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A COMPARATIVE STUDY OF THE EFFICACY OF ANTIDEPRESSANTS – ESCITALOPRAM VS SERTRALINE IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER AND CHRONIC KIDNEY DISEASE ON HEMODIALYSIS

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ABSTRACT

Background: Major Depressive Disorder (MDD) is a severe, overlooked comorbidity in patients with Chronic Kidney Disease (CKD) on hemodialysis, the prevalence of depression being 5 to 20%. In India prevelance of CKD is 13.24% in 2025.Worldwide, CKD was the 12th cause of mortality and the 17th cause of morbidity. Studies have advocated the efficacious use of SSRI's for depression. **Methods:** This comparative study evaluated efficacy of two anti-depressants in 60 patients of CKD on hemodialysis with MDD. They were divided into two groups, one receiving Escitalopram (5mg/day) and the other Sertraline (25mg/day) for four weeks.Clinical response was assessed using the Hamilton Rating Scale for Depression (HAM-D) and Beck Depression Inventory (BDI). **Results:** Both groups showed similar clinical improvement. Escitalopram mean HAM-D scores fell from 22.90 to 12.83, and Sertraline from 21.33 to 11.27. Escitalopram mean BDI scores fell from 37.7 to 21.43, and Sertraline from 34.20 to 18.77. There was no statistically significant difference ($p > 0.05$) in the scores, observed by both the scales . **Conclusion:** Both Escitalopram and Sertraline are equally effective in reducing the depressive symptoms in patients of CKD on hemodialysis.

INTRODUCTION

Kidney diseases are growing in severity and intensity in recent times in both developed and developing nations. Underlying metabolic or medical conditions, injury, or infections can lead to acute kidney diseases, which in turn may predispose individuals to chronic kidney ailments in the future.[1] Globally, the primary causes of kidney ailments are shifting from infectious origins to non-communicable, chronic illnesses like diabetes and hypertension, which now account for 40–60% of cases in India.[1,2] Chronic Kidney Disease (CKD) inflicts significant morbidity and mortality in a country's population.[1] The global age-standardised prevalence of CKD in adults was 14.2% in 2023, representing a relative rise of 3.5% from 1990.[3] In 2023, CKD was the ninth leading cause of death globally, accounting for 1.48 million deaths, and the 12th leading cause of disability-adjusted life years.[3,4] Talukdar R et al., conducted a meta-analysis in 2025, and found the prevalence of CKD from community-based studies in India as 13.24%. Within this Indian demographic, the prevalence among men was found to be 14.80%, while among women it was 13.51% ; the southern zone exhibited a pooled CKD prevalence of 14.78%. Pooled CKD prevalence was found to be higher in studies from rural areas (15.34%) compared to those from urban areas (10.65%).This review indicates a rising trend of CKD in Indians aged 15 years and above, increasing from 11.12% during 2011–2017 to 16.38% between 2018–2023.[5]

CKD is defined as a progressive and long-standing deterioration of renal function, characterized by a glomerular filtration rate (GFR) of less than 60 ml/min or structural/functional kidney damage persisting for more than three months. Pathophysiologically, as functional renal tissue mass is lost, the kidneys fail to maintain fluid and electrolyte homeostasis, leading to a diminished ability to excrete excess phosphate, acid, and potassium. This metabolic failure culminates in uremia, a clinical syndrome marked by fatigue, anorexia, and decreased mental acuity. As renal function reaches End-Stage Renal Disease (ESRD), or Stage 5, where the GFR falls below 15 mL/min, survival becomes dependent on renal replacement therapy (RRT).[6] Hemodialysis is the most common RRT modality, designed to correct electrolyte imbalances and remove metabolic toxins like urea and creatinine by pumping blood through a dialyzer containing a semipermeable membrane.[6,7] This life-saving procedure is intensive and physically taxing, typically requiring patients to attend sessions for three to five hours, three times per week. Beyond the physical strain, the requirement for permanent vascular access (such as surgically created arteriovenous fistulas) and the high risk of complications like hypotension, stenosis, and thrombosis impose a massive burden on the patient. All these factors combined result in a significant loss of independence and a fundamental alteration of the patient's social and functional life.[7]

The psychological toll of this chronic condition is profound.A study by Patel NM et al., conducted in 2025, in Gujarat, observed that 84.4% of CKD patients presented with mild anxiety, and 50% experienced mild to moderate depression, thus reflecting the significant burden of psychiatric symptoms in CKD patients.[8] Depression is considered the most common psychiatric comorbidity among hemodialysis patients, yet it remains critically under-diagnosed because its somatic symptoms like fatigue, sleep disturbances, and appetite changes overlap almost entirely with the physical manifestations of uremia. This diagnostic difficulty is hazardous, as untreated depression creates a "vicious cycle" where emotional distress leads to poor adherence to dietary restrictions, fluid intake limits, and medical monitoring . Patients with comorbid depression are twice as likely to be hospitalized and face a significantly higher risk of mortality and rapid progression to ESRD compared to non-depressed patients.[8,9] The etiology of this distress is multifactorial, involving the loss of social roles, the financial strain of frequent hospitalizations, and a decline in cognitive and sexual function.[8]

Despite the severity of these issues, research into pharmacological management has been limited, as renal patients are often excluded from major antidepressant trials.[9,10] Headyati et al., in 2010 assessed the effect of sertraline on depressive symptoms in CKD patients, but data comparing multiple agents in this specific cohort is scarce.[11] Bossola et al., in 2024 did a systematic review of RCTs and found that SSRIs may be effective in reducing depressive symptoms in CKD patients.[12] Recent longitudinal studies have emphasized the persistence of depressive and anxiety symptoms among haemodialysis patients over time. These studies advocate for the integration of mandatory mental health screening and multidisciplinary intervention programs as a standard part of routine dialysis care, rather than intermittent or reactive

treatment.[13] Our study is a comparative clinical investigation assessing the efficacy of two antidepressants, escitalopram versus sertraline in CKD patients on hemodialysis. No other study has directly compared these two specific antidepressants in the depressed CKD population undergoing hemodialysis.

AIMS AND OBJECTIVES

- To assess response of Escitalopram in patients of MDD in CKD on haemodialysis.
- To assess response of Sertraline in patients of MDD in CKD on haemodialysis.
- To compare the efficacy of antidepressant drugs: Escitalopram Vs Sertraline in patients of MDD in CKD on haemodialysis.

METHODOLOGY

Study setting and study design- This is a comparative study assessing efficacy of antidepressants- Escitalopram and Sertraline in patients of major depressive disorder in CKD patients on hemodialysis in a tertiary care hospital at Navi Mumbai.

Sample Size- This study enrolled 60 patients of CKD on hemodialysis who met the following inclusion criteria, patients age from 18 to 55 years, on hemodialysis for ≥3 months, at least primary education and having symptoms of depression. Patient excluded were those with a past history of any psychiatric illnesses, medical conditions like stroke, IHD, seizures, delirium or significant metabolic disorders.

Procedure- Institutional ethics committee approval was taken prior to the study. Written informed consent was taken from all the patients. All patients with chronic kidney disease on maintenance hemodialysis for at least three months were screened. Those aged 18–55 years, meeting DSM-5 criteria for major depressive disorder, and without past psychiatric illness or significant comorbid medical conditions such as stroke, ischemic heart disease, seizures or delirium, were evaluated.

A total of 60 eligible patients underwent detailed psychiatric evaluation and mental status examination, followed by baseline assessment of depressive symptoms using the Hamilton Depression Rating Scale (HAM-D) and Beck Depression Inventory (BDI). Patients were then allocated into two groups of 30 each using computer generated randomization: one group received Tab Escitalopram (5 mg/day) and the other received Tab Sertraline (25 mg/day). Patients were assessed weekly for four weeks, using HAM-D and BDI to monitor symptom changes. At the end of the study period, outcomes were evaluated and statistical analysis was performed using SPSS version 21, with a p-value of less than 0.05 considered to be statistically significant.

Tools of assessment-

1. Hamilton depression rating scale (HAM-D) - The HAM-D is a clinician administered depression assessment scale, having 17 items. Each item is scored on a scale of 0–4 intended to determine the severity of depression. The total score indicates the severity of depression, where a score of 0–7 is considered normal, 8–16 indicates mild depression, 17–23 signifies moderate depression, and a score of more than 24 represents severe depression.[14]

2. Becks Depression Inventory (BDI) - The Beck Depression Inventory (BDI-II) is a standardized 21-item self-report scale designed to assess the severity of depression according to DSM-5 criteria. It measures symptoms over the past two weeks, utilizing a scoring system that ranges from minimal to severe depression. Each of the 21 items is rated on a 4-point scale ranging from 0 to 3 based on symptom severity. By adding all the responses together, clinicians obtain a total score up to a maximum of 63 which provides a quantitative measure of the patient's overall depressive burden. A score of 0 to 13 indicates minimal depression, 14 to 19 represents mild depression, 20 to 28 suggests moderate depression, and 29 to 63 denotes severe depression.[15]

Statistical Analysis-

The data was described in terms of range, mean ±standard deviation, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the groups was done using student t tests. For comparing categorical data, Chisquare(2) test was performed. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using SPSS (Statistical Package for the Social Science) SPSS 21 versions statistical program for Microsoft Windows

RESULTS-

The study consisted of 60 patients of CKD with major depressive disorder undergoing hemodialysis. Patients were divided into two groups. One group, (n=30) was treated with Tab. Escitalopram and other group (n=30) was treated with Tab.Sertraline.

In our study, of the 60 patients of CKD, 66.7% of the patient's were males and 33.3% were females. Majority of the patient's, 70% were in age group of 41-50 years, 13.3 % were less than 40 years and 16.7 % of the patient's were more than 50 years. We found that, 40% of the patients were educated till secondary school, 38.3% were primary educated and 21.7% were graduates. Also, 80% of the patients were Hindu and 96.7% of patients were married. We found that, 53.3% of the patient's were from joint family and 33.3% were skilled workers.

Majority of the patient's, 66.7% of them were not working, as they left their job due to haemodialysis. We noted that, 56.7% of the patients had either a history tobacco use, or a combination of tobacco & alcohol at some point, however they reported that they discontinued the substance use after beginning hemodialysis.

We found that 33.3% of the patients had a diagnosis of CKD for more than 6 years, 28.3% had a diagnosis of less than 2 years, while majority of them, 38.3% had a diagnosis for 2-6 years. We noted that a majority of the patients, 48.3% of them were on hemodialysis for less than 2 years, 31.7% of them were on haemodialysis for 2 to 6 years, while 20% were on hemodialysis for more than 6 years.

In our study, we found that 55% patients of CKD had persistent depressive disorder with major depressive disorder while 45% had a diagnosis of Major depressive disorder.

Patients had a mean Chronic Kidney Disease (CKD) duration of 5 years (range: 6 months to 21 years) and a mean hemodialysis duration of 3.5 years. Depressive symptoms had been present for a mean of 2.8 years (2months to 8 years), as mentioned in Table 1.

TABLE-1: PATIENTS WITH CHRONIC KIDNEY DISEASE, HEMODIALYSIS, DEPRESSION AND SCORES ON RATING SCALES (HAM-D AND BDI).

	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	21	55	45.7	6.9
KidneyDisease (Years)	6 month	21	5	3.7
Hemodialysis (Years)	4 month	11	3.5	2.6
Depression (Years)	2 month	8	2.8	2.2
HAM-D Baseline (scores)	12	35	22.1	5.4
HAM-D 1st visit	11	33	19.8	5.2
HAM-D 2nd visit	9	30	17.4	4.9

HAM-D 3rd visit	7	26	14.8	4.6
HAM-D 4th visit	6	21	12.1	4
BDI Baseline scores	19	50	35.8	8
BDI 1st visit	16	46	32.7	7.8
BDI 2nd visit	14	41	28.5	8.3
BDI 3rd visit	11	38	24.6	7.2
BDI 4th visit	8	35	20.1	6.7

As seen in Table 1, there is a total mean reduction of 10 points in the HAM-D score (22.1 to 12.1) over 4 weeks. The consistent reduction in the standard deviation was from 5.4 to 4.0 in the HAM-D score. There is a total mean reduction of 15.7 points (35.8 to 20.1) in the BDI score. Like the HAM-D, the BDI scores show a steady improvement at every interval.

The CKD patients, at baseline demonstrated a "Severe" range for depression, however the final mean scores indicated a shift towards "Moderate" or "Mild" depression after 4 wks of antidepressant treatment.

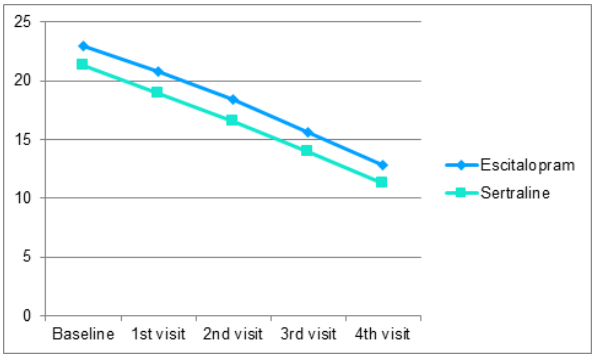
BDI scores in 41.7 % of the patient's had moderate depression, 28.3 % patients had severe depression, while mild depression in 26.7 % patients and minimal depression in 3.3% patients.HAM-D scores in 40% of the patient's had very severe depression, 33.3% had severe depression, 25% had moderate depression while 1.7% had mild depression.

In our study we observed that, the comparison of age, gender, duration of CKD, duration of hemodialysis when done with antidepressants was not statistically significant, using chi-square test & p was >0.05.

TABLE-2: COMPARISON OF ANTIDEPRESSANTS - ESCITALOPRAM AND SERTRALINE WITH THE MEANS OF AGE, DURATION OF CHRONIC KIDNEY DISEASE, HEMODIALYSIS AND DEPRESSION

Mean	Escitalopram	Sertraline
Age (Years)	47.07	44.40
Kidney Disease (Years)	4.80	5.22
Hemodialysis (Years)	3.26	3.66
Depression (Years)	2.47	3.11

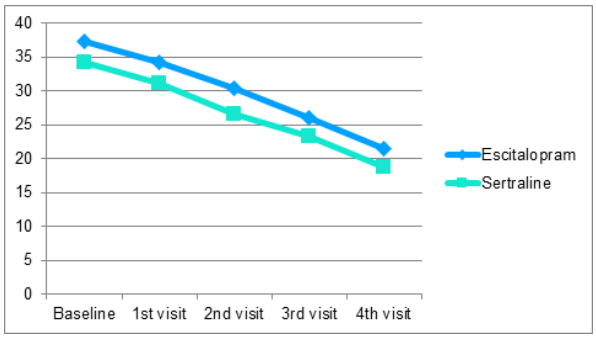
As observed in Table 2, the mean age of CKD patients on Escitalopram was 47.07 years and on Sertraline was 44.40 years. The mean duration of CKD for Escitalopram was 4.80 years and for Sertraline was 5.22 years. Escitalopram had 3.26 years and Sertraline had 3.66 years as the mean duration for hemodialysis treatment. Escitalopram had 2.47 years as mean duration of depressive illness and Sertraline had 3.11 years.



GRAPH-1:COMPARISON OF ANTIDEPRESSANT MEDICATIONSWITH HAM-D MEAN SCORES

Graph1, shows comparison of Escitalopram and Sertraline with mean scores of HAM D test at baseline and subsequent weekly four visits. Escitalopram on HAM - D baseline, first, second, third and fourth visit, scored 22.90, 20.73, 18.37, 15.60, 12.83 as mean scores, while Sertraline scored 21.33, 18.90, 16.50, 14.00, 11.27 respectively.

We found that Escitalopram was used in 25, 4 and 1 patient's with severe , moderate and mild depression scores on HAM-D respectively, while those on Sertraline had 9,10,11 patients with very severe, severe and moderate scores on HAM-D respectively, Chi- square test was used to compare and p was 0.124 which was not statistically significant.



GRAPH 2: COMPARISON OF ANTIDEPRESSANT MEDICATIONSWITH BDI MEAN SCORES

Graph 2 shows the mean BDI scores at baseline and subsequent four visits of patients on Escitalopram and Sertraline. On BDI baseline, first, second, third, and fourth visit, Escitalopram scored 37.37, 34.20, 30.37, 26.00, 21.43 and Sertraline scored 34.20,31.17,26.67,23.23 & 18.77 respectively.

Escitalopram had 11,13,5 and 1 patients with extreme, severe, moderate and borderline depression respectively, on BDI scores. Sertraline had 6,12,11 and 1 patients with extreme, sever ,moderate and borderline depression respectively, on BDI scores. Both groups demonstrated significant reductions in HAM-D and BDI scores, Chi square test was used to compare & p was 0.289 which was not statistically significant.

Clinical improvement was evident from the first & subsequent follow-ups. However, improvement in the treatment of depression with SSRI in both the groups was found to similar with no statistically significant difference seen.

DISCUSSION

Literature search revealed no studies till date, comparing efficacy of two antidepressants on patients of CKD on hemodialysis, thus making it difficult to compare our results with others.

Very few studies exist regarding use of a single antidepressant medication in CKD patients on hemodialysis, and only a few have compared the use of a single antidepressant medication with psychotherapy.

Our study found that patient's of CKD on haemodialysis with major depressive disorder was predominantly observed among middle-aged, married males, of Hindu religion, living in joint families, lower educational attainment, lower socioeconomic standing, and high rates of unemployment.This was consistent with the demographic profiles of CKD patients on haemodialysis by studies done by Shanmukham et al., in 2022 and Othayq & Aqeeli et al., in 2020.[16,17]

In our study, the patients had a mean chronic kidney disease duration of 5 years and a mean hemodialysis duration of 3.5 years. A study done by Shanmukham et al., in 2022, also reported a comparable mean CKD duration of 3.88 years and a hemodialysis duration of 3.68 years among their depressed patients.[16]

We observed that major depressive disorder is a severe and highly prevalent comorbidity in chronic kidney disease patients undergoing hemodialysis. The meta-analysis by Palmer et al., in 2013, similarly emphasizes that depression is a pervasive, globally recognized complication across chronic kidney disease populations that necessitates targeted clinical management.[9]

Following the four-week pharmacological intervention, both the Escitalopram and Sertraline groups demonstrated highly significant clinical improvements, showing mean score reductions of approximately 10 points on the HAM-D and 15.7 points on the BDI with no statistically significant difference between the two treatments ($p > 0.05$). This therapeutic response is consistent with broader systematic reviews, such as the meta-analysis by Palmer et al., in 2013, which affirms that general efficacy of SSRIs significantly reduces depressive symptom scores among chronic kidney disease populations.[9]

Our study had all the demographic parameters of comparable value, thus making it easier to compare the efficacy of the two antidepressants - Escitalopram and Sertraline. After four weeks of treatment, patients taking either Escitalopram or Sertraline experienced a significant reduction in their depressive symptoms, with HAM-D scores dropping by an average of 10 points and BDI scores decreasing by roughly 15.7 points, proving both medications were equally effective.

We found various studies advocating the use of a single antidepressant in CKD patient's on haemodialysis with depression.

A study by Lopes et al., in 2002 is a large, international, prospective observational study found that the patients with a physician diagnosis of depression, treatment with antidepressive medication was observed for approximately 36.6% in the United States and 12.1% in Europe.[18]

Turk et al., in 2006 used sertraline,50mg for 8 weeks in 40 hemodialysis patients diagnosed with depression BDI score>15 with significant improvement in the BDI scores and the quality of life.[19]

A study by Kamo et al., in 2004 found Fluvoxamine maleate (50mg) to be efficacious in patients with mild depression undergoing hemodialysis.[20]

A study by Watnick et al., in 2003 reported that only 16% of CKD patients on haemodialysis with BDI scores ≥ 15 were on antidepressants.[21]

Wuerth et al., in 2003, in their study, tried sertraline, bupropion in depressed patients of CKD and hemodialysis for 12 weeks who were diagnosed by BDI, HAM-D and psychiatric interview. There was improvement seen in the patient's depressive symptoms.[22]

Kennedy et al., in 1989 tried antidepressant in major depression in CKD and hemodialysis for 7 weeks, diagnosed with BDI, HAM-D,MMSE and significant improvement in patients was found.[23]

Lee et al., in 2004 tried Fluoxetine (20mg) in CKD & hemodialysis patients for 8weeks with more than 50% reduction in HAM-D scores.[24]

Koo et al., in 2005 used Paroxetine (10mg) for 8 weeks in patients diagnosed with BDI scale and found improvement in depressive and nutritional status.[25]

Levy et al., in 1996 treated patients with Fluoxetine (20mg) in depressed patients for 8 weeks with improvement in depressive features.[26]

The study by Blumenfield et al., in 1996 confirmed the relative safety of Fluoxetine in depressed patients in renal failure on hemodialysis.[27]

CONCLUSION-

Our research found no statistically significant difference in the clinical efficacy between the two anti-depressants ($p > 0.05$), indicating that both agents are equally suitable for the CKD patients on haemodialysis.Psychiatrists can therefore confidently choose between these agents based on individual patient needs, such as tolerability, cost, and potential drug-drug interactions, rather than concerns regarding differential efficacy. A baseline screening of CKD patients and a holistic treatment care is thus essential in consultation liason with the Psychiatrists.

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