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Impact of Stress, Anxiety, and Depression on Chronic Kidney Disease and its Effects on Quality of Life

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ABSTRACT

Objectives: This study aimed to evaluate the levels of stress, anxiety, and depression in patients with chronic kidney disease (CKD) and examine their impact on quality of life (QOL).

Material and Methods: The study conducted at KIMS-Saveera in Anantapur focused on 400 individuals diagnosed with CKD. To gather information, an online survey using Google Forms was employed. This survey included questions about health, as well as assessments using the Depression, Anxiety, and Stress Scale-21 to understand mental well-being and the kidney-related QOL scale to evaluate the QOL related to kidney disease.

Results: The survey revealed that 300 males and 100 females participated in the study, and most of the participants had moderate levels of depression (41.3), anxiety (37.5), and stress (31.7). Notably, a significant negative correlation was observed between age and psychological health (PHC) ($r = -0.198$, $n = 400$, $P = 0.004$).

Conclusion: This study revealed that stress, anxiety, and depression moderately impact the QOL for CKD patients. The findings underscore the importance of considering mental health factors in the overall care of individuals and emphasizing a holistic approach to address both physical and emotional well-being.

Keywords: Chronic kidney disease, Quality of life, Depression, anxiety, and stress scale-21, Kidney-related quality of life, End-stage renal disease

INTRODUCTION

Chronic kidney disease (CKD) poses a worldwide health challenge, marked by a gradual and irreversible deterioration in kidney function. This decline is frequently associated with persistent and longstanding disease, making CKD a significant and enduring health concern on a global scale.[1,2] With over 750 million people affected worldwide, CKD has emerged as a major public health issue.[3] In India, the swift progression of CKD to end-stage renal disease (ESRD) is attributed to inadequate medical facilities and delayed diagnoses, leading to poor control of risk factors.[4] The transition from pre-dialysis management to renal replacement therapy (RRT), which includes treatments such as dialysis or kidney transplantation, is a critical phase in the course of CKD. This transition can be emotionally challenging for individuals, as it involves significant lifestyle changes and ongoing medical interventions. The psychological impact of this shift can lead to increased vulnerability to anxiety and mood disorders, exacerbating existing mental health issues.[5,6]

Furthermore, the association between CKD and psychiatric disorders is noteworthy. Hospitalizations due to psychiatric disorders are more common among CKD patients compared to those with other chronic diseases.[7] This underscores the importance of addressing not only the physical aspects of CKD but also the mental health and well-being of individuals undergoing treatment.[8] Efforts to improve the management of CKD should encompass not only medical interventions but also comprehensive support for patients' mental health. This includes timely diagnosis, access to adequate medical facilities, and strategies to mitigate the psychological burden associated with the progression of the disease and the transition to RRT. A holistic approach that considers both physical and mental health aspects is crucial in improving the overall well-being of individuals affected by CKD.

Depression is an emotional condition marked by both somatic and cognitive symptoms, which may manifest as feelings of sadness, worthlessness, sleep disturbances, loss of appetite, and diminished interest in regular activities.[9] The onset of depression can lead to unfavorable clinical outcomes due to its impact on dialysis and medication adherence. In addition, it can influence the immune system's functioning and have detrimental effects on nutritional status.[10]

Anxiety is characterized as an emotional state involving heightened fear, uncertainty, helplessness, and a sense of impending threat.[9] The presence of both depression and anxiety is linked to negative outcomes, including progression to ESRD and a high mortality rate.[3] Stress is described as a type of disturbance that induces physical, emotional, or psychological strain. Extended hospitalization for renal disease treatment leads to considerable stress.[10]

Financial dependence, an inability to meet family responsibilities, and a diminished active social life have been identified as factors contributing to a lower quality of life (QOL) among long-term hemodialysis patients.[11] In the field of nephrology, the concept of QOL has gained recognition as a significant patient-reported outcome. A substantial percentage, ranging from 60% to 97%, of patients undergoing hemodialysis report experiencing fatigue, which has a detrimental effect on their QOL.[12]

Depression in hemodialysis patients is linked to various factors, including gender, marital status, ethnicity, QOL, acceptance of the illness, dialysis shift, and anxiety.[13] Notably, depression is often underdiagnosed due to its similarities with concurrent uremic symptoms such as anorexia, fatigue, and sleep disorders.[14] The study seeks to evaluate stress, anxiety, and depression in CKD, examining their collective impact on the overall QOL.

MATERIAL AND METHODS

At the beginning of the study, a cross sectional survey was done at the Nephrology department in a tertiary care hospital, employing an online mode. The research received approval from the Institutional Review Board (RIPER/IRB/PP/2022/006) and commenced after obtaining informed consent from participants. The study focused on individuals aged over 18 years diagnosed with CKD with comorbidities and undergoing dialysis. Exclusion criteria encompassed individuals unwilling to participate in the survey and those diagnosed with bipolar and mood disorders. A sample size of 425 was estimated, considering a 50% CKD prevalence, a 4% margin of error, and a 1% design effect at a 95% confidence level. With a 10% non-response rate, 450 responses were targeted, and 400 were included in the final analysis after eliminating 50 due to errors and incomplete data.

The study procedure involved providing respondents with a link to a Google questionnaire form. Before entering the online survey, participants were asked to express their willingness to participate by opting "yes" through platforms such as WhatsApp, Facebook, and Twitter. The questionnaire covered sociodemographics, Depression, Anxiety, and Stress Scale-21 (DASS-21), and Kidney Disease QOL-36 (KDQOL-36).

Data sources

The study gathered sociodemographic information, covering aspects such as age, gender, marital status, education, domicile, smoking and alcohol habits, allergies, history of comorbidities, and the duration of kidney disease. To assess stress, anxiety, and depression, the DASS-21 scale was employed, consisting of 21 questions across three domains, and participants' responses were scored according to the Lovibond DASS-21 criteria. In addition, the study utilized the KDQOL-36 questionnaire, a widely employed tool used for measuring the QOL in kidney disease patients, encompassing domains such as 12-Item Short Form survey (SF-12), the burden of kidney disease, symptoms/problems of kidney disease, and the effect of kidney disease. Scoring for the KDQOL-36 was done following the RAND-36 item health survey guidelines.[15]

Statistical analysis

For this study, data collection utilized Google Forms, and data cleaning and organization were performed in Microsoft Excel. Statistical analysis was conducted using IBM SPSS statistics version 29.0.0.0. Pearson's correlation was employed to explore the relationships between sociodemographic variables and scales measuring depression, anxiety, stress, and KDQOL. Descriptive statistics, including frequency and percentage, were employed to summarize sociodemographic

information, DASS scale scores, and data related to comorbidities associated with CKD.

RESULTS

A total of 400 responses were collected for this study. The demographic distribution indicates that the majority of respondents were aged above 50 years, comprising 52.25% of the sample, followed by those in the age range of 41–50 years at 24.25%, 31–40 years at 14.5%, and a smaller percentage in the 21–30 years category at 9.0%. By gender, the data suggest a predominance of male respondents, accounting for 75.0% of the total responses. Regarding the duration of kidney disease, the highest frequency was observed in the 6-month to 3-year range, with 202 respondents constituting 50.5% of the total sample. The detailed distribution of all the variables among respondents is presented in Table 1.

Table 1: Sociodemographic characteristics.

Characteristic	Frequency	Percentage
Age		
21–30	36	9
31–40	58	14.5
41–50	97	24.25
>50	209	52.25
Gender		
Male	300	75
Female	100	25
Domicile		
Rural	206	51.5
Urban	194	48.5
Education		
Literate	180	45
Illiterate	220	55
Alcohol		
Yes	204	51
No	196	49
Smoking		
Yes	146	36.5
No	131	32.75
Duration of kidney disease		
<1 Month	14	3.5
1 Month–5 Months	127	31.75
6 Months–3 Years	202	50.5
4 Years–9 Years	42	10.5
>10 Years	16	4

The DASS-21 scores, as illustrated in Table 2, reflected the psychological well-being of the participants during the study period. The data revealed that the majority of respondents fall into the moderate category of depression (41.3%), anxiety (37.5%), and stress (31.7%).

Table 3 shows that there is a moderate negative correlation between depression, anxiety, stress ($P = 0.003$, $P = 0.044$, $P = 0.002$), and subscales of KDQOL, and it is statistically significant, as there is a decrease in kidney health conditions increase in psychological conditions.

The results in Table 4 reveal that age is a significant predictor of depression; with an increase in age, depression ($P = 0.00^*$) tends to increase. In addition, there is a significant negative correlation between physical health and mental health conditions ($P = 0.004^*$, $P = 0.002^*$), implying that as age increases, overall health tends to decrease. A moderate positive correlation exists between the duration of kidney disease and kidney health conditions ($P = 0.001$). The result of this study shows that as the duration of kidney disease and increases, the effect on kidney health tends to increase.

The health status presented in Table 5 has been obtained through the analysis of the SF-36. The survey is a tool widely used to assess various dimensions of health-related QOL. The results indicates the majority of patients fall into the category of moderate health conditions 42% of the total. Following this, 32.5% of patients were categorized as having poor health, while 29% were classified as having good health.

DISCUSSION

The study's primary goal was to assess symptoms of stress, anxiety, and depression in individuals with CKD and their impact on overall QOL. Notably, research is scarce on the psychological aspects of CKD. The study suggests that CKD, with few studies specifically addressing depression, anxiety, and stress, and even fewer exploring their collective influence on the overall QOL for CKD patients. This highlights the research's significance in contributing to this knowledge. In the present study, patients experience a moderate impact on depression, anxiety, and stress. This higher incidence could be attributed predominantly to elder participants, placing them at an elevated risk for ESRD, whereas the study conducted by Pai *et al.*[16] involving 95 patients found that hemodialysis patients exhibited no abnormal psychological mental states but did display mild mood changes related to stress and anxiety, with no signs of depression. Our results may due to several factors, such as regular hospital visits for treatment procedures, the stress of undergoing dialysis, financial distress, and because most of the participants are from a rural background (51.5%) and possibly experiencing transportation burden, resulting in their psychological wellbeing and overall QOL being affected.

The outcomes of our study revealed that a significant portion of the participants exhibited moderate levels of depression (41.3), anxiety (37.5), and stress (31.7). These findings support the study conducted by Nagar *et al.*[5], which reported that 50% of their subjects showed moderate levels of depression, anxiety, and stress. The findings of the study might be due to the prolonged duration of kidney disease,

Table 2: The occurrence of depression, stress, and anxiety among chronic kidney disease.

	Stress		Anxiety		Depression	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Normal	78	19.5	46	11.5	16	4.0
Mild	115	28.7	69	17.3	20	5.0
Moderate	127	31.7	150	37.5	165	41.3
Severe	47	11.0	123	30.8	77	19.3
Extremely severe	33	8.2	12	3.0	122	30.5

Table 3: Correlation of depression, stress, and anxiety with subscales of kidney disease quality of life.

Variables	PHC		MHC		KDHC	
	r-value	*P*-value	r-value	*P*-value	r-value	*P*-value
Depression	−0.093	0.173	−0.177	0.010*	−0.151	0.003*
Anxiety	0.019	0.783	−0.078	0.259	−0.138	0.044*
Stress	−0.196	0.004*	−171	0.012*	−0.182	0.002*

**P*-value is significant at the <0.05 level. PHC: Physical health components, MHC: Mental health components, KDHC: Kidney disease health components

Table 4: Correlation of demographics with depression, anxiety, stress, and subscales of kidney disease quality of life.

Variables	Anxiety	Stress	Depression	PHC	MHC	KDHC
Age						
r-value	0.295	0.428	0.366	−0.198	−0.412	−0.352
P-value	0.126	0.062	0.00*	0.004*	0.002*	0.658
Gender						
r-value	0.06	0.127	−0.012	−0.101	−0.01	0.27
P-value	0.38	0.063	0.865	0.143	0.886	0.695
Domicile						
r-value	−0.022	0.069	0.076	−0.047	−0.118	0.14
P-value	0.754	0.318	0.269	0.49	0.085	0.841
Education						
r-value	−0.004	0.77	0.065	0.064	−0.102	−0.006
P-value	0.951	0.26	0.345	0.351	0.138	0.925
Alcohol						
r-value	−0.049	−0.041	−0.046	−0.429	0.32	0.425
P-value	0.477	0.548	0.501	0.143	0.577	0.277
Smoking						
r-value	0.004	−0.033	0.004	−0.103	0.123	−0.22
P-value	0.958	0.627	0.949	0.135	0.073	0.747
Duration of kidney disease						
r-value	−0.091	−0.049	−0.023	−0.035	−0.1	0.332
P-value	0.184	0.472	0.734	0.612	0.143	0.001*

*Correlation is significant at 0.01 level, PHC: Physical health components, MHC: Mental health components, KDHC: Kidney disease health components

ranging from 6 months to 3 years (50.5). The prolonged duration of kidney disease might contribute to an increase in psychological symptoms, given the progression of CKD to ESRD.

In our investigation, it was observed that individuals >50 years (50.25) tend to experience depression, particularly male respondents. These findings contrast with a study conducted by Mosleh *et al.*[17], which reported that females were more prone to anxiety symptoms (P = 0.04), and older people were significantly associated with depression (P = 0.031). The outcomes of our study regarding the correlation of demographic profiles with the subscales of KDQOL show a negative correlation of age with PHC and MHC (P = 0.004, P = 0.002). This suggests that as age increases, both physical and mental health conditions tend to decrease. However, a study conducted by Cunanan *et al.*[18] found a correlation

Table 5: Health status of chronic kidney disease patients.

Health status	Frequency	Percentage
Good	116	29
Moderate	168	42
Poor	130	32.5

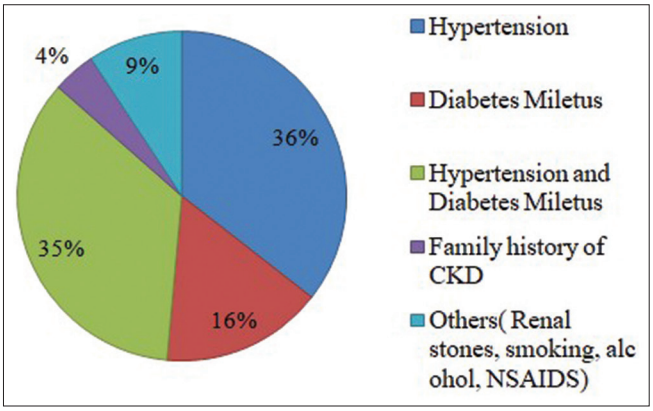

Figure 1: Graphical representation of comorbidities of chronic kidney disease patients, CKD: Chronic kidney disease, NSAIDs: Non-steroidal anti-inflammatory drugs.

between age and physical health (P = 0.012) but not with mental health. The dissimilar findings between our study and Cunanan *et al.* could be attributed to various factors, such as differences in the study population, methodologies, or prevalence of specific comorbidities.[18] In our study, a significant portion of the participants (35%) had both hypertension and diabetes mellitus [Figure 1], which might be a contributing factor to the observed reduction in overall QOL [Figure 1].

The study conducted by Syamsiah *et al.* on the relationship between depression and QOL in patients undergoing dialysis[3] determined a statistically significant link between depression and QOL, the study results suggested that patients undergoing hemodialysis experienced a moderate QOL. In contrast, our study showed that subjects had moderate QOL. This outcome might be attributed to the fact that individuals with CKD in the final stage are required to undergo regular dialysis, which imposes a substantial burden on them. The regularity of dialysis sessions, coupled with the challenges associated with end-stage CKD, could contribute to the observed moderate QOL compared to patients with diabetes or malignancies.

CONCLUSION

The study findings show that the majority of elder participants are prone to depression, followed by anxiety and stress. The study also concluded that depression, anxiety, and stress-related symptoms had shown moderate effects on QOL. These findings show that it is important for doctors and healthcare professionals to pay attention not only to the physical aspects of kidney disease but also to the emotions and psychological conditions of patients. This could serve as a starting point for further investigations to understand the root causes and potential risk factors contributing to these mental health levels. Emphasizing the importance of early diagnosis and intervention, it underscores the potential for improving QOL and implementing mental health programs and awareness campaigns to address the mental well-being of the community.

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Ethical approval

The research/study is approved by the Institutional Ethics Committee of Raghavendra Institute of Pharmaceutical Education and Research, Via Number RIPER/IRB/PP/2022/006, dated 29th July 2022.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The author(s) confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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