

Anxiety Among Chronic Kidney Disease Patients Undergoing Hemodialysis Therapy: A Cross-Sectional Study In A Tertiary Care Center

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How to cite this article: Nilesh Mhaske, Heera Jayasheela (2024) Anxiety Among Chronic Kidney Disease Patients Undergoing Hemodialysis Therapy: A Cross-Sectional Study In A Tertiary Care Center. *Library Progress International*, 44(3), 16917-16925

Abstract

Background. Chronic Kidney Disease (CKD) is a progressive condition that often leads to end-stage renal disease (ESRD), necessitating regular hemodialysis treatment. Patients may experience anxiety and stress during the hemodialysis process, which may hurt their general health and adherence to therapy. **Method:** This prospective, cross-sectional, observational research study was conducted to assess the levels of anxiety among chronic kidney disease (CKD) patients undergoing hemodialysis therapy. The study was conducted among the 100 selected patients through stratified random sampling at selected hospitals in the Ahmednagar district. The Hamilton Anxiety Rating Scale (HAM-A) and Patients Experience Questionnaire were administered, and demographic and clinical data was collected from medical records and personal interview techniques. Frequency and percentage descriptive analysis were utilized to find out the demographic and clinical data. Chi-square test was utilized to find out the association with anxiety levels among the dialysis patients. **Results.** A significant portion of patients, 55%, experienced moderate (55%) to mild (43%) anxiety, with a mean anxiety score of 29.4 and a standard deviation of 4.404, indicating moderate anxiety levels overall. There were no significant correlations between anxiety level and any of the demographic or clinical variables. **Conclusions.** This study's findings suggest that anxiety among CKD patients is influenced by a complex interplay of factors beyond the scope of the variables examined in this study.

Keywords: Anxiety, Chronic Kidney Diseases, Hemodialysis, Therapy, Tertiary Care Center

Introduction:

Chronic kidney disease (CKD) is a long-standing debilitating medical condition. Hemodialysis patients with chronic kidney disease (CKD) may develop anxiety and depression symptoms due to a variety of medical and psychosocial reasons.¹ Regardless of the reason, glomerular filtrate rate <60 ml/min/1.73 m² for three months or longer is indicative of chronic kidney disease (CKD), a progressive renal impairment.²

Up to 10% of adults worldwide have CKD, which is invariably irreversible. The global burden of CKD is rising, and it is projected to become the 5th most common cause of years of life lost globally by 2040.³

In India, given its population >1 billion, the rising incidence of CKD is likely to pose major problems for both healthcare and the economy in future years. Indeed, it has been estimated that the age-adjusted incidence rate of ESRD in India is 229 per million population, and >100,000 new patients enter renal replacement programs annually in India.⁴

Reducing blood levels of urea, creatinine, and other harmful chemicals is the goal of hemodialysis. Hemodialysis can be uncomfortable and hurt family relations, socioeconomic status, and spiritual, psychological, and physical health. Effect Haemodialysis's psychological impacts will impact one's social, emotional, and spiritual well-being. Anxiety is one of the psychological effects that result.⁵

Anxiety is an unpleasant mental condition that appears as fear and unwelcome, stressful bodily symptoms. While these symptoms are a typical and acceptable reaction to stress, they turn pathological if they outweigh the stressor's severity, persist after the stressor has subsided, or arise when there is no external stressor present.⁶

Taking care of Anxiety is a critical concern for healthcare providers. Numerous studies attest to the high rates of anxiety among CKD patients. Anxiety is thought to affect 23.7% of CKD patients. Furthermore, dialysis-dependent CKD patients have a higher chance of developing Anxiety (34.5%) than do non-dialysis-dependent patients (13.3%).⁷

In patients with end-stage renal disease (ESRD) receiving hemodialysis (HD), anxiety is a prevalent but usually disregarded mental health complaint. Uncertainty, dread, and terror are disruptive emotions that define anxiety.⁸

Anxiety disorders can present as a wide range of common medical issues, such as palpitations, tremors, indigestion, numbness or tingling, uneasiness, shortness of breath, diaphoresis, and terror. Before diagnosing these symptoms as an anxiety disorder, the doctor must rule out a number of medical problems, such as lung, cardiovascular, and neurological disorders. Furthermore, there is a great deal of overlap between the symptoms of uremia, depression, and anxiety.⁸

Patients' thoughts about their quality of life are significantly negatively impacted by this mental illness. Many of the seemingly irrational behaviors of patients, or behaviors that put them in conflict with staff and physicians, like behavioral noncompliance, may be the expression of an underlying anxiety disorder. Little is known about the prevalence and impact of anxiety disorders in patients with ESRD treated with HD. Three clinical vignettes that highlight the effects of anxiety disorders on patients with ESRD receiving HD treatment are presented in this review.⁹

Anxiety, on the other hand, has been linked to an increase in co-morbidities, a longer time of hospitalization, and a decrease in vitality.¹⁰

In addition, different studies have assessed the role of socio-demographic variables in hemodialysis patients, reporting that age, gender, residence, economic, job and marital status, influence the quality of life of hemodialysis patients.¹¹

This study was carried out by researchers to find out how common anxiety is among hemodialysis patients. The purpose of this research is to evaluate the relationship between these patients' sociodemographic characteristics and the prevalence of anxiety disorders.

Method: This prospective, cross-sectional, observational research study was conducted to assess the levels of anxiety among chronic kidney disease (CKD) patients undergoing hemodialysis therapy. The study was conducted among the 100 selected patients through stratified random sampling at selected hospitals in the Ahmednagar district. The Hamilton Anxiety Rating Scale (HAM-A) and Patient Experience Questionnaire were administered, and demographic and clinical data was collected from medical records and personal interview techniques. Frequency and percentage descriptive analysis were utilized to find out the demographic and clinical data. A chi-square test was utilized to find out the association with anxiety levels among the dialysis patients.

Results:

Findings Related to Frequency and Percentage of Demographic and Clinical Variables of Participants.

Table: 1 Frequency and Percentage of Demographic Variables

n= 100

Sr. No.	Demographic Variable	Frequency (F)	Percentage (%)
1	Age in years		
	a) Above 18 to 27	10	10%
	b) 28 to 37	16	16%
	c) 38 to 47	46	46%
	d) 48 to 57	28	28%
2	Gender		
	a) Male	34	34%
	b) Female	66	66%
3	Marital status		
	a) Married	89	89%
	b) Unmarried	11	11%
4	Educational Qualification		
	a) Illiterate	40	40%
	b) Primary education	38	38%
	c) Higher secondary education	6	6%

	d) Graduate	10	10%
	e) Postgraduate	6	6%
5	Occupation		
	a) Housewife	20	20%
	b) Daily wages	5	5%
	c) Private Employee	19	19%
	d) Govt. Employee	20	20%
	e) Business	2	2%
	f) Agriculturist	34	34%
6	Type of family		
	a) Nuclear	51	51%
	b) Joint	42	42%
	c) Extended	7	7%
7	Income		
	d) Upper Middle Class (Rs. >7533 and above)	24	24%
	e) Upper Middle Class (Rs. 3766 – Rs.7532)	33	33%
	f) Middle Class (Rs. 2260 – Rs. 3765)	20	20%
	g) Lower Middle Class (Rs. 1130 – Rs. 2259)	23	23%
8	Place of residence		
	a) Rural	50	50%
	b) Semi-urban	42	42%
	c) Urban	8	8%
9	Distance from hospital		
	a) 5 Km	1	1%
	b) 10 Km	35	35%
	c) 15 Km	35	35%
	d) More than 15 Km	29	29%
10	Health Insurance		
	a) Employee Insurance	66	66%
	b) Self	34	34%

Table 1 shows the demographics of 100 participants. Most are 38 to 47 years old (46%), followed by 48 to 57 (28%), 28 to 37 (16%), and 18 to 27 (10%). Females outnumber men 66% to 34%. Marriage status shows 89% of participants are married and 11% are single. 40% of participants are illiterate, 38% have elementary education, 6% each have upper secondary and postgraduate education, and 10% are graduates. Agriculture is the main occupation (34%), followed by housewives (20%), government employees (20%), private employees (19%), daily wage workers (5%), and business people (2%). Nuclear families make up 51%, joint families 42%, and extended families 7%. With 33% in the upper-middle class (Rs. 3766 – Rs. 7532), 24% above Rs. 7533, 23% in the lower middle class (Rs. 1130 – Rs. 2259), and 20% in the middle class, income levels vary. Half of the participants live in rural regions, 42% in semi-urban, and 8% in metropolitan areas. 1% live within 5 miles of the hospital, 35% between 10 and 15 km, and 29% more than 15 km. Finally, 66% have employee insurance and 34% self-insurance. This demographic breakdown helps explain the study's conclusions.

Table: 2 Frequency and Percentage of Clinical Variables

n= 100

Sr. No.	Clinical Characteristics	Frequency (F)	Percentage (%)
1	Co-morbid illness		
	a) Cardiac disease	15	15%
	b) Diabetes	9	9%

	c) Hypertension	54	54%
	d) Diabetes and hypertension	15	15%
	e) Other	7	7%
2	Number of HD sessions per week		
	a) Once in a week	0	0%
	b) Twice in a week	86	86%
	c) Thrice in a week	14	14%
3	Physical activity		
	a) Moderate	47	47%
	b) Sedentary	53	53%
4	Type of vascular access		
	a) Arteriovenous fistula	0	0%
	b) Arteriovenous graft	90	90%
	c) Central venous catheter	10	10%
5	Antihypertensive Medication		
	a) Angiotensin-converting enzyme inhibitors	16	16%
	b) Calcium channel blockers	19	19%
	c) Beta-blockers	19	19%
	d) Calcium channel blockers and Beta-blockers	46	46%

The health characteristics of the 100 participants in the study are comprehensively examined in the clinical variables table 2.

In terms of co-morbidities, 54% of participants have hypertension, 15% have cardiac disease, another 15% have both diabetes and hypertension, 9% have diabetes alone, and 7% report other ailments. In terms of the frequency of hemodialysis (HD) sessions per week, the majority (86%) undertake HD twice a week, while 14% have it thrice a week, and nothing has it once a week. The physical activity levels of the participants indicate that 53% maintain a sedentary lifestyle, while 47% participate in moderate physical activity. An arteriovenous graft is employed by a significant 90% of all vascular access types, while 10% employ a central venous catheter. An arteriovenous fistula is not used by any vascular access type. In terms of antihypertensive medication, 46% of participants are taking a combination of beta-blockers and calcium channel blockers. Of the remaining individuals, 19% utilize calcium channel blockers and beta-blockers exclusively, while 16% utilize angiotensin-converting enzyme inhibitors.

Findings Related to levels of anxiety among CKD patients undergoing hemodialysis.

Table: 3 Frequency and Percentage of levels of anxiety among CKD patients undergoing hemodialysis.

n= 100

Anxiety Level	Frequency (F)	Percentage (%)
Minimal Anxiety (0 - 14)	0	0%
Mild Anxiety (15 - 28)	43	43%
Moderate Anxiety (29 - 42)	55	55%
Severe Anxiety (43 - 56)	2	2%
Total	100	100%

Table 3, which illustrates the anxiety levels of 100 chronic kidney disease (CKD) patients who are undergoing hemodialysis, offers a glimpse into the psychological health of the participants. None of the participants reported experiencing negligible anxiety, as evidenced by a frequency of 0%. The majority of

patients, 55%, experienced moderate anxiety, while 43% of them experienced mild anxiety. 2% of the participants reported experiencing severe anxiety.

This distribution emphasizes that a substantial number of CKD patients who are undergoing hemodialysis experience moderate to minor levels of anxiety, with only a small number of patients experiencing severe anxiety. To guarantee a thorough comprehension of the anxiety levels in this population, the total sample size for this assessment is 100.

Table: 4 Central Tendency of levels of anxiety among CKD patients undergoing Hemodialysis
n= 100

	Mean (M)	Standard Deviation (SD)
Anxiety Level	29.4	4.404

The central tendency of anxiety levels among 100 chronic kidney disease (CKD) patients undergoing hemodialysis is summarized in the table, which offers critical statistical insights into their psychological well-being. The participants' mean anxiety score is 29.4, suggesting a propensity for moderate anxiety within the group. The variability in apprehension scores among the patients is indicated by the standard deviation of 4.404. This statistical analysis emphasizes the widespread anxiety that CKD patients experience while undergoing hemodialysis, as well as the degree of variability that exists within the population.

Findings Related to the association of levels of anxiety among CKD patients undergoing hemodialysis with their selected Demographic and Clinical Variables.

Table: 5 Chi-Square Association of levels of anxiety among CKD patients undergoing hemodialysis with their selected Demographic Variables

n= 100

Sr. No.	Demographic Variable	F	Level of Anxiety			df	χ^2 Value	p-value
			Mild	Moderate	Severe			
1	Age in years					6	4.457	0.615
	a) Above 18 to 27	10	4	6	0			
	b) 28 to 37	16	10	6	0			
	c) 38 to 47	46	20	25	1			
	d) 48 to 57	28	9	18	1			
2	Gender					2	2.624	0.269
	a) Male	34	12	22	0			
	b) Female	66	31	33	2			
3	Marital status					2	3.986	0.136
	a) Married	89	40	48	1			
	b) Unmarried	11	3	7	1			
4	Educational Qualification					8	4.307	0.828
	a) Illiterate	40	19	20	1			
	b) Primary education	38	15	22	1			
	c) Higher secondary education	6	2	4	0			
	d) Graduate	10	6	4	0			
	e) Postgraduate	6	1	5	0			
5	Occupation							

	a) Housewife	20	9	11	0	10	13.439	0.2
	b) Daily wages	5	0	4	1			
	c) Private Employee	19	10	9	0			
	d) Govt. Employee	20	10	10	0			
	e) Business	2	1	1	1			
	f) Agriculturist	34	13	20	2			
6	Type of family					4	2.002	0.735
	a) Nuclear	51	22	27	2			
	b) Joint	42	18	24	0			
	c) Extended	7	3	4	0			
7	Income					6	5.227	0.515
	d) Upper Middle Class (Rs. >7533 and above)	24	12	12	0			
	e) Upper Middle Class (Rs. 3766 – Rs.7532)	33	10	22	1			
	f) Middle Class (Rs. 2260 – Rs. 3765)	20	9	10	1			
	g) Lower Middle Class (Rs. 1130 – Rs. 2259)	23	12	11	0			
8	Place of residence					4	2.267	0.687
	a) Rural	50	22	26	2			
	b) Semi-urban	42	18	24	0			
	c) Urban	8	3	5	0			
9	Distance from hospital					6	3.548	0.738
	a) 5 Km	1	1	0	0			
	b) 10 Km	35	17	18	0			
	c) 15 Km	35	15	19	1			
	d) More than 15 Km	29	10	18	1			
10	Health Insurance					2	2.805	0.246
	a) Employee Insurance	66	25	39	2			
	b) Self	34	18	16	0			

The chi-square test results in Table 5 indicate that there is no significant association between the anxiety levels of 100 chronic kidney disease (CKD) patients who are undergoing hemodialysis and their designated demographic variables. The variables that were evaluated are as follows: age ($\chi^2=4.457$, $p=0.615$), gender ($\chi^2=2.624$, $p=0.269$), marital status ($\chi^2=3.986$, $p=0.136$), educational qualification ($\chi^2=4.307$, $p=0.828$), occupation ($\chi^2=13.439$, $p=0.200$), type of family ($\chi^2=2.002$, $p=0.735$), income ($\chi^2=5.227$, $p=0.515$), place of residence ($\chi^2=2.267$, $p=0.687$), distance from the hospital ($\chi^2=3.548$, $p=0.738$), and health insurance ($\chi^2=2.805$, $p=0.246$). Consequently, no statistically significant correlation was observed between anxiety levels and any of the demographic variables.

Table: 6 Chi-Square Association of levels of anxiety among CKD patients undergoing hemodialysis with their selected Clinical Variables

n= 100

Sr. No.	Clinical Characteristics	F	Level of Anxiety			df	χ^2 Value	p-value
			Mild	Moderate	Severe			

1	Co-morbid illness							
	a) Cardiac disease	15	7	8	0	8	7.962	0.437
	b) Diabetes	9	2	7	0			
	c) Hypertension	54	20	32	2			
	d) Diabetes and hypertension	15	9	6	0			
	e) Other	7	5	2	0			
2	Number of HD sessions per week							
	a) Once in a week	0	0	0	0	2	2.227	0.328
	b) Twice in a week	86	37	48	1			
	c) Thrice in a week	14	6	7	1			
3	Physical activity							
	a) Moderate	47	21	26	0	2	1.833	0.4
	b) Sedentary	53	22	29	2			
4	Type of vascular access							
	a) Arteriovenous fistula	0	0	0	0	2	0.399	0.819
	b) Arteriovenous graft	90	38	50	2			
	c) Central venous catheter	10	5	5	0			
5	Antihypertensive Medication							
	a) Angiotensin-converting enzyme inhibitors	16	7	8	1	6	4.784	0.572
	b) Calcium channel blockers	19	7	11	1			
	c) Beta-blockers	19	10	9	0			
	d) Calcium channel blockers and Beta-blockers	46	19	27	0			

According to the chi-square test results in Table 6, there is no statistically significant correlation between the anxiety levels of 100 chronic kidney disease (CKD) patients who are undergoing hemodialysis and their selected clinical variables. Variables that were evaluated included the number of hemodialysis sessions per week ($\chi^2=2.227$, $p=0.328$), co-morbid illness ($\chi^2=7.962$, $p=0.437$), physical activity ($\chi^2=1.833$, $p=0.400$), type of vascular access ($\chi^2=0.399$, $p=0.819$), and antihypertensive medication ($\chi^2=4.784$, $p=0.572$). Therefore, there were no statistically significant correlations between anxiety levels and any of the clinical variables.

Discussion:

According to the data, the majority of participants (46%) are between the ages of 38 and 47. This is consistent with earlier research showing that middle-aged people are more likely to participate in health-related studies, especially those that address chronic health disorders and long-term care. The idea that middle-aged and older people tend to participate in health interventions more frequently is further supported by the noteworthy percentage of participants (28%) who were in the 48–57 age range. This age group is more likely to be involved in healthcare studies because they experience a rising number of health challenges, particularly those related to lifestyle disorders (Smith et al., 2019; Anderson & Wong, 2018).¹²

The preponderance of rural areas, poor educational attainment, and dependence on agriculture highlight prevalent obstacles to healthcare access, particularly in settings with little resources. Furthermore, the large proportion of participants who were married, had health insurance, and were female highlights the complexity of healthcare consumption patterns in this population. The effects of these factors on clinical outcomes should be investigated further, with an emphasis on enhancing healthcare knowledge and accessibility for rural, lower-income communities.¹³

The data show that 54% of participants suffer from hypertension, making it the most prevalent comorbidity. This finding

is consistent with the well-established association between hypertension and end-stage renal disease (ESRD), as noted by Weir et al. (2019). Hypertension is not only a major cause of kidney failure but also complicates the management of patients on dialysis, leading to higher morbidity and mortality rates. Additionally, 15% of participants have both diabetes and hypertension, a combination that is particularly concerning due to its strong association with cardiovascular complications, as highlighted by Coresh et al. (2017).¹⁴

Diabetes alone affects 9% of participants, which is lower than what might be expected, given the strong link between diabetes and kidney disease. Hill et al. (2019) noted that diabetes is one of the leading causes of ESRD worldwide, and its presence in dialysis patients significantly worsens outcomes, including cardiovascular risk.¹⁵

The majority of participants (86%) undergo hemodialysis twice a week, while 14% receive dialysis thrice a week. This is consistent with current practice guidelines, which recommend at least three dialysis sessions per week for adequate clearance of toxins in patients with ESRD. However, the fact that a significant portion of participants receive only two sessions per week may indicate resource constraints, as suggested by Kalantar-Zadeh et al. (2021), who emphasized that reduced dialysis frequency is often linked to healthcare limitations in resource-poor settings.¹⁶

A significant proportion of participants (90%) use an arteriovenous (AV) graft as their vascular access for hemodialysis. This is somewhat unusual, as the KDOQI (2020) guidelines recommend arteriovenous fistulas (AVFs) as the first-line access due to their lower complication rates and longer patency compared to AV grafts and central venous catheters (CVCs). The absence of AVFs in this study raises questions about vascular access management. Lok et al. (2021) emphasized that AVFs have better long-term outcomes, including fewer infections and thromboses, and are associated with improved patient survival.¹⁷

19% of participants use calcium channel blockers or beta-blockers alone, while 16% utilize angiotensin-converting enzyme (ACE) inhibitors. The relatively low usage of ACE inhibitors might be due to concerns over hyperkalemia, a common complication in dialysis patients, as highlighted by Herzog et al. (2017).¹⁸

Conclusion:

The study's findings reveal that among the 100 chronic kidney disease (CKD) patients undergoing hemodialysis, a significant portion experienced moderate (55%) to mild (43%) anxiety, with a mean anxiety score of 29.4 and a standard deviation of 4.404, indicating moderate anxiety levels overall. The demographic analysis showed that the majority of participants were aged 38-47, female, married, and had low educational attainment, with most residing in rural areas and holding agricultural occupations. Clinically, hypertension was the most common comorbidity, with most patients undergoing hemodialysis twice a week and having arteriovenous grafts as vascular access. Despite these detailed demographic and clinical characterizations, the chi-square tests revealed no significant associations between anxiety levels and any specific demographic or clinical variables, suggesting that anxiety among CKD patients undergoing hemodialysis is influenced by a complex interplay of factors beyond the scope of the variables examined in this study.

Limitations: This study was limited only to patients undergoing hemodialysis therapy.

Ethics permission: The study was approved by the Ethics Review Committee (IEC) of PIMS-DU in Loni, Maharashtra.

Conflict of interest: The authors declare that they have no financial or other conflicts of interest.

Acknowledgment: The author would like to acknowledge everyone who participated for their proactive participation, cooperation, and interest in the study.

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