Assessment of psychological distress in end stage renal disease: is it spirituality related?

Evangelos C. Fradelos[1,2], Victoria Alikari[2], Konstantinos Tsaras[1], Ioanna V. Papathanasiou[1], Foteini Tzavella[1], Dimitrios Papagiannis[3], Sofia Zyga[2]

1) Community Nursing Lab, Nursing department, University of Thessaly, Larissa, Greece

2) Department of Nursing, University of Peloponnese, Sparta, Greece

3) Nursing Department, University of Thessaly, Larissa, Greece

PSYCHOLOGY

Abstract

Introduction. Patients undergoing hemodialysis (HD) are faced with bearing this burden and report poor mental health. Spirituality can be a key factor in managing these problems among HD patients.

Aim. This cross-sectional study aimed at exploring possible factors that are associated with psychological distress among HD patients and testing its relation to spirituality.

Methods. HD patients were recruited from six dialysis units in Greece. Psychological distress was assessed using the scale Symptom Check List 90-R and spirituality using the Facit Sp-12 questionnaire. In addition, a special design questionnaire regarding demographic, social, and clinical characteristic was administrated.

Results. According to the results, factors such age, gender, marital status and area of residence are associated with psychological distress, while dimensions of spirituality such Meaning in Life and Peace can have a positive influence on psychological distress.

Conclusion. This study highlights the vital role of spirituality, which can act as a mechanism for managing stressful situations. In particular, this study highlights the positive effect of the meaning and purpose of life, as well as the role of peace and harmony.

Keywords: hemodialysis, psychological distress, psychiatric symptoms, spirituality

Introduction

Patients undergoing hemodialysis (HD) have to bear the burden resulting from their underlying chronic illness and the therapeutic regimen, which "keeps the patient tied" with the machine of HD. The stress of HD patients may be related to the fact that they are undergoing a complicated medication and dietary regimen and experience various dietary and temporal constraints, changes in their role in the community, family and couple [1]. The socio-economic problems that arise from the chronic illness itself, the HD regimen, lifestyle changes as well as the personality traits of the patient can lead HD patients who are mentally and socially unstable to adopt reactive behaviors such as anxiety and depression [2].The result of these internal processes is often the onset of psychiatric symptoms, which affect the process of the end stage renal disease (ESRD) [3].

Psychological distress which occurs with symptoms of anxiety and depression may be due to coexisting chronic conditions, such as diabetes mellitus and heart failure. The presence of anxiety in ESRD with HD is probably due to a sense of uncertainty about the future, feelings of guilt and self-loss, which are combined with the chronicity and the incurable nature of the disease [4]. Depressive symptoms have also been

associated with fatigue, hopelessness, anxiety, headache, suicide attempts, reduced functional ability, higher rates of hospitalization, increased withdrawal rates from the session of HD and early mortality [5]. Fatigue - which can be physical, mental (low concentration), emotional (reduced motivation or apathy) or fatigue after HD [6] - is associated with depression, anemia, sleep disorders, and many sexual problems. Along with the above, replacement of the renal function by HD can have significant effects on body image, as patients may perceive themselves as unattractive.

A key factor in managing these problems among HD patients is spirituality and, according to studies, HD patients present a multitude of spiritual needs [7]. High levels of spirituality have been associated with optimal psychosocial adaptation to the disease [8]. Spirituality has a positive effect on the overall health of patients with ESRD [9] and is a coping strategy of anxiety [10] and fear of individual's death resulting from such a chronic condition [11]. Alradaydeh and Khalil [12] found that spirituality is protective against depression, which is confirmed by other studies [12,13]. Several studies suggest that this effect is also observed in clinical syndromes such as generalized anxiety disorder [13,14] but, also, in more critical situations, such as suicidal ideation [14]. Increased religiosity is one of those mechanisms which allow the search for the meaning of life and reduce the feeling of despair. Moreover, a coping strategy connected with religion is hope, since it leads the individual to act and move according to the treatment goals. Lack of hope can leave the individual with no prospect, and perhaps can passively expect to die. Although hope does not have the power of healing, it encourages the patient to continue fighting and seeking clinical improvements [15]. Moreover, resilience can also be used by HD patients as a coping strategy to adapt to the new reality and to modify their lives quickly [16].

Aim

This study aimed to explore possible factors that are associated with the psychological distress among HD patients and to test if spirituality is associated. Given that previous research [17] highlighting the effect of spirituality on psychological distress among HD patients is minimal and contradictory, we decided to explore the effect of spirituality in psychological distress and the relationships between these variables.

Methods
Study design and sample

This was a cross-sectional study conducted in 2018 in a private HD, namely "Iatriko Therapeutirio Iliou Medifil A.E." (Athens) and in five HD units of public hospitals: (i) General Hospital of Lamia (Central Greece), (ii) Panarkadiko General Hospital "Evangelistria" (South Greece), (iii) General Hospital of Chios Island "Skylitseio" (East Greece), (iv) General Hospital of

Athens "G. Gennimatas" (Athens), and (v) University Hospital of Alexandroupolis (North Greece). The source population was represented by patients with end stage renal disease undergoing hemodialysis, the number of which being estimated to be around 10,500 in Greece. The sample consisted of 367 patients undergoing HD who were randomly selected from six HD units in various geographical areas of Greece. Stratified random sampling procedure per unit was used in recruiting samples. The sample size is approximately 3.5% of the source population patients. The inclusion criteria were the following: (i) age above 18, (ii) undergoing HD 3 times/week for at least 6 months, (iii) native language Greek, (iv) ability to read and sign the consent form, (v) time-space oriented, (vi) not currently undergoing transplant procedures. Patients with mental or cognitive disorders were excluded from the study.

Ethics

To carry out the study, licenses were obtained from the Data Protection Authority (Protocol number: ΓΝ/ΕΞ/4670-3/04-08-2016), and Scientific Councils of the six HD Units. In all cases, oral and written information was provided to patients about the aims of the work, the confidentiality, and anonymity of the answers and their right to interrupt at any time during the procedure.

Instruments

Data were collected through anonymous self-completed questionnaire, which consisted of three parts:

a. The first part contained questions regarding demographic, social, and clinical information such as age, gender, marital status, duration of dialysis comorbidities. Moreover, some additional information was gathered such as self-reported religiosity using a single item religiosity "How religious are you?" with a four-point Likert scale ranging 0-4, where 0 corresponded to not religious and 4 to highly religious. "How close do you feel to God?" was a single item assessing connection to god in a four Likert point scale ranging 0-4, where 0 corresponded to not close at all, while 4 corresponded to as close as I can be. Finally, "Current Activity Level" was assessed in a four-point Likert scale ranging 0-4, were 0 = Normal activity, without symptoms, 1 = Some symptoms, but do not require bed rest during waking day, 2 = Require bed rest for less than 50% of waking day, 3 = Require bed rest for more than 50% of waking day, 4 = Unable to get out of bed.

b. The Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale-12 (FACIT-Sp-12) [18,19]. This scale was constructed by Cella et al., 1993 [18] and includes three subscales: Meaning in Life, Peace, and Faith. Each factor of spirituality includes 4 items in a 5-point Likert type scale (0 = none to 4 = very). The questions referred to the last seven days. The higher the score, the greater the spiritual well-being. The total sum of answers gives information on general spiritual well-being. This is a valid tool with a high-reliability index (Cronbach's alpha 0.87).

c. The Symptom Checklist 90-Revised (SCL 90-R). It is a valid self-completed scale of measurement of subjective discomfort and symptomatic behavior in various dimensions of psychopathology. It consists of 90 questions which are grouped into nine major symptomatological dimensions – subscales: Somatization (12 items), Obsessive Compulsive (10 items), Interpersonal Sensitivity (9 items), Depression (13 items), Anxiety (10 items), Hostility (6 items), Phobic Anxiety (7 items), Paranoid Ideation (6 items), and Psychoticism (10 items). Each question is graded in a 5-point Likert type (0 = none to 4 = too much). It also includes seven questions that are not included in the above subscales, related to sleep and food disorders and they are referred to in the text as "Additional Items" and are counted on the total score. In addition to the nine subscales, three total psychopathology indicators are also exported: a) Global Severity Index (GSI), b) Positive Symptoms Total (PST), and c) Positive Symptom Distress Index (PSDI). The scale has been standardized in the Greek population [20], and has been used in other studies as well [21].

Statistical analysis

The statistics of the research empirical data were processed with SPSS v. 22.0 for Windows (SPSS, Inc., Chicago, IL, USA). Descriptive and inferential statistical methods were generated. Continuous variables are presented with mean, standard deviation, median, interquartile range, and range (min-max), while categorical variables are presented as absolute (n) and relative (%) frequencies. Scores on Symptom Checklist 90-R scale were used as the outcomes (dependent variables) of the under-research correlations and scores on FACIT - Sp12 Scale and patient characteristics as the determinants (independent variables). Parametric statistical tests were applied because the sample size was large enough (n=367), and according to the Central Limit Theorem, it approximates the normal distribution [22]. Initially, we performed bivariate analyses. Student's t-test and one-way analysis of variance were used for the association between categorical and continuous variables and Pearson's correlation coefficient for the correlation between continuous variables. Multivariate linear regression analysis (stepwise method) was applied to identify predictors of psychopathology dimensions on SCL 90-R Scale. Regression coefficients (β) with standard errors and 95% confidence intervals were computed. All reported p-values were two-tailed, and statistical significance level was set at 0.05.

Results

In table I the sociodemographic characteristics of the sample are presented. A percentage of 62.1% of patients were male. The mean age was 61.80 years (SD=15.11). From the total of 193 who reported other health issues, the majority of them suffered from hypertension (60%), diabetes mellitus (40%) and glomerulonephritis (30%).

Table I. Sociodemographic characteristics of participants (n=367).

Characteristics	n	%
Gender		
Male	228	62.1
Female	139	37.9
Age (Years)		
Mean (SD)	61.80 (15.11)	
Residence		
Rural Area	64	17.4
Suburban Area	56	15.3
Urban Area	247	67.3
Family Status		
Unmarried	69	18.8
Married	217	59.1
Divorced	31	8.4
Widow	50	13.6
Occupational Status		
Unemployed	37	10.1
Household	36	9.8
Self-employed	40	10.9
Private employee	15	4.1
State-employee	15	4.1
Retired	224	61.0
Religion		
Christian Orthodox	352	95.9
Christian Catholic	0	0.0
Muslim	6	1.6
Other	9	2.5
Other health problems		
Yes	193	52.6
No	174	47.4
	Mean	**SD**
Years on HD	5.69	5.25
Children	1.57	1.41
How religious are you?	2.56	1.08
How close do you feel to God?	2.54	1.11
Current Activity Level	2.46	1.09

SD = Standard Deviation

The mean score of FACIT- Sp 12 Scale was 30.55% (SD=8.22). The "meaning in Life" showed the highest average (mean=11.99, SD=3.27) followed by (mean=9.30, SD=3.95), while the "Peace" the lowest (mean=9.26, SD=3.38).

The mean score of SCL 90-R was 0.89 (SD=0.63). "Depression" had the highest score (mean=1.14, SD=0.75) followed by Additional Items (mean=1.12, SD=0.76), Obsessive Compulsive(mean=1.01, SD=0.77), Somatization (mean=0.98, SD=0.74), Anxiety (mean=0.82, SD=0.76), Interpersonal Sensitivity (mean=0.81, SD=0.70), Paranoid Ideation (mean=0.81, SD=0.75), Phobic Anxiety (mean=0.76, SD=0.86) and finally "Psychoticism" had the lowest (mean=0.58, SD=0.63). Regarding the three global distress indices the following values were observed Global Severity Index (mean=0.89, SD=0.63), Positive Symptoms Total (mean=42.18, SD=24.22) and finally Positive Symptom Distress Index (mean=1.83, SD=0.55).

Regarding the distribution of 367 HD patients in the presence (score ≥1) or the absence (score <1) of distress symptoms based on the values of the SCL 90-R and using the cut-off score 1 which corresponds to the answer "Little" of the scale: The prevalence of symptoms in all dimensions of the SCL 90-R was below 50% except "Depression" and "Additional Items". More specific in the presence of Somatization symptoms there were 171 individuals (46.6%), in Obsessive Compulsive symptoms 163 (44.4%), in Interpersonal Sensitivity symptoms 121 (33%), Depression symptoms 189 (51.5%), Anxiety symptoms 133 (36.2%), Hostility was reported by 103 (28.1%), in the presence of Phobic Anxiety symptoms there were 118 (32.2%) individuals, in Paranoid Ideation symptoms 127 (34.6%), in Psychoticism symptoms 76 (20.7%), additional Items were reported by 208 (56.7%) and finally in Global Severity Index 126 (34.3%).

Table II. Multivariate analysis using the stepwise method with a dependent variable (SCL 90-R Psychiatric Symptom Scale) and independent variables FACIT - Sp12 Scale and patient characteristics[*] (n=367).

Symptom Checklist 90-R	Predictors	β	SE	95% CI	p-value
Somatization	Constant	2.867	0.239	2.398 to 3.337	<0.001
	Meaning in Life	-0.071	0.011	-0.093 to 0.049	<0.001
	Peace	-0.045	0.011	-0.067 to 0.023	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.168	0.064	0.043 to 0.293	0.009
	Children	0.050	0.021	0.008 to 0.092	0.021
	Religion				
	Christian Orthodox (Reference)	0			
	Non-Christian Orthodox	-0.318	0.153	-0.620 to 0.016	0.039
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.222	0.065	-0.350 to 0.094	<0.001
	Current Activity Level	-0.109	0.032	-0.171 to 0.047	<0.001
	Adjusted R²=40.2% F=36.138 p<0.001				
Obsessive Compulsive	Constant	2.213	0.214	1.793 to 2.633	<0.001
	Meaning in Life	-0.070	0.012	-0.094 to 0.045	<0.001
	Peace	-0.058	0.012	-0.081 to 0.035	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.183	0.068	0.049 to 0.316	0.007
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.152	0.072	0.010 to 0.293	0.035
	Current Activity Level	-0.116	0.032	-0.179 to 0.052	<0.001
	Adjusted R²=36.2% F=42.544 p<0.001				
Interpersonal Sensitivity	Constant	1.513	0.200	1.119 to 1.908	<0.001
	Meaning in Life	-0.082	0.012	-0.105 to 0.059	<0.001
	Peace	-0.029	0.011	-0.051 to 0.008	0.008
	Gender				
	Male (Reference)	0			
	Female	0.262	0.064	0.136 to 0.387	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.144	0.068	0.011 to 0.277	0.034
	Adjusted R²=29.4% F=39.054 p<0.001				
Depression	Constant	2.378	0.236	1.914 to 2.841	<0.001
	Meaning	-0.084	0.011	-0.106 to 0.063	<0.001
	Peace	-0.044	0.011	-0.066 to 0.023	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.239	0.061	0.119 to 0.358	<0.001
	Age (Years)	0.006	0.002	0.002 to 0.010	0.006
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.182	0.063	-0.307 to 0.058	0.004
	Current Activity Level	-0.095	0.032	-0.158 to 0.033	0.003
	Adjusted R²=45.9% F=52.787 p<0.001				

β = Regression coefficient, SE = Standard Error, CI = Confidence Interval;
[*] In the multivariate model the characteristics of the patients were included in the bivariate analysis with a significance level at 0.25

Table III. Multivariate analysis using the stepwise method with a dependent variable ("SCL-90R" Psychiatric Symptom Scale) and independent variables FACIT - Sp12 Scale and patient characteristics[*] (n=367).

Symptom Checklist 90-R	Predictors	β	SE	95% CI	*p-value*
Anxiety	Constant	2.401	0.170	2.067 to 2.735	<0.001
	Meaning in Life	-0.071	0.011	-0.093 to -0.048	<0.001
	Peace	-0.062	0.011	-0.084 to -0.039	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.218	0.064	0.093 to 0.344	<0.001
	Years on HD	-0.012	0.006	-0.023 to 0.000	0.049
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.139	0.066	-0.268 to -0.010	0.035
	Current Activity Level	-0.079	0.032	-0.142 to -0.015	0.015
	Adjusted R²=39.6% F=40.999 p<0.001				
Hostility	Constant	1,785	0,236	1,321 to 2.249	<0.001
	Meaning in Life	-0.041	0.013	-0.065 to -0.016	<0.001
	Peace	-0.047	0.012	-0.070 to -0.023	<0.001
	Age (Years)	-0.008	0.002	-0.012 to -0.004	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.211	0.072	0.069 to 0.352	0.004
	Adjusted R²=17.7% F=20.739 p<0,001				
Phobic Anxiety	Constant	1.612	0.254	1.112 to 2.112	<0.001
	Meaning in Life	-0.059	0.014	-0.088 to -0.031	<0.001
	Peace	-0.053	0.014	-0.080 to -0.026	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.383	0.079	0.228 to 0.537	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.255	0.083	0.093 to 0.417	0.002
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.186	0.080	-0.343 to -0.029	0.021
	Current Activity Level	-0.097	0.039	-0.174 to -0.020	0.013
	Adjusted R²=32.0% F=29.758 p<0.001				
Paranoid Ideation	Constant	1.582	0.197	1.194 to 1.969	<0.001
	Meaning in Life	-0.058	0.014	-0.085 to -0.031	<0.001
	Peace	-0.032	0.013	-0.058 to -0.007	0.014
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.168	0.080	0.011 to 0.325	0.036
	Adjusted R²=14.3% F=21.431 p<0.001				
Psychoticism	Constant	1.265	0.151	0.968 to 1.561	<0.001
	Meaning in Life	-0.061	0.011	-0.082 to -0.040	<0.001
	Peace	-0.034	0.010	-0.063 to -0.014	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.271	0.061	0.151 to 0.391	<0.001
	Adjusted R²=27.3% F=46.894 p< 0.001				
Additional Items	Constant	2.923	0.199	2.532 to 3.313	<0.001
	Meaning in Life	-0.089	0.012	-0.112 to -0.066	<0.001
	Peace	-0.040	0.012	-0.063 to -0.017	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.225	0.066	0.095 to 0.355	<0.001
	Children				
	Yes (Reference)	0			
	No	-0.274	0.070	-0.412 to -0.137	<0.001
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.212	0.065	-0.341 to -0.084	<0.001
	Adjusted R²=35.3% F=40.936 p<0.001				

β = Regression coefficient, SE = Standard Error, CI = Confidence Interval
[*] In the multivariate model the characteristics of the patients were included in the bivariate analysis with a significance level at 0.25

A multivariate analysis was applied to find predictors of psychological distress among HD patients. In the multivariate analysis, the Spirituality (FACIT - Sp12 Scale) and the characteristics of patients associated with psychological distress symptoms were introduced at the 0.25 significance level of the bivariate analysis. In tables II, III and IV multivariate analysis using multiple linear regression with the stepwise method is presented. According to multivariate analysis, Meaning in Life, Peace, Gender, Area of Residence, age and Other Health Problems are the most frequent predictors for the presence of psychological distress and manifestation of psychiatric symptomatology among ESRD patients.

Table IV. Multivariate analysis using the stepwise method with a dependent variable SCL 90-R Psychiatric Symptom Scale) and independent variables FACIT - Sp12 Scale and patient characteristics[*] (n=367).

Symptom Checklist 90-R	Predictors	β	SE	95% CI	*p-value*
Global Severity Index	Constant	2.006	0.172	1.669 to 2.344	<0.001
	Meaning in Life	-0.073	0.010	-0.092 to -0.054	<0.001
	Peace	-0.047	0.009	-0.065 to -0.029	<0.001
	Gender				
	Male (Reference)	0			
	Female	0.217	0.053	0.114 to 0.320	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	0.121	0.056	0.011 to 0.230	0.031
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.182	0.052	-0.283 to -0.081	<0.001
	Adjusted R²=42.1% F=54.244 p<0.001				
Positive Symptoms Total	Constant	72.150	6.562	59.245 to 85.055	<0.001
	Meaning in Life	-2.410	0.364	-3.125 to -1.694	<0.001
	Peace	-1.856	0.351	-2.546 to -1.166	<0.001
	Gender				
	Male (Reference)	0			
	Female	6.876	2.006	2.931 to 10.821	<0.001
	Residence				
	Urban Area (Reference)	0			
	Non-Urban Area	12.272	2.123	8.097 to 16.446	<0.001
	Other Health Problems				
	Yes (Reference)	0			
	No	-6.552	1.968	-10.423 to -2.681	<0.001
	Adjusted R²=42.8% F=55.779 p<0.001				
Positive Symptom Distress Index	Constant	2.081	0.227	1.635 to 2.528	<0.001
	Meaning in Life	-0.030	0.010	-0.050 to -0.011	0.003
	Peace	-0.020	0.010	-0.039 to -0.001	0.041
	Gender				
	Male (Reference)	0			
	Female	0.125	0.056	0.015 to 0.236	0.026
	Residence				
	Urban Area (Reference)	0			
	Non Urban Area	-0.218	0.058	-0.332 to -0.104	<0.001
	Children	0.043	0.019	0.006 to 0.080	0.024
	Occupational Status				
	Working (Reference)	0			
	No Working	0.213	0.069	0.078 to 0.348	0.002
	How close do you feel to God?	0.057	0.025	0.007 to 0.106	0.025
	Other Health Problems				
	Yes (Reference)	0			
	No	-0.115	0.054	-0.221 to -0.008	0.035
	Adjusted R²=18.3% F=11.245 p<0.001				

Notes: β = Regression coefficient, SE = Standard Error, CI = Confidence Interval
[*] In the multivariate model the characteristics of the patients were included in the bivariate analysis with a significance level at 0.25

Discussion

This study investigated the effect of spirituality in psychological distress among HD patients. One of the specific objectives of the present study was to assess the impact of social, demographic, and clinical factors on psychological distress. The results are significant for health care professionals working in HD units, as psychological distress can affect the patient's QoL and increase the mortality.

The diagnosis of ESRD and life-long HD was found to have a significant impact on the psychological distress experienced by these patients. The results of this study confirm the initial assumptions of the research that HD patients are experiencing psychological distress. According to the results, the prevalence of psychological distress in ESRD undergoing HD is considerable, given than one in three patients of the sample (34.5%, n=126) reported the presence of symptoms according to the SC 90-R scale taking a cut-off of 0.99. The highest scores were recorded in the category of symptoms of "Depression" (51.5%), followed by "Somatization" (46.6%), "Obsessive Compulsive" (44.4%), "Anxiety" (36.2%), and the lowest score by "Psychoticism" (20.7%). The presence of psychological distress in approximately 35% of participants is a finding that is consistent with similar international studies [23,24].

In addition, many of the patient characteristics were found to be related to psychological distress, but only some of them, such as gender, residence, age, and co-morbidity, were introduced into multiple regression models as predictors.

In the present study, the percentage of patients who experienced depressive symptomatology was 51.5%. According to a meta-analysis of 2013 [25], the prevalence of depression in HD patients was 39.3% (depression was evaluated with self-administered questionnaires) and 22.8% (diagnosis of depression was set after a clinical interview according to the criteria of Diagnostic and Statistical Manual of Mental Disorders). This variation may be due both to cultural differences between the studied populations and to different methodological approaches (e.g. sampling, evaluation mode).

Additionally, the percentage of somatization symptoms was quite high (46.6%). This finding is consistent with other studies related to psychological distress among Greek HD patients [26,27] while international studies have found similar results reinforcing the belief that HD patients have high rates of somatization compared to patients with other chronic conditions [21,28]. As far as the frequency is concerned, the obsessive-compulsive symptoms are following in this study. However, the high incidence of these symptoms cannot be easily assessed because of their coexistence with other mental disorders such as anxiety, depression and posttraumatic stress disorder [29,30].

In our study, 36.2% experienced symptoms of anxiety. As with both depression and anxiety, there is also a wide variation in the reported rates of anxiety symptomatology in HD patients. In the study by Preljevic et al. [31], 17% of the patients met the Diagnostic and Statistical Manual of Mental Disorders criteria [25] for the diagnosis of anxiety disorder, while in the study of Bassola et al. [32], 48.7% of HD patients showed severe symptoms of anxiety. The intensity and frequency of anxiety symptoms could be interpreted because of feelings of uncertainty about the future, guilt and loss of self-image and the self-esteem often experienced by the HD patients in conjunction with the chronic progressive form of the disease [4,33].

The effect of gender in most SCL 90-R symptom categories was significant in this study, except for hostility, paranoid ideation, and psychoticism. The effect of gender on mental health has been discussed over the last few years, as there are studies among HD patients who do not detect statistically significant differences in the mental health level between men and women [27,34]. However, most researchers agree that women undergoing hemodialysis experience higher levels of mental stress than men [35,36]. These increased levels of mental stress among women can be attributed to multiple roles, family and professional obligations, and hormonal differences between the two sexes [37].

Age was also a significant predictor in the domains of Depression and Hostility. This finding is in contrast to several studies which found that younger HD patients are more mentally impaired [36]. In a recent prospective study by Sugisawa et al. [38] have found that the risk of psychiatric problems is increased for ages 50-59 and decreased significantly for patients aged 60 years and older. Similar results came from the study of Turkistani et al. [39] according to which the presence of anxiety was associated with age and in particular patients over the age of 40 years old were more likely to experience anxiety symptoms [39]. The symptoms of anxiety in elderly patients may be related to the anxiety of death experienced by these patients and their reduced vitality [32].

A factor found to be significantly associated with the existence psychological distress was coexisting diseases. This finding was expected, as there are many studies in the literature, which led to similar results [40].

Looking at the effect of spirituality on psychological distress, we observe that subscales of "Meaning in Life" and "Peace" as well as the overall scale of spirituality had a negative effect on all sub-scales and general indicators of the SCL 90-R at a statistical significance level p<0.001. The subscale "Faith" clearly showed smaller and weaker effect than the others. More specifically, "Faith" seems to have a negative effect on "Somatization" (p<0.001), on "Interpersonal Sensitivity" (p=0.064), on "Depression" (p=0.043), on "Hostility" (p=0.012), on "Additional Items" (p=0.002), the Global Severity Index (p=0.050) and the Positive Symptom Total Score (p=0.048).

These results give a clear answer to the research question on the effect of spirituality on the psychological distress that HD patients are experiencing. Therefore, a negative statistically significant relationship was found, as correlation and regression tests revealed that "Peace" and "Meaning in Life" can ease psychological distress. Therefore, psychological distress is negatively related to spirituality, a finding that is in agreement with earlier related studies [41]. Spirituality can act as a protective factor for the mental health of HD patients. It is worth noting that there are studies which show that patients undergoing HD use spirituality as a stress management strategy in order to be able to cope with the emotional requirements and the various constraints caused by the ESRD [42]. According to the results of the present study, the increase by one unit of the spirituality scale leads to a reduction of several psychological distress symptoms, with the greatest decrease observed in the depressive symptoms, followed by anxiety and somatization. In a study in Brazil among 150 HD patients, spirituality was found to be associated with the improvement of mental health, psychological distress, sleep disturbances and psychosomatic complaints [36]. A recent study in Jordan found similar results since a negative relationship between depression, anxiety, and stress with spirituality was found. More specifically, only spirituality was related to psychological parameters. The findings of the present study reinforce those of Musa, Pevalin and Al Khalaileh, given that in our study the subscale of "Faith' exhibited fewer correlations [13].

Strengths and limitations

The fairly large sample (n=367) and the collection of enough information, such as social and clinical features, are among the strengths of the study. In addition, data collection was performed by several HD centers across Greece, which helped provide data from a diverse and heterogeneous patient population.

A major disadvantage of the study is its cross-sectional design, which does not give us an insight into the evolution of spirituality and its impact over time. Additionally, data collection took place during HD sessions, so there were some external variables such as noise, interruptions from health professionals, which might have some influence on the answers given.

Conclusion

This study highlights the important role of spirituality which can act as a mechanism for managing stressful situations. In particular, this study highlights the positive effect of the meaning and purpose of life, as well as the role of peace and harmony. Focusing on enhancing spirituality in the day-to-day care of HD patients could improve various aspects of mental health and relieving patients from psychological distress. Spiritual support, as a complementary part of psychological intervention, could be recommended for HD patients especially in Greece,

where the spiritual element is strong. To experience high levels of the above parameters helps HD patients find ways to cope with the mental difficulties which can accompany ESRD. However, the precise mechanism of the protective action of these factors is still under study.

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