

Research Paper

A Cross-Sectional Study on Prevalence of Depression in CKD Patients at a South Indian Tertiary Care Hospital

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ABSTRACT

Background Information: Chronic Kidney Disease (CKD) is one of the major causes of deaths reported in India. Chronic illnesses like CKD can lead to psychological distress. However, there are very few studies that determine the association of Depression with CKD and its predisposing factors. This study aims at finding out the prevalence of Depression in Chronic Kidney Disease patients and its correlation with age, gender and renal parameters of the disease like serum creatinine and BUN. **Materials & Methods:** We used a cross sectional design to recruit 123 CKD patients who were undergoing conservative and dialysis treatment at a tertiary care hospital in India. The structured questionnaire used in this study gathered information on respondent demographic and depression characteristics, and information obtained from the HAM D (Hamilton Depression Assessment scale) and PHQ 9 (Patient Health Questionnaire). Factors associated with depression were examined by chi square test. The socioeconomic status was evaluated using kuppaswamy SES scale. **Statistical Consideration:** All the raw data was collected, entered in excel sheet 2009 in window 10 version, the statistical analysis was done in SPSS 64 BIT version software by Chi square test statistical method for knowing the significant P Value. **Results:** The prevalence of depression was 62.6% (n=77) and 67.48% (n=83) with respect to HAM-D and PHQ 9 respectively. Age of the patients ($P < 0.05$), Gender ($P < 0.01$), and serum creatinine levels ($P = 0.02$, $P = 0.05$ with HAM-D and PHQ 9 respectively), BUN ($p=0.032$, $p=0.024$ HAM-D and PHQ 9 respectively) showed a statistically significant association with depression. There was significant positive correlation between Age ($r=0.231^{**}$; $p=0.010$; $r=.130^*$, $p=.052$), BUN ($r=.213^*$, $P=0.18$; $r=.185^*$, $p=.034$), BUN: serum creatinine ratio ($r=.261^{**}$, $P=0.004$; $r=.120^*$, $p=0.015$) and depression severity. Most of the depressed patients were from upper lower economic class (32.5%, 35.7% w.r.t HAM D and PHQ 9 respectively) **Conclusion:** The

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increased prevalence of depression was observed in CKD patients. We strongly recommend initiating screening of depression in CKD patients to improve the quality of life.

Keywords: *Chronic Kidney Disease, prevalence, depression, HAMD, PHQ9, SES*

Chronic kidney disease (CKD) is one of the major causes of deaths reported in India. This can be called as the progressive condition as the number of individuals affected raised to 800 million individuals i.e., > 10% of total population nation-wide.¹ India is a country of diversified food habits, also has varied patterns of developing infections. This brings a difficulty to communize CKD in terms of etiology, clinical presentation and patient demographics. CKD is believed to be developed in patients with existing conditions like Diabetes mellitus and Hypertension. Chronic kidney disease patients present both physiological and psychological aberrations. The prevalence of depression in pre-dialysis CKD patients is at a rate of 20 to 25%. The mechanisms of Depression are broadly classified into behavioral and biological.

Behavioral mechanisms include burdens of illness, lack of social support and poor quality of life. Inflammation, altered autonomic activity, hormonal imbalances and comorbidities are some of the possible biological mechanisms in CKD.

Behavioral Mechanisms:

The quality of life and mental health of a patient can be greatly impacted by symptoms of chronic kidney disease (CKD), such as fatigue, sleeplessness, pain, and decreased appetite. These physical symptoms may make psychological anguish worse and play a role in the onset or exacerbation of depression.

Due to their physical restrictions, the need for treatment (such as dialysis), or the stigma attached to their condition, patients with chronic kidney disease (CKD) may feel socially isolated. Social support is essential for mental health, and loneliness and depression can be exacerbated by a lack of social engagement or a perception of social support. Chronic stress can result from managing the demands of chronic kidney disease (CKD), which include regular doctor visits, dietary restrictions, drug schedules, and potential consequences including dialysis or kidney transplantation. Concerns of dying, a lower standard of living, financial hardship, and changes in social roles may exacerbate feelings of hopelessness and despair, contributing to depression.

Biological mechanisms:

Chronic inflammation is linked to chronic kidney disease (CKD), which can impact the brain and cause symptoms of depression. Depression has been linked to inflammatory cytokines such as tumor necrosis factor-alpha (TNF-alpha) and interleukin-6 (IL-6).

Depression symptoms may be exacerbated by changes in neurotransmitter levels, which are involved in mood regulation and include norepinephrine, serotonin, and dopamine.

Changes in the hypothalamic-pituitary-adrenal (HPA) axis, which controls mood and the stress response, are among the hormonal imbalances that can result from chronic kidney disease (CKD).

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Brain vascular alterations and cognitive decline are linked to chronic kidney disease (CKD). These cognitive alterations may make it more difficult for a patient to manage stress, adjust to changes in their health, and uphold social connections, which may raise their risk of depression.

Miscellaneous causes:

Some people turn to unhealthy coping strategies like substance misuse (drugs or alcohol) or avoidance tactics to manage the stress of having chronic kidney disease (CKD). These coping mechanisms might exacerbate depressive symptoms and make it more difficult to practice self-care.

Depression is among the psychological adverse effects of several drugs that are frequently used to treat chronic kidney disease (CKD), such as corticosteroids and other immunosuppressants. Moreover, mood may be impacted by pharmaceuticals used to treat CKD symptoms, such as antihypertensive medications or painkillers.

Depression has increased mortality rate among ESRD patients whereas its effect on CKD is unclear.² Some of the factors that contribute to depression secondary to CKD include female sex, younger age, low education and family income, unemployment and smoking.³ The prevalence of depression is 3 to 4 times higher compared with general population and two to three times higher compared to other chronic diseases.⁴ The female to male prevalence ratio was approximately estimated to be 2:1. Accordingly, there is a significant positive correlation with the stage of kidney failure and depression.⁵⁻⁶

Aim

To investigate the prevalence of Depression in Chronic Kidney Disease patients and its correlation with age, gender and renal parameters of the disease.

Objectives

- To identify the prevalence of CKD in south Indian population.
- To correlate stages of CKD, Gender, Age, levels of serum creatinine, BUN, Serum creatinine with depression severity.

METHODOLOGY

This is an observational cross-sectional study carried out over a period of 6 months at a Tertiary care hospital within a population of 123 patients. Patients who are clinically diagnosed with CKD of various stages with age greater than 18 years were included in the study. Patients who had a history of psychiatric illness or depression before getting diagnosed with CKD and who are on currently under antidepressants were excluded from the study.

After prior consent and ethical clearance, specially designed demographic Proforma was applied on all the CKD patients and depression was screened using Hamilton Depression rating scale (HAM D) and Patient Health Questionnaire 9 (PHQ 9). The socio economic status was assessed using Kuppuswamy SES score.

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Data collection

- Personal and socio-demographic information (i.e., age, sex, residence, height, weight, past medical history, occupation of head of the family, monthly income of family, head of the family education).
- Disease-related information: date of diagnosis with CKD, duration of haemodialysis, number of dialysis sessions
- Most recent report of Serum creatinine level and BUN
- Clinical questionnaire data obtained using Ham-D (Hamilton Depression Rating Scale) and PHQ-9 scales (Patient Health Questionnaire)

Outcome measures

The primary outcome of this study is to estimate the prevalence of depression among CKD patients. According to the Ham-D scale a range of 8-16,17-23,>23 indicate mild, moderate and severe stages of depression respectively. Likewise, the PHQ-9 has different ranges of 5-9 (Mild depression), 10-14 (Moderate depression), 15-19 (Moderately severe depression) and 20-27 (Severe depression).

The secondary outcome is to estimate the association of depression with age, sex, stage of CKD and presence of any co morbidity.

The other outcome of this study is to assess the prevalence of depression in various socioeconomic groups. The socioeconomic grouping is done using kuppuswamy socioeconomic scale which classifies Socioeconomic status into Lower (<5), upper-lower (5-10), lower-middle (11-15), upper- middle (16-25), Upper class (26-29).

Statistical Analysis

Data will be entered and analyzed using the Statistical Package for Social Scientists (SPSS) software version 64 bit 29.0.0. The categorical variables association was identified using Chi-Square test and Pearson's coefficient was found to understand the correlation.

RESULTS

A total of 123 CKD patients were recruited in the study. The table 1 shows the prevalence of depression with respect to demographic factors like age, gender and socioeconomic status. The study population were grouped taking age as a segregating factor. The grouping was done with ten-year age difference. Our study has five, fifteen, forty-one, five subjects from 20-30 yr,31-41,42-52,53-63,64-74,75-85 age groups respectively. About 60 depressive subjects are between group of 42-74 which gave a conclusion that middle age and geriatric population are prone to depression. Age has significant association ($p < 0.05$) with depression prevalence. Our study has 66 male and 57 female subjects. Both genders have shown almost equal prevalence.

This study has more subjects with stage 5 CKD followed by stage 4 and 3 consecutively. The stage of CKD has significant association ($p = 0.059$) with depression prevalence. This study has about 90 subjects from upper lower and lower middle class. Out of which 60 subjects are depressive. There are 77 and 83 depressive subjects with respect to HAM-D and PHQ-9 respectively.

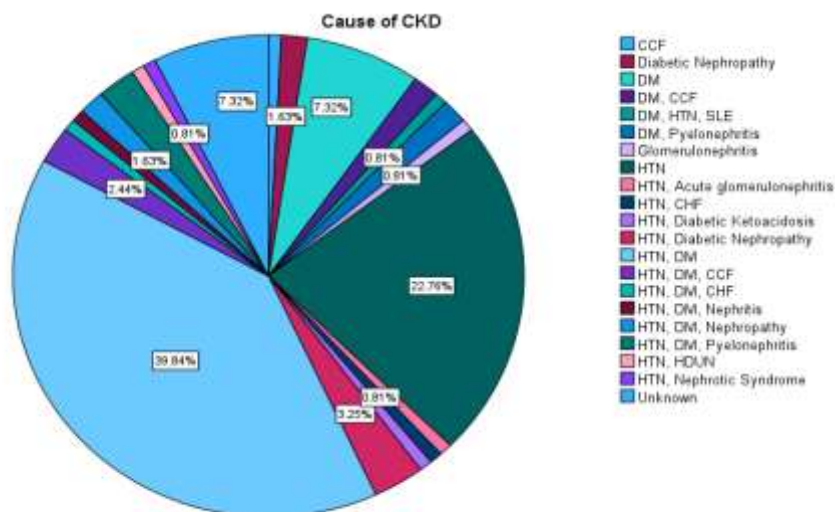
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Table 1: Table showing the prevalence of depression

Parameter (N=123)	w.r.t HAM D SCALE(n=77) (HAMD SCORE ≥ 8)	w.r.t PHQ 9 SCALE(n=83) (PHQ 9 SCORE ≥5)	Significance (P value)
PREVALENCE w.r.t Age groups (yrs)			
20-30(n=5)	3.25%(n=4)	2.44% (n=3)	<0.05
31-41(n=15)	4.8% (n=6)	8% (n=10)	
42-52(n=25)	10.5% (n=13)	13.8%(n=17)	
53-63(n=41)	22.7% (n=28)	21.1(n=26)	
64-74(n=31)	16.2% (n=20)	17%(n=21)	
75-85(n=5)	4% (n=5)	4%(n=5)	
86-96(n=1)	0.8% (n=1)	0.8%(n=1)	
PERCENT prevalence w.r.t stage of CKD			
Stage 1(n=2)	1.3%(n=1)	1.2%(n=1)	0.059
Stage 2(n=6)	3.9%(n=3)	1.2%(n=1)	
Stage 3(n=15)	9.1%(n=7)	8.4%(n=7)	
Stage 4(n=26)	20.8%(n=16)	24.1%(n=20)	
Stage 5(n=74)	64.9%(n=50)	65.1%(n=54)	
PERCENT prevalence			
FEMALE(N=57)	70.1%(n=40)	71.9%(n=41)	<0.01
MALE(N=66)	56% (n=37)	63.6% (n=42)	
SOCIOECONOMIC STATUS			
LOWER (n=14)	7(5.69%)	7(5.69%)	
UPPER LOWER(n=63)	40(32.5%)	44(35.77%)	
LOWER MIDDLE(n=29)	20(16.2%)	20(16.2%)	
UPPER MIDDLE (n=10)	5(4.06%)	6(4.8%)	
UPPER(n=7)	5(4.06%)	6(4.8%)	
TOTAL PREVALENCE(N=123)	62.6%(n=77)	67.48%(n=83)	

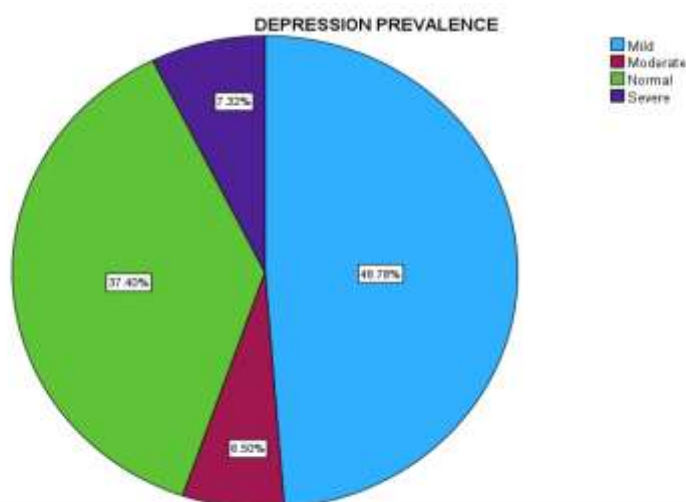
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Figure 1: Causes of CKD



The subjects have various past medical conditions which are considered as risk factors for Chronic Kidney disease. These causes include Congestive cardiac failure (CCF), diabetic nephropathy, Diabetes mellitus (DM), Hypertension, Pyelonephritis, Glomerulonephritis, nephrotic syndrome, hydronephrosis (HDUN). This study subjects have Diabetes and hypertension as major risk factors. There are 22.7% of study population with hypertension as a risk factor. There are 39.8% of study population with both diabetes and hypertension.

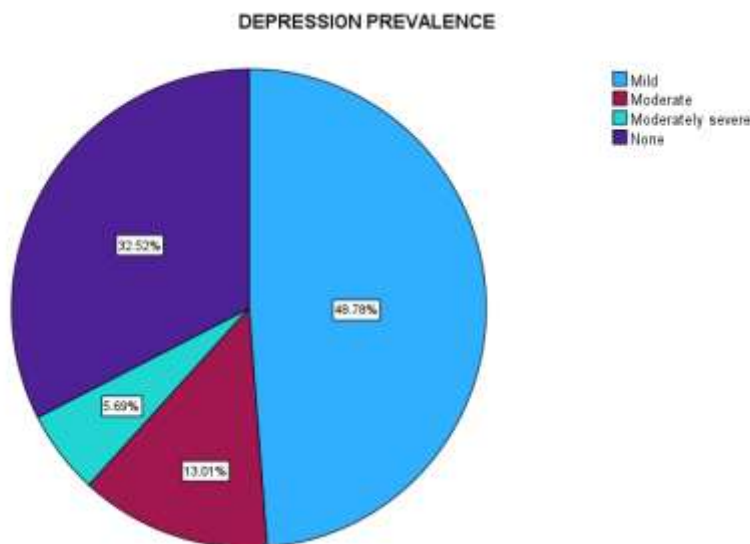
Figure 2: pie chart showing Prevalence of depression w.r.t staging of depression (HAM D)



The figure 2 shows the prevalence of depression using Hamilton depression rating scale. This scale categorises the depression into mild, moderate and severe. This study has 60(48.78%) subjects with mild depression. Moderate and severe depression was observed in 8(6.8%) and 9(7.9%) subjects respectively.

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Figure 3: Pie chart showing the Prevalence of depression w.r.t Staging of depression (PHQ 9)



The figure 3 shows the prevalence of depression using Patient Healthcare assessment questionnaire 9(PHQ-9) scale. This scale categorises the depression into mild, moderate, moderately severe and severe. This study has 60(48.78%) subjects with mild depression. Moderate and Moderately severe session was observed in 15(13%) and 7(5.7%) subjects respectively. There was only one subject with severe depression.

Table 2: Table showing the relation between renal parameters and HAM D, PHQ-9 Scales

PARAMETER	w.r.t HAM D SCALE(n=77) (HAMD SCORE ≥ 8)	w.r.t PHQ 9 SCALE(n=83) (PHQ 9 SCORE ≥5)
MEAN BUN (mg/dL)	113.06±53.142(p=0.032)	126.18± 60.806(p=0.024)
MEAN Sr Creatinine(mg/dL)	5.2257±2.68477(p=0.02)	126.18± 60.806(p=0.024)
MEAN BUN: CREATININE	24.80534±9.897412 (p=0.052)	26.3323±12.245085 (P=0.038)
MEAN GFR (ml/min)	17.396±16.4689(p=0.047)	15.816±14.4129(p=0.035)

The mean scores of renal parameters like BUN, Serum creatinine, BUN: Sr. creatinine, GFR were found to be 113.06±53.142(p=0.032), 5.2257±2.68477 (p=0.02), 24.80534 ± 9.897412 (p=0.052), 7.396±16.4689 (p=0.047) and 126.18±60.806(p=0.024) 126.18±60.806 (p=0.024) 26.3323±12.245085 (P=0.038), 15.816±14.4129 (p=0.035) with respect to HAM-D and PHQ-9 respectively as shown in table 2. All the renal parameters have shown significant association with depression severity.

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Table 3: Table showing correlation of renal parameters with depression

PARAMETER	PEARSON CORRELATION(r)		SIGNIFICANCE (p value)	
	HAM-D	PHQ-9	HAM-D	PHQ-9
AGE	.231**	.130*	.010	.052
GFR	-.127*	-.144*	.023	.011
BUN	.213*	.185*	.018	.034
BUN: Serum creatinine	.261**	.120*	.004	.015
Serum creatinine	.202*	.154*	.015	.041

** correlation is significant at 0.01 level * correlation is significant at 0.05 level

A positive correlation was observed between Depression scores and age, BUN, BUN: serum creatinine, and serum creatinine. A negative correlation was observed between GFR and depression scores as shown in table 3.

DISCUSSION

Our study aimed to study the clinical correlates of depression in CKD patients in India. A high prevalence of depression was observed in CKD patients in our study.

The mean age in our study was in accordance with the study by Gupta S et al; Wherein, the mean age observed was 54 ± 12.56years. Lacson E Jr et.al;(17) reported significant association of age with depression severity. Kop WJ et.al;(3) Ghormo de, et.al;(18) also reported a significant association of age with depression which is supportive to our study.

Agrawal et al. (11) found that the prevalence of depression was 78% where PHQ 9 was used as one of their diagnostic scales. Gadia et.al, (21) and H.K. Aggarwal et.al., (27) reported the prevalence as 66% and 69% which are almost alike to our study.

Gupta S et, al;(10) have reported a prevalence of 44.05% using montgomeryasberg depression rating scale.Yazici et.al;(13) reported 42.5% prevalence using beck depression scale. Stasiak CE, et.al;(15) reported 29.6% prevalence using beck depression and anxiety inventory scale. Lacson E Jr et.al;(17) reported 41% prevalence using depressive affect scores. Kop WJ et.al;(3) Ghormode et.al;(18) Amira O et.al;(22) Hedayati SS et.al;(25) have reported a prevalence between 21-23% using CES-D scale, Hospital anxiety depression scale, zung depression scale, diagnostic and statistical manual of mental disorders-based interview respectively. Agrawaal KK et.al;(11) has reported a prevalence of 65% and 51% using HAD-17 and ICD-10 scales reepectively. All these studies have shown a prevalence rate lesser than our study.

Santos et.al;(16) has reported 83.7% prevalence using Subjective frailty Assessment and PHQ 9 scale. Dziubek W,et.al;(14) has reported a prevalence of 72.4% using Beck depression scale. Hawamd eh S,et.al;(23) has reported a prevalence of 70% using Hamilton depression rating scale. Rodriguez-angarita et.al; reported 95% prevalence using MINI international neuropsychiatric interview. All these studies have comparatively a higher prevalence than our study. This might be due to varied study design, sample size and the diagnostic scale employed. We couldn't find female predominance in our study which is contradictory to Esen et.al., (12) that there is significant impact of gender on exhibiting depressive symptom.

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Our study analysed that patients with Diabetes and Hypertension were more prone to CKD as written by Kovesdy et al. (1). According to Chiang et al. (5) the mean serum creatinine was 5.05mg/dL as depicted in our study. There is significance between serum creatinine levels and severity of depression which is very similar to the study of Gupta S et al. (10) (P=0.018) and H.K. Aggarwal (27) (p<0.05). Our study concludes association of stage of CKD with depression severity and this is supportive to the Chiang et al. study which proved that more the advanced the stage, the more likely the patient is to determine a depressive mood. Our study has shown negative correlation between GFR and depression severity. The BUN: Serum creatinine and BUN have shown positive correlation with severity of depression. Thus, accumulation of uremic toxins could be a possible cause for developing neuropsychiatric disorders like depression (31). Our study identified that there are more depressed patients from upper lower economic class.

Our study has few limitations as follows: the study samples were obtained from a tertiary care hospital, hence, the findings cannot be generalized to the general population; sample size was comparatively smaller to draw conclusions and the effect of stage of the disease could not be studied as there were very few subjects with stage I, II, III CKD. This was an observational cross-sectional study; a prospective longitudinal study of cohorts would result in better comprehensive findings. More studies are required in Indian population to evaluate the difference in the depressive symptoms in the patients and their response to treatment with antidepressants and psychotherapy.

CONCLUSION

Depression is one of the most common co morbidities among the patients suffering from CKD. More than half of the population was diagnosed with depression and are mostly from upper lower economic class. We strongly recommend initiating screening of depression in CKD patients to improve the quality of life. Better strategies are to be developed to identify patients with high risk which could contribute for desired prognosis. More such studies at multi-centric level are needed for prevention of depression among CKD patients.

REFERENCES

1. Kovesdy C. P. (2022). Epidemiology of chronic kidney disease: an update 2022. *Kidney international supplements*, 12(1), 7–11. <https://doi.org/10.1016/j.kisu.2021.11.003>
2. Shirazian S. (2018). Depression in CKD: Understanding the Mechanisms of Disease. *Kidney international reports*, 4(2), 189–190. <https://doi.org/10.1016/j.ekir.2018.11.013>
3. Kop, W. J., Seliger, S. L., Fink, J. C., Katz, R., Odden, M. C., Fried, L. F., Rifkin, D. E., Sarnak, M. J., & Gottdiener, J. S. (2011). Longitudinal association of depressive symptoms with rapid kidney function decline and adverse clinical renal disease outcomes. *Clinical journal of the American Society of Nephrology: CJASN*, 6(4), 834–844. <https://doi.org/10.2215/CJN.03840510>
4. Waraich, P., Goldner, E. M., Somers, J. M., & Hsu, L. (2004). Prevalence and incidence studies of mood disorders: a systematic review of the literature. *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, 49(2), 124–138. <https://doi.org/10.1177/070674370404900208>
5. Chiang, H. H., Livneh, H., Yen, M. L., Li, T. C., & Tsai, T. Y. (2013). Prevalence and correlates of depression among chronic kidney disease patients in Taiwan. *BMC nephrology*, 14, 78. <https://doi.org/10.1186/1471-2369-14-78>

A Cross-Sectional Study on Prevalence of Depression in CKD Patients at a South Indian Tertiary Care Hospital

6. Goh, Z. S., & Griva, K. (2018). Anxiety and depression in patients with end-stage renal disease: impact and management challenges - a narrative review. *International journal of nephrology and renovascular disease*, *11*, 93–102. <https://doi.org/10.2147/IJNRD.S126615>
7. Figueiredo-Braga, M., Silva, B., Ganhão, S., Aguiar, F., Cornaby, C., Brito, I., & Poole, B. D. (2021). Kidney Function, Age, and Education as Contributors to Depression and Anxiety in Juvenile Systemic Lupus Erythematosus. *European journal of investigation in health, psychology and education*, *11*(4), 1503–1515. <https://doi.org/10.3390/ejihpe11040107>
8. Jain, N., Carmody, T., Minhajuddin, A. T., Toups, M., Trivedi, M. H., Rush, A. J., & Hedayati, S. S. (2016). Prognostic Utility of a Self-Reported Depression Questionnaire versus Clinician-Based Assessment on Renal Outcomes. *American journal of nephrology*, *44*(3), 234–244. <https://doi.org/10.1159/000448598>
9. Alshelleh, S., Alhourri, A., Taifour, A., Abu-Hussein, B., Alwreikat, F., Abdelghani, M., Badran, M., Al-Asa'd, Y., Alhawari, H., & Oweis, A. O. (2022). Prevalence of depression and anxiety with their effect on quality of life in chronic kidney disease patients. *Scientific reports*, *12*(1), 17627. <https://doi.org/10.1038/s41598-022-21873-2>
10. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_272_18
11. Agrawaal, K. K., Chhetri, P. K., Singh, P. M., Manandhar, D. N., Poudel, P., & Chhetri, A. (2019). Prevalence of Depression in Patients with Chronic Kidney Disease Stage 5 on Hemodialysis at a Tertiary Care Center. *JNMA; journal of the Nepal Medical Association*, *57*(217), 172–175. <https://doi.org/10.31729/jnma.4408>
12. Esen, B., Kahvecioglu, S., Atay, A. E., Ozgen, G., Okumus, M. M., Seyahi, N., Sit, D., & Kadioglu, P. (2015). Evaluation of relationship between sexual functions, depression and quality of life in patients with chronic kidney disease at predialysis stage. *Renal failure*, *37*(2), 262–267. <https://doi.org/10.3109/0886022X.2014.990348>
13. Yazıcı, R., & Güney, İ. (2022). Prevalence and related factors of poor sleep quality in patients with pre-dialysis chronic kidney disease. *The International journal of artificial organs*, *45*(11), 905–910. <https://doi.org/10.1177/03913988221118941>
14. Dziubek, W., Pawlaczyk, W., Rogowski, L., Stefanska, M., Golebiowski, T., Mazanowska, O., Krajewska, M., Kuzstal, M., & Kowalska, J. (2021). Assessment of Depression and Anxiety in Patients with Chronic Kidney Disease and after Kidney Transplantation-A Comparative Analysis. *International journal of environmental research and public health*, *18*(19), 10517. <https://doi.org/10.3390/ijerph181910517>
15. Stasiak, C. E., Bazan, K. S., Kuss, R. S., Schuinski, A. F., & Baroni, G. (2014). Prevalence of anxiety and depression and its comorbidities in patients with chronic kidney disease on hemodialysis and peritoneal dialysis. *Jornal brasileiro de nefrologia*, *36*(3), 325–331. <https://doi.org/10.5935/0101-2800.20140047>
16. Santos, D. G. M. D., Ferreira, L. G. S., Pallone, J. M., Ottaviani, A. C., Santos-Orlandi, A. A., Pavarini, S. C. I., Zazzetta, M. S., & Orlandi, F. S. (2022). Association between frailty and depression among hemodialysis patients: a cross-sectional study. *Sao Paulo medical journal = Revista paulista de medicina*, *140*(3), 406–411. <https://doi.org/10.1590/1516-3180.2021.0556.R1.14092021>
17. Lacson, E., Jr, Bruce, L., Li, N. C., Mooney, A., & Maddux, F. W. (2014). Depressive affect and hospitalization risk in incident hemodialysis patients. *Clinical journal of the American Society of Nephrology: CJASN*, *9*(10), 1713–1719. <https://doi.org/10.2215/CJN.01340214>
18. Ghormode, D. K., Ghormode, P. D., Dewangan, B., Sethi, S. K., & Babar, V. (2021). Evaluating depression and anxiety symptoms associated with chronic kidney disease in

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- the central Indian tertiary care hospital-a cross sectional study. *International Journal of Health and Clinical Research*, 4(2),226– 230.Retrievedfrom <https://www.ijhcr.com/index.php/ijhcr/article/view/817>
19. Bezerra, C. I. L., Silva, B. C., & Elias, R. M. (2018). Decision-making process in the pre-dialysis CKD patients: do anxiety, stress and depression matter?. *BMC nephrology*, 19(1), 98. <https://doi.org/10.1186/s12882-018-0896-3>
 20. Albuhayri, A. H., Alshaman, A. R., Alanazi, M. N., Aljuaid, R. M., Albalawi, R. I. M., Albalawi, S. S., Alsharif, M. O., Alharthi, N. M., & Prabahaar, K. (2022). A cross-sectional study on assessing depression among hemodialysis patients. *Journal of advanced pharmaceutical technology & research*, 13(4), 266–270. https://doi.org/10.4103/japtr.japtr_322_22
 21. Gadia, P., Awasthi, A., Jain, S., & Koolwal, G. D. (2020). Depression and anxiety in patients of chronic kidney disease undergoing haemodialysis: A study from western Rajasthan. *Journal of family medicine and primary care*, 9(8), 4282–4286. https://doi.org/10.4103/jfmpe.jfmpe_840_20
 22. Amira O. (2011). Prevalence of symptoms of depression among patients with chronic kidney disease. *Nigerian journal of clinical practice*, 14(4), 460–463. <https://doi.org/10.4103/1119-3077.91756>
 23. Hawamdeh, S., Almari, A. M., Almutairi, A. S., & Dator, W. L. T. (2017). Determinants and prevalence of depression in patients with chronic renal disease, and their caregivers. *International journal of nephrology and renovascular disease*, 10, 183–189. <https://doi.org/10.2147/IJNRD.S139652>
 24. Tsai, Y. C., Chiu, Y. W., Hung, C. C., Hwang, S. J., Tsai, J. C., Wang, S. L., Lin, M. Y., & Chen, H. C. (2012). Association of symptoms of depression with progression of CKD. *American journal of kidney diseases: the official journal of the National Kidney Foundation*, 60(1), 54–61. <https://doi.org/10.1053/j.ajkd.2012.02.325>
 25. Hedayati, S. S., & Finkelstein, F. O. (2009). Epidemiology, diagnosis, and management of depression in patients with CKD. *American journal of kidney diseases: the official journal of the National Kidney Foundation*, 54(4), 741–752. <https://doi.org/10.1053/j.ajkd.2009.05.003>
 26. Rodríguez-Angarita, C. E., Sanabria-Arenas, R. M., Vargas-Jaramillo, J. D., & Ronderos-Botero, I. (2016). Cognitive impairment and depression in a population of patients with chronic kidney disease in Colombia: a prevalence study. *Canadian journal of kidney health and disease*, 3, 26. <https://doi.org/10.1186/s40697-016-0116-7>
 27. Aggarwal, H. K., Jain, D., Dabas, G., & Yadav, R. K. (2017). Prevalence of Depression, Anxiety and Insomnia in Chronic Kidney Disease Patients and their Correlation with the Demographic Variables. *Prilozi (Makedonska akademija na naukite i umetnostite. Oddelenie za medicinski nauki)*, 38(2), 35–44. <https://doi.org/10.1515/prilozi-2017-0020>
 28. Mosleh, H., Alenezi, M., Al Johani, S., Alsani, A., Fairaq, G., & Bedaiwi, R. (2020). Prevalence and Factors of Anxiety and Depression in Chronic Kidney Disease Patients Undergoing Hemodialysis: A Cross-sectional Single-Center Study in Saudi Arabia. *Cureus*, 12(1), e6668. <https://doi.org/10.7759/cureus.6668>
 29. Wilund, K. R., Thompson, S., Viana, J. L., & Wang, A. Y. (2021). Physical Activity and Health in Chronic Kidney Disease. *Contributions to nephrology*, 199, 43–55. <https://doi.org/10.1159/000517696>
 30. Sharma, R., Sharma, S. C., Chalise, P., Regmee, J., & Sharma, S. (2022). Anxiety and Depression among Patients with Chronic Kidney Disease Undergoing Haemodialysis

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in a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA; journal of the Nepal Medical Association*, 60(251), 634–637. <https://doi.org/10.31729/jnma.7608>

31. Simões E Silva, A. C., Miranda, A. S., Rocha, N. P., & Teixeira, A. L. (2019). Neuropsychiatric Disorders in Chronic Kidney Disease. *Frontiers in pharmacology*, 10, 932. <https://doi.org/10.3389/fphar.2019.00932>

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Conflict of Interest

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