–1.9)	−0.3 (−1.4–0.8)
Coping without god	−0.5 (−1.1–0.1)	0.5 (−0.3–1.2)
Question whether god exists	0.2 (−0.5–1.0)	0.3 (−0.4–1.0)
Express anger at god	0.4 (−0.4–1.2)	−0.2 (−1.3–0.8)

Sequentially adjusted for depressive symptoms at baseline and age, gender, marital status, children, education, employment, comorbidity, and primary cause of renal failure. In immigrant patients also for generation status

* $p \leq .05$

** $p \leq .01$

only two studies found that positive religious coping was associated with less depressive symptoms (Bosworth et al., 2003; Koenig et al., 1998). The repeatedly found association between negative religious coping and depressive symptoms reflects how symptoms of depression accompany deep existential struggles in patients facing serious or chronic disease.

No longitudinal associations between religious behavior and negative religious coping at baseline with depressive symptoms at follow-up were found. When examining the longitudinal association by using a logistic regression model, we found that in the immigrant patient group positive religious coping at baseline was significantly associated with the presence of depressive symptoms at 12-month follow-up, but not with depressive symptoms at 6-month follow-up. This result suggests that patients who endorse positive religious coping permit the onset of depressive symptoms in a later stage. No other studies in chronic dialysis patients examined longitudinal associations between religion and depressive symptoms. In other populations, less depressive symptoms at follow-up were found in case of higher baseline religious behavior. It is possible that in chronic dialysis patients, depressive symptoms ensure that patients endorse more negative religious coping, which explains the cross-sectional associations found. Whether depressive symptoms endorse more negative religious coping at follow-up is not clear.

While immigrant chronic dialysis patients showed more religious behavior and positive religious coping compared to native dialysis patients, this does not seem to offer advantage regarding depressive symptoms. The prevalence of

depressive symptoms was significantly higher in immigrant patients compared to native patients. This higher prevalence was not explained by negative religious coping. Namely, for both native and immigrant chronic dialysis patients strong associations were found between negative religious coping and depressive symptoms and the moderation analysis showed cross-sectionally no difference between both groups. However, the longitudinal associations between religious coping and depressive symptoms at follow-up were not significant. The moderation analysis showed that the effect of “coping without God” on depressive symptoms at follow-up differed between native and immigrant patients. For native patients, the item “coping without God” seems to relate to less depressive symptoms at follow-up and for immigrant patients this item seems to relate to more depressive symptoms at follow-up. One may raise the question whether this item has the same meaning for native and immigrant patients. The item “coping without God” has its origins in principles of attributional style (Pargament et al., 2000). Pargament discerns deferring style (delegate all problem solving to God), self-directing style (solve the problem without help of God, although the capacity to do so may be interpreted as to be given by God), and collaborative style (combining the two approaches). Possibly, the deferring style is in concordance with other agnostic (secular or even atheistic) convictions among the secularized native Dutch patients. Among the migrants, the deferring style seems to be less in line with their religious convictions, and even may reflect to a certain degree a loss of religious trust, corresponding with depressive symptomatology.

Table 5 Moderation analysis for interaction term religious behavior/religious coping and immigrant status with depressive symptoms in linear mixed model

	Depressive symptoms Total group b (95% confidence interval)
Daily prayer	−0.1 (−0.4–0.3)
Immigrant status	0.1 (−1.1–1.3)
Daily prayer × immigrant status	0.1 (−0.3–0.4)
Weekly religious attendance	−0.1 (−0.2–0.1)
Immigrant status	−0.3 (−1.6–1.0)
Weekly religious attendance × immigrant status	0.1 (−0.1–0.2)
Positive coping	−0.4 (−1.4–0.6)
Immigrant status	−2.0 (−4.7–0.8)
Positive coping × immigrant status	1.0 (−0.3–2.3)
Negative coping	−1.2 (−2.8–0.4)
Immigrant status	0.7 (−2.8–4.2)
Negative coping × immigrant status	−0.3 (−2.4–1.9)
Negative coping, 3 items	−0.2 (−0.6–0.2)
Immigrant status	1.6 (−1.2–4.3)
Negative coping, 3 items × immigrant status	−0.3 (−0.9–0.2)
Negative coping, separate items	
Punishment reappraisal	0.9 (−1.5–3.4)
Immigrant status	1.8 (−0.8–4.5)
Punishment reappraisal × immigrant status	−1.0 (−2.8–0.7)
Abandonment interpretation	−0.5 (−1.9–0.9)
Immigrant status	2.0 (−0.5–2.6)
Abandonment interpretation × immigrant status	−1.3 (−3.0–0.4)
Coping without God	−0.7 (−1.4–0.0)
Immigrant status	−2.2 (−4.4–0.1)
Coping without God × immigrant status	1.2 (0.2–2.4)*
Question whether God exists	−0.3 (−1.1–0.6)
Immigrant status	−0.1 (−2.4–2.2)
Question whether God exists × immigrant status	0.2 (−1.0–1.3)
Express anger at God	−0.3 (−1.1–0.6)
Immigrant status	1.6 (−0.5–3.8)
Express anger at God × immigrant status	−1.1 (−2.5–0.3)

* $p \leq .05$ ** $p \leq .01$

The present study has some limitations. First, information about religious behavior and coping was only available at baseline, while data on depressive symptoms were available at baseline, 6-, and 12-month follow-up. Therefore, we could only examine whether religion at baseline was associated with depressive symptoms at follow-up. Possibly, when change in religious behavior and coping had been taken into account, further insight could be obtained how depressive symptoms may lead to change in religious behavior and coping (VanderWeele, Jackson, & Li, 2016). Second, due to the poor internal consistency of the negative religious coping subscale, we were forced to examine the items separately. This is consistent with what others have found before. Namely,

in a study in a general population in the Netherlands also negative religious coping items were analyzed separately because of low internal consistency (Braam et al., 2010). However, we also presented the total score on the negative coping subscale to allow comparison with other research. Third, it may be argued that some negative coping items could be symptoms of depression (punishment or abandonment interpretation). However, previous studies found associations between negative coping items and outcomes even after adjustment for depression (Pargament, Koenig, Tarakeshwar, & Hahn, 2001). A fourth limitation is a possible information or cultural bias, as our data are based on self-report questionnaires and therefore questions may have been interpreted and answered differently by patients

of different ethnic origins. More specifically since the RCOPE applies that it is theistic and designed for people with a Christian or Jewish background, the items may not be entirely sufficient to assess Islamic religious coping. Also low percentages of Islamic individuals were included in studies using the RCOPE (Abu Raiya, Pargament, Mahoney, & Stein, 2008). Fifth, we cannot control for length of stay of immigrants in the Netherlands: this is a limitation as this may also influence both religious behavior and coping and depressive symptoms. Sixth, although the scores on both the positive and negative religious coping subscale are comparable to other studies (Braam et al., 2010; Hills, Paice, Cameron, & Shott, 2005; Magyar-Russell et al., 2014; Nurasikin et al., 2012; Phelps et al., 2009), the score on especially the negative coping subscale is low. Therefore, it is possible that a floor effect of both subscales influenced our results.

In conclusion, the patterns of associations of religious behavior and coping with symptoms of depression are quite similar among native and immigrant chronic dialysis patients. While immigrant chronic dialysis patients endorse more religious behavior and positive religious coping, this does not provide any benefit with respect to the presence of depressive symptoms. For both native and immigrant chronic dialysis patients, cross-sectional associations between negative religious coping and depressive symptoms were found. However, no indications were found for a longitudinal association between negative religious coping at baseline and depressive symptoms at follow-up in both groups. Religion does not seem to explain the different prevalence of depressive symptoms we found in immigrant and native dialysis patients.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures were in accordance with the ethical standards of the institutional research committee and this study was carried out in consistency with the Declaration of Helsinki, regarding ethical principles for medical research involving humans.

Informed Consent All patients gave written informed consent before inclusion.

Appendix A

10-Item RCOPE

Original American version (Pargament, 1999).

Positive (1–5) and negative (6–10) religious coping items:

1. I think about how my life is part of a larger religious force.
2. I work together with God as partners to get through hard times.
3. I look to God for strength, support, and guidance in crises.
4. I try to find the lesson from God in crises.
5. I confess my sins and ask for God's forgiveness.
6. I feel that stressful situations are God's way of punishing me for my sins or a lack of spirituality.
7. I wonder whether God has abandoned me.
8. I try to make sense of the situation and decide what to do without relying on God.
9. I question whether God really exists.
10. I express anger at God for letting terrible things happen.

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