RESEARCH ARTICLE

ANXIETY AMONG CAREGIVERS OF PATIENTS UNDERGOING HEMODIALYSIS

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Abstract

Introduction: Hemodialysis (HD) imposes a significant physical, psychological, social, and economic burden not only on patients but also on their caregivers, who are most commonly family members or close relatives. Caregivers play a central role in providing ongoing physical, emotional, and social support throughout the treatment process, while their responsibilities may contribute to the development of anxiety. The purpose of this study was to explore anxiety among caregivers of patients undergoing HD.

Material and Methods: The present study included 100 caregivers of HD patients attending a private dialysis center in Attica. Data were collected through structured interviews using the Zung Self-Rating Anxiety Scale (SAS) along with caregivers' characteristics. The level of statistical significance was set at $p < 0.05$.

Results: Of the 100 participants, 62% were female and 52% were aged over 60 years. The mean anxiety score was 57.8±11.5 on the Zung Self-Rating Anxiety Scale (range 20–80), indicating moderate levels of anxiety. Anxiety was significantly associated with caregivers' self-reports, including fatigue (p=0.050), restrictive lifestyle (p=0.044), level of information regarding HD (p=0.008), perceived caregiving as a burden (p=0.027), difficulties in coordinating healthcare needs (p=0.025), insomnia (p=0.003), uncertainty about future (p=0.013), and family conflicts (p=0.056).

Conclusions: Anxiety among caregivers of HD patients was significantly associated with their caregiving-related perceptions. Targeted interventions addressing their perceptions may help reduce anxiety and improve caregivers' overall well-being.

Keywords: Anxiety, hemodialysis, patients

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INTRODUCTION

Chronic kidney disease is a major global health concern that often progresses to end-stage renal disease, requiring renal replacement therapies such as hemodialysis, peritoneal dialysis, or kidney transplantation. According to the Global Burden of Disease Study, kidney disease ranks among the leading causes of mortality worldwide, accounting for 1.1 million deaths, annually.[1]

Patients undergoing hemodialysis (HD) face numerous challenges related to both the disease and its treatment. These include dietary restrictions, limitations in fluid intake, disturbances in bone metabolism, complications associated with vascular access, physical and cognitive impairments. Consequently, the above difficulties affect patients' functional capacity, reduce their ability to perform activities independently, thus negatively impacting their overall quality of life.[2,3]

Therefore, HD imposes significant physical, psychological, social, and economic burden not only on patients but also on their caregivers who are most commonly family members or close relatives. Caregivers play a central role in providing continuous physical, emotional, and social support throughout the treatment process, and their responsibilities are often associated with substantial caregiver burden that can negatively affect multiple dimensions of their well-being.[4] More in detail, caregivers of HD patients experience substantial psychological, social, and economic burden due to the long-term nature of treatment, the chronic course of the disease, the risk of dialysis-related complications, and the demands of caregiving. These challenges may result in elevated anxiety, disruptions in daily life, financial strain, reduced work participation, and deterioration in well-being.[5,6]

Evidence from the literature shows that informal caregivers are at increased risk of developing psychiatric disorders, with anxiety being among the most prevalent yet still relatively under-investigated in caregiving research.[10] Anxiety represents a particularly distressing experience in the context of informal care, as symptoms such as persistent worry and fear may significantly impair daily functioning and interfere with caregiving responsibilities.[11] Furthermore, anxiety has been associated with adverse physical health outcomes, including increased risk of cardiovascular disease, poorer overall health status, and reduced quality of life among caregivers.[7,8] Finally, emotional disturbance not only affects caregivers' quality of life but also influence patient care and disease management.[5,6] Consequently, the identification and management of high caregiver burden may contribute to improved psychological and physical health outcomes in this population. [7,8] Understanding caregivers' emotional burden is crucial for healthcare professionals to provide appropriate support and facilitate adaptation to the changes imposed by the HD.

Accordingly, the present study aimed to explore anxiety among caregivers of HD patients.

2. MATERIALS AND METHODS

2.1. Design, Setting, and Period of the Study

This cross-sectional, single-center study included 100 caregivers of patients receiving HD in a private dialysis center in Attica between March 2023 and December 2023. Participants were selected by the method of convenience sampling.

2.2. Inclusion and Exclusion Criteria of the Sample

Only spouses were included to ensure sample homogeneity, as caregiving experiences, and psychological responses may differ substantially between spouses, children, siblings, and other relatives. Focusing on spouses allowed for a more consistent assessment of factors associated with caregiving.

Criteria for the inclusion of participants in the study were: a) understanding the Greek language, b) provide unpaid care to HD patients, and c) being the spouse of the HD patient. Exclusion criteria were: a) not understanding the Greek language, b) provision of care to HD hospitalized patients and c) diagnosis with a psychiatric illness.

2.3. Data Collection and Procedure

Data collection was conducted through individual interviews in a designated private office after the completion of the patients' HD treatment. The duration of each interview was approximately 20 minutes.

2.4. Research Instrument

Data were collected using the Zung Self-Rating Anxiety Scale (SAS) which included the following participants' characteristics. Demographics: gender, age, and job. Caregivers perceptions and self-reported characteristics: fatigue, lead of a restrictive lifestyle, level of information regarding HD, perceive of caregiving as a burden, difficulties

in coordinating healthcare needs, insomnia, future uncertainty and family conflicts.

2.4.1 Assessment of Anxiety

Anxiety levels were measured using the Greek version of the Zung Self-Rating Anxiety Scale (SAS), a widely used self-report instrument for assessing anxiety symptoms. The scale consists of 20 items evaluating psychological and somatic aspects of anxiety experienced during the previous week. Responses are rated on a four-point Likert scale ranging from 1 to 4, with several items scored in reverse. Total scores are calculated by summing item responses, with higher scores reflecting greater anxiety severity. [9] The Greek version of SAS demonstrates satisfactory psychometric properties, including internal consistency, with a reported Cronbach's alpha coefficient of 0.897. 10

2.5. Ethical Considerations

The present study was approved by the Research Committee of the HD center. Participants who met the entry criteria were informed by the researcher for the purposes of this study. Written informed consent was obtained for all participants. Data collection guaranteed anonymity and confidentiality. All subjects had been informed of their rights to refuse or discontinue participation in the study, according to the ethical standards of the Declaration of Helsinki (1989) of the World Medical Association.

2.6. Statistical Analysis

Categorical data are presented with absolute and relative (%) frequencies, while continuous data are presented with mean, standard deviation (SD), median and interquartile range (IQR). The normality of the quantitative data was checked with the Kolmogorov-Smirnov test and graphically with histograms and Q-Q plots. Kruskal-Wallis, Mann-Whitney and spearman's' rho tests were used to test for correlation between scale score and participants characteristics. The observed significance level of 5% was considered statistically significant. All statistical analyzes were performed with SPSS version 25 (SPSS Inc, Chicago, Il, USA).

3. RESULTS

3.1 Descriptive results

Table 1 presents the demographic characteristics of the sample. A total of 100 caregivers participated in the study. The majority were female (62.0%), while 38.0% were male. Regarding age distribution, 48% of caregivers were younger than 60 years, 20% were aged between 61 and 70 years, and 32% were older than 70 years. With respect to employment status, most caregivers were pensioners (60.0%), followed by employed individuals (29.0%), whereas 11.0% were unemployed.

Table 1: *Distribution of the sample according to their characteristics (n=100)*

	n (%)
Gender	
Male	38(38.0%)
Female	62(62.0%)
Age (years)	
<60	48 (48%)
61-70	20(20.0%)
>70	32(32.0%)
Job	
Unemployed	11(11.0%)
Employed	29(29.0%)
Pensioner	60(60.0%)

In terms of self-reported participants' characteristics (demographics, perceptions), the majority of caregivers reported experiencing fatigue (69.0%) and feeling that their lives were restricted due to caregiving responsibilities (53.0%). Most participants stated that they were sufficiently informed about hemodialysis (58.0%). Regarding healthcare management, the majority reported no difficulties in coordinating the patient's healthcare needs (79.0%). Moreover, 27% of the sample reported that caring for their spouse was burdensome. In addition, most caregivers reported not experiencing uncertainty (60.0%) or family conflicts (64.0%). Concerning sleep disturbances, the largest

proportion of participants reported no insomnia (39.0%), although a considerable number indicated experiencing insomnia occasionally (38.0%).

Do you experience fatigue?	
Yes	69(69.0%)
No	31(31.0%)
Do you feel your life is restricted?	
Yes	53(53.0%)
No	47(47.0%)
Are you informed about HD?	
Very	29(29.0%)
Enough	58(58.0%)
A little	13(13.0%)
Is caring for spouse a burden to you?	
Yes	27(27.0%)
No	73(73.0%)
Difficulties coordinating the patient's healthcare needs?	
No	79(79.0%)
Yes	2(2.0%)
Sometimes	19(19.0%)
Have you experienced insomnia?	
No	39(39.0%)
Yes	23(23.0%)
Sometimes	38(38.0%)
Have you experienced future uncertainty?	
No	60(60.0%)
Yes	12(12.0%)
Sometimes	28(28.0%)
Have you experienced family conflicts?	
No	64(64.0%)
Yes	10(10.0%)
Sometimes	26(26.0%)

Table 2: *Distribution of the sample according to their self-reports (n=100)*

2.2 Measurement of anxiety

From 3, regarding anxiety it is observed that the mean anxiety score was 57.8 (SD = 11.5), indicating mild-to-moderate levels of anxiety among caregivers according to the Zung Self-Rating Anxiety Scale. Although the average score remained within the mild-to-moderate range, it approached the upper threshold of this category, suggesting a considerable degree of psychological distress among participants.

Table 3: *Measurement of anxiety (n=100)*

	Mean (SD)
Anxiety (Range 20-80)	57.8(11.5)

3.2 Statistic results

Factors associated with anxiety

Table 4 presents the association of participants' characteristics with their anxiety. Anxiety was found to be statistically significantly associated to whether the patient reported to have fatigue (p=0.050), to lead a restrictive life (p=0.044), to be informed about HD (p=0.008), to perceive caring for spouse as a burden (p=0.027), to have difficulties coordinating the patient's healthcare needs (p=0.025), to have insomnia (p=0.003), to experience future uncertainty, (p=0.013) and had family conflicts (p=0.056).

More specifically participants who reported fatigue and those who reported leading a restrictive life experienced more anxiety (medians 37 and 37, respectively) than those who did not (median 32 and 31 respectively). Those who were less informed about HD had higher anxiety (median 41) than those who were “very or enough” informed (medians 33 and 31, respectively). Furthermore, those who reported caregiving for spouse as a burden had more anxiety (median 40) than who did not (median 33). In addition, patients who reported difficulties coordinating the patient’s healthcare needs, those who had insomnia, those who experienced uncertainty about future had higher anxiety and those who reported family conflicts (median 57.5, 48, 36, and 38, respectively).

Table 4: *Factors associated with anxiety*

	Anxiety	Anxiety	Anxiety
	Mean (SD)	Median (IQR)	p-value
Gender			0.946
Male	35.7(11.4)	35(27-41)	
Female	36.3(12.8)	34(25-43)	
Age (years)			0.095
≤60	35.0(12.8)	31.5(24-42)	
61-70	33.1(10.4)	32.5(25-37.5)	
>70	39.5(12.1)	39(30-45.5)	
Job			0.138
Unemployed / Household	36.3(14.0)	32(25-42)	
Employed	32.7(11.3)	30(23-39)	
Pensioner	37.7(12.3)	36.5(26-44.5)	
Do you experience fatigue?			0.050
Yes	39.7(13.0)	37(31-46)	
No	34.4(11.7)	32(25-41)	
Do you feel your life is restricted?			0.044
Yes	38.2(12.2)	37(29-46)	
No	33.7(12.1)	31(24-41)	
Are you informed about HD?			0.008
Very	35.0(13.1)	33(25-43)	
Enough	34.5(11.5)	31(25-41)	
A little	45.4(10.2)	41(39-53)	
Is caring for spouse a burden to you?			0.027
Yes	42.2(13.9)	40(36-51)	
No	34.9(11.5)	33(25-41)	
Difficulties coordinating the patient’s healthcare needs?			0.025
No	34.9(10.9)	34(25-41)	
Yes / Sometimes	50.0(18.6)	57.5(31.5-64.5)	
Have you experienced insomnia?			0.003
No	34.7(11.3)	33(25-41)	
Yes / Sometimes	49.6(14.3)	48(41-63)	
Have you experienced uncertainty?			0.013
No	30.7(10.3)	25(23-39)	
Yes / Sometimes	37.7(12.4)	36(29-44)	
Have you experienced family conflicts?			0.056
No	34.8(12.8)	31(24-40)	
Yes / Sometimes	38.3(11.0)	38(30-45)	

4. DISCUSSION

The key findings of the present study indicated a psychological burden among caregivers of HD patients. In relation to the study objective, the results demonstrated that caregivers' anxiety was significantly associated with their self-reported variables.

Similar to the present findings, evidence from the literature supports the high prevalence of emotional burden among caregivers of HD patients. A relevant study conducted in Greece among 404 caregivers of HD patients reported that 30.2% experienced depression and 52% experienced anxiety.[11] In Greece evidence suggests that caregivers of HD patients report higher levels of emotional burden compared to those of patients receiving other therapies (kidney transplantation, peritoneal dialysis). Caregivers of HD patients experience greater symptoms of depression and anxiety, indicating a substantial psychological impact associated with the ongoing demands of care.[12] Accordingly, a cross-sectional study by Shukri et al.,13 among 340 caregivers of hemodialysis patients in Terengganu, Malaysia found that 35.9% experienced high levels of anxiety. Likewise, a cross-sectional study conducted by Bawazier et al.,14 among 100 caregivers of HD patients at a national referral hospital in Indonesia reported that 28% experienced anxiety and 18% experienced depression. Similar findings have been reported in a cross-sectional study conducted in Indonesia among 104 family caregivers of HD patients. The authors found that 25% and 9.6% of the sample presented clinically significant symptoms of anxiety and depression, respectively. Furthermore, caregiver burden was positively associated with anxiety and depression and indirectly affected quality of life through psychological distress.[15]

While documenting the prevalence and severity of anxiety among caregivers is important, a deeper understanding of the mechanisms underlying caregiver distress is essential, as its consequences may extend beyond caregivers themselves and influence patient outcomes. Evidence regarding chronic illness indicates that poorer caregiver mental health is independently associated with an increased risk of mortality among patients, even after adjustment for important patient- and caregiver-related factors. This association may be explained by several interrelated pathways. High caregiving demands may contribute to emotional and physical exhaustion, potentially diminishing caregivers' ability to provide effective care. This, in turn, may adversely affect treatment adherence, timely recognition of health status changes, and appropriate utilization of healthcare services. Furthermore, deterioration in patients' health may increase caregiving demands, creating a self-reinforcing cycle of distress. Consequently, early identification of caregiver psychological distress is crucial, as timely interventions may help maintain caregivers' quality of life, strengthen their coping resources, and ultimately support optimal patient care.[15] Therefore, future research should move beyond the mere assessment of anxiety prevalence and focus on identifying the pathways through which caregiver distress develops and influences both caregiver and patient outcomes. A better understanding of these mechanisms may provide a stronger foundation for the development of targeted interventions aimed at reducing caregiver anxiety and promoting psychological well-being.[16]

According to the results of the present study, higher anxiety had participants who reported fatigue, to lead a restrictive life, to be less informed about HD, to perceive caregiving as a burden, as well as those who reported difficulties coordinating the patient's healthcare needs, insomnia, uncertainty about future and having family conflicts. Therefore, caregivers' anxiety is influenced by a wide range of factors. Pio et al.,15 supported that factors associated with increased caregiver burden include older caregiver age, female gender, being a spouse, lower educational attainment, lower socioeconomic status, a greater number of hours devoted to caregiving, and prolonged caregiving duration. Beyond these factors, caregiving has been associated with adverse social and emotional consequences, including stress, social isolation, deteriorated family relationships, fatigue, reduced independence, lack of confidence, and financial difficulties. Collectively, these factors may contribute to elevated anxiety levels among caregivers, highlighting the need for comprehensive psychosocial support strategies.[15] Close relatives of patients experience a continuous process of balancing emotional, ethical, and practical demands while accompanying their loved ones through the progression of illness. As the patient's health deteriorates, caregiving responsibilities increase, often accompanied by moral distress and emotional strain. These challenges highlight the critical role of healthcare professionals in providing tailored support, recognizing individual needs and resources and facilitating open communication.[17,18]

A noticeable finding is that caregivers who reported difficulties coordinating the patient's healthcare needs experienced anxiety. Caregivers often need to navigate and interact extensively with the healthcare system. These interactions include scheduling medical appointments, communicating with healthcare professionals, obtaining medications, managing insurance-related issues, and dealing with complex procedures. Furthermore, the healthcare system encompasses a wide range of physicians, nurses, therapists, pharmacists, administrative staff, insurance providers (both private and public), hospitals, clinics, pharmacies, and long-term care facilities. Within this context, caregivers frequently assume the role of patient advocates, particularly when conflicts arise in the pursuit of optimal care for their relatives.[19]

One more remarkable finding is that participants who reported conflicts with HD patients had more anxiety. Martire et al.,20 suggest that the management of chronic illness within close relationships may involve complex interpersonal dynamics, as patients are expected to engage in extensive self-management while caregivers often play a supportive role. This interaction may lead to tensions or disagreements regarding treatment adherence, lifestyle changes, and daily disease management, highlighting the potential for relational strain within patient–caregiver dyads.

Higher anxiety had participants who reported to be less informed about HD. Provision of information is a key component of shared decision-making and active involvement in care. However, the nature and delivery of information may vary depending on patient needs and may change over time.[21]

Educational, supportive, and behavioral interventions may enhance caregivers' coping abilities, psychological adjustment, and overall well-being. Therefore, healthcare services should provide education, counseling, and psychosocial support while addressing practical challenges, including financial strain, employment obligations, and transportation difficulties.[15,18]

Consideration of potential confounding variables is essential for accurately identifying factors associated with caregiver anxiety and minimizing biased interpretations of study findings. Previous research has shown that patient-related characteristics, including lower income, multiple comorbidities, and reduced self-care ability, may increase the physical and psychological demands placed on caregivers, thereby contributing to higher levels of anxiety.[15] In the present study, the predominance of female caregivers (62%) reflects the typical caregiving population reported in the literature, although it may limit the generalizability of the findings. In addition, several caregiving-related factors may influence anxiety levels, such as duration and intensity of caregiving, and the availability of social support

Limitations of the study

The present study was of cross-sectional design and there was no evidence of causal relationship between the variables under evaluation. The method of convenience sampling in a single center in Attica is not representative of all caregivers of HD patients living in Greece, thus limiting the generalizability of the results. The study sample was relatively small although several significant associations were found. Other additional limitations were the absence of a second measurement in time which would allow any significant differences to emerge. Moreover, data were collected from a single dialysis center in Attica, which may limit the applicability of the results to other healthcare settings. Differences in organizational practices, patient populations, and care delivery models across dialysis centers may influence caregiver experiences and anxiety levels. Finally, the interpretation of the findings should be considered in light of the literature review strategy, which was restricted to studies published in English and Greek and indexed in selected electronic databases, potentially limiting the inclusion of all relevant evidence.

CONCLUSIONS

Anxiety was significantly associated with caregivers' self-reports, including fatigue, restrictive lifestyle, low level of information regarding HD, perceived caregiving as a burden, difficulties in coordinating healthcare needs, insomnia, future uncertainty, and family conflicts.

With increasing life expectancy family caregivers are expected to remain the primary source of care for many HD patients.

Interventions aimed at reducing caregiver burden and strengthening coping resources represent an important area for healthcare investment globally. In this context, identifying factors associated with anxiety may facilitate the development of targeted and effective interventions to improve caregivers' mental health and overall well-being. Further large-scale, multicenter studies are needed to investigate individual and environmental factors that may

influence caregiver anxiety and to improve the generalizability of findings across different populations and healthcare settings.

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