

## Original Study

# Study of Cognitive Impairment and Depression in end Stage Renal Disease (EsrD) Patients

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## ABSTRACT:

**Aim:** to study in cognitive impairment and depression in cases of end stage renal disease.

**Material and method:** this cross sectional study was done in AVBR hospital, a teaching tertiary care hospital in wardha district of central india. Forty patients of ESRD on dialysis and 30 control were studied. Mini cog and Ham-D tests were implemented for detection of cognitive impairment and depression among them.

**Results :** In our study 26(65%) were males and 14(35%) were females. Cognitive impairment was prevalent in ESRD patients( $2.75 \pm 1.40/4.20 \pm 0.71$ ) ( $p=0.0001$ ) as compared to the controls. The proportion of depression in ESRD patients was significantly higher than the controls, ( $15.55 \pm 3.10/3.46 \pm 1.65$ ) ( $p = 0.0001$ ).

**Conclusion :** Cognitive impairment and depression are common accompaniments in ESRD patients. Studies have proved that they significantly affect the disease outcome, morbidity and mortality. Etiology is multifactorial and these additional burden should be recognised and treated appropriately with a multidisciplinary teamwork involving nephrologist, neurologist, physician, psychiatrist and clinical psychologist.

**Key Words:** Depression, cognitive impairment, ESRD, HAM-D, Mini-Cog™.

## INTRODUCTION

**Chronic kidney disease (CKD)** is a slow progressive loss of kidney function over a period of several years. Decreased renal function is a predictor of hospitalisation with cognitive dysfunction, depression and poor quality of life.

According to World health organization, depression is one of the commonest association with end stage renal disease (ESRD) [1]. It is typically more severe and more difficult to treat when associated with other comorbidities [2,3,4]. Different assessment tools measure depression in ESRD. [3, 5] Depression is characterised by both cognitive and somatic features and it is also a risk factor for mortality [6, 7].

Epidemiological data suggest that individuals with ESRD have high risk of developing cognitive disorders. The risk is generally explained by increased prevalence of subclinical ischemic cerebrovascular episodes, uremic toxins and associated other co morbidities. [8,9]. A recent data has confirmed that faster the eGFR declines greater is the cognitive impairment. [10].

This study was aimed at determining the proportion/frequency of depression and cognitive impairment in ESRD patients on dialysis.

## Aim and Objective:

To study the proportion frequency of cognitive impairment and depression in ESRD patients and to correlate them with creatinine levels.

## Materials & Methods

This was a cross sectional study of patients with ESRD attending the medicine outpatient clinic of Jawaharlal Nehru Medical College Sawangi (meghe), a teaching hospital (AVBRH). Duration of the study was 2 months. Approval was given by the health research & ethical committee of the institution; consecutive 40 ESRD patients who agreed to participate in the study were recruited. Thirty normal age and sex matched healthy control were compared.

Demographic & clinical data were documented. We used the Mini COG and HAM-D score to identify the presence cognitive impairment and depression. The **Mini-Cog™** is a 3-minute instrument that can increase detection of cognitive impairment in patients. It consists of two components, a 3-item recall test for memory and a simply scored clock drawing test. The cut off for defining cognitive impairment using Mini-Cog™ is  $<3$  [28].

Similarly another tool, **Hamilton Rating Scale for**

**Depression (HRSD)**, abbreviated **HAM-D**, is a multiple item questionnaire used to detect grades of depression, 0 - 7 = Normal, 8 - 13 = Mild Depression, 14-18 = Moderate Depression, 19 - 22 = Severe Depression, > 23 = Very

Severe Depression.<sup>[29]</sup>

Descriptive and inferential statistics with Chi square test and student's unpaired 't' test was used for analysis of data.

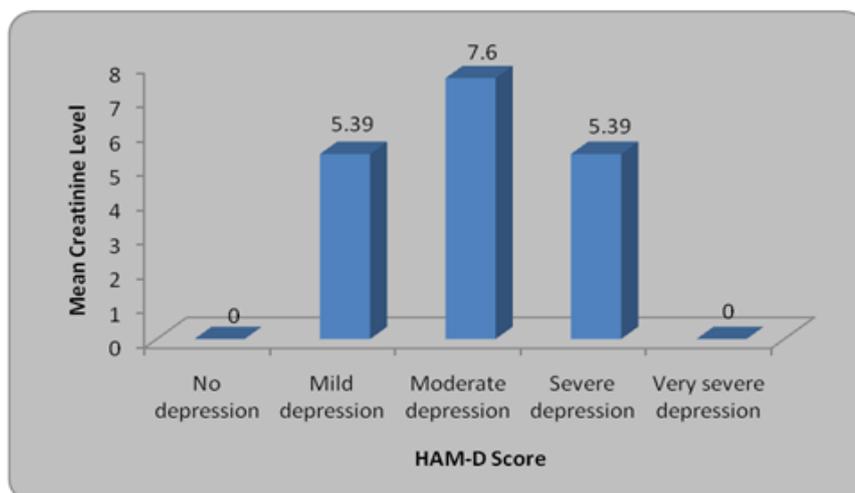
**RESULTS**

**Table 1 showing baseline characteristics of cases and controls.**

	ESRD Group	Control Group	t-value/ χ <sup>2</sup> -value	p-value
<b>Age in yrs</b>				
<40 yrs	11	9	0.71	0.86,NS
40-49 yrs	10	5		
50-59 yrs	8	7		
≥ 60 yrs	11	9		
Mean±SD	47.82±14.57	47.80±15.32		
<b>Gender</b>				
Male	26	21	0.19	0.65,NS
Female	14	9		
<b>Marital Status</b>				
Married	36	27	0.00	1.00,NS
Single	4	3		
<b>Alcohol/Smoking</b>				
Present	9	1	5.14	0.023,S
Absent	31	29		
<b>Co-morbidities(Diabetes, Hypertension)</b>				
Present	28	11	7.72	0.005,S
Absent	12	19		
<b>Creatinine</b>	7.65±5.15	0.88±0.29	7.16	0.0001,S
<b>MINI COG Score</b>	2.75±1.40	4.20±0.71	5.15	0.0001,S
<b>HAM-D Score</b>	15.55±3.10	3.46±1.65	19.33	0.0001,S

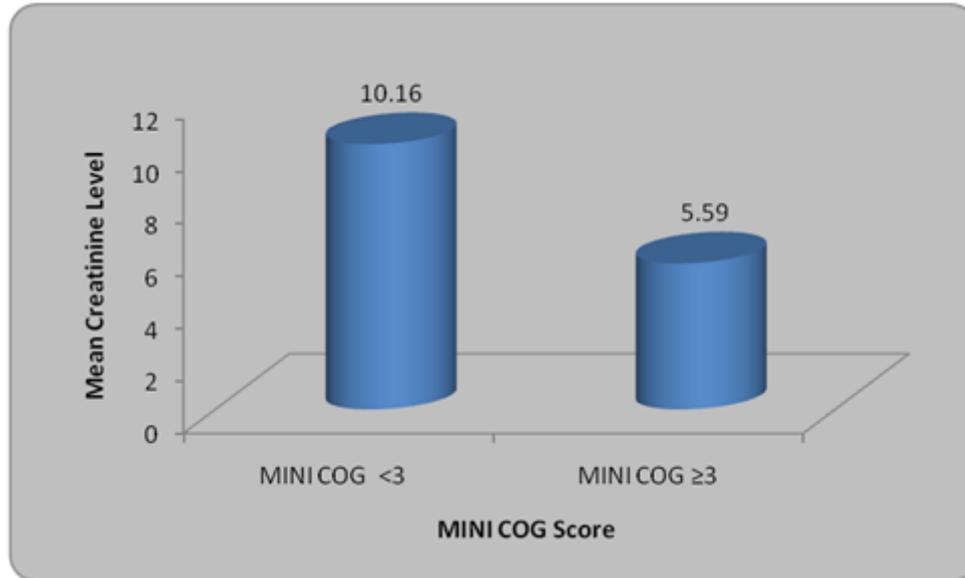
**Table 2 : Assessment of depression with relation to creatinine by HAM-D Score in ESRD patients**

Depression scale	No depression (0-7)	Mild depression (8-13)	Moderate depression (14-18)	Severe depression (19-22)	Very severe depression (>23)
No of subjects	0	10	20	10	0
Creatinine mean	0±0	5.39±3.28	7.60±4.62	5.39±3.28	0±0
F-value	2.11,p=0.135,NS,p>0.05				



**Table 3: Assessment of cognitive impairment with relation to creatinine by mini Cog score in ESRD patients**

	MINI COG <3 (no. Of subjects) N=18	MINI COG ≥3 N=22
Creatinine (mean)	10.16 ±6.43	5.59 ±2.43
t-value	3.08,p=0.004,S	



**DISCUSSION**

This study was carried out in AVBR hospital, Wardha district of central India. A total of 40 ESRD and 30 control were studied, there were 14 females (35%) and 26 males (65%). The mean creatinine level was more in age group 40-49 years in patients of ESRD.

Co morbidities like diabetes and hypertension were more prevalent in cases than in control which was statistically significant (p value: 0.005). In our study the mean mini cog value in ESRD patients was 2.75± 1.40 as compared to the control group which was 4.20±0.71 suggesting cognitive

impairment is more frequent in ESRD patients (p=0.004).

Several possible mechanisms cause cognitive impairment in ESRD,these can be cerebral atrophy(frontal lobe) due to long term haemodialysis, cerebrovascular diseases, intracranial vascular calcifications, early progress into Alzheimer’s disease,hyperhomocysteinemia ,hypercoagulable state, inflammation and oxidative stress.<sup>[11,12,13,14,15]</sup>

The incidence of cerebral micro bleeds are higher in patients of haemodialysis and also in patients with moderate decrease in renal function <sup>[16,17]</sup>

A lot of hypothesis are there for cognitive impairment in ESRD patients. In ESRD the normal vasoregulatory properties of brain and kidney are disrupted leading to vascular damage. It has been proved by transcranial Doppler ultrasound in patients of ESRD which showed altered cerebrovascular hemodynamics leading to cognitive impairment <sup>[18,19]</sup>

The Rotterdam study showed that anti hypertensive treatment was associated with low risk for vascular dementia in ESRD patients <sup>[20]</sup>

During the past decade it has been proved that anti hypertensive drugs prevent cognitive decline in ESRD. Recent theories also suggest a role of angiotensin converting enzymes inhibitors in uremic cognitive dysfunction.<sup>[21]</sup>

In our study, all the patients of ESRD had mild to severe depression(p>0.05).The mean creatinine in severely depressed patients was 5.39±3.28, moderate depressive patients was 7.60±4.62. The possible explanation of the creatinine variants may be because of the regularity of dialysis treatment which varied from cases to cases because of financial constraints and other hurdles faced by ESRD patients in rural area. Hospitalisation also adds to the burden of depression.<sup>[22]</sup>

Earlier studies demonstrated a clear relationship between depression and mortality in ESRD patients but recent studies are unable to show a definitive relationship between depression and mortality <sup>[7, 23]</sup>. A study showed that baseline mental component scoring assessed 1-3 months after initiating haemodialysis in ESRD patients showed depression which went on deteriorating over time <sup>[24]</sup>. Another study found prevalence of depressive symptoms of 19-24% overtime after initiation of haemodialysis <sup>[25]</sup>. It is likely that relationship between depression and physical decline is not simply unidirectional. In some cases, depression may lead to poorer health and mortality and in other cases it is the reverse which is true. This is consistent with other studies. <sup>[26, 27]</sup>

**CONCLUSION**

To conclude, depression and cognitive impairment are prevalent in ESRD patients. The cognitive disorders observed

in these patients are multifactorial in aetiology ranging from vascular degeneration to neural degeneration. Understanding the pathophysiologic interaction between renal impairment and cerebral functions in ESRD patients is important to minimize the risk for cognitive impairment. Furthermore, while controversies still exist regarding therapy of patients with ESRD with depressive symptoms, it is reasonable to start antidepressants drugs for better results. Better and effective tools for establishing a diagnosis for depression, evaluating possible risks, implementing reasonable guidelines for treatment of depression in ESRD patients is mandatory and a complete responsibility should be shared by the treating physician, nephrologists, neurologist, psychiatrists and clinical psychologist.

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