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Research Article

STUDY OF CEREBROVASCULAR ACCIDENT IN CHRONIC KIDNEY DISEASE

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ABSTRACT

The terms job satisfaction and organization commitment are very important for any organization employees' in order to succeed in the global competition. Likewise the software and IT companies' employees' also need job satisfaction and organization commitment for its success. Therefore in this study the major objective is to identify the significant impact of job satisfaction on organization commitment and also to find out the relationship between job satisfaction and organization commitment. The study also focuses on the moderation effect of experience on job satisfaction and organization commitment. For data analysis hierarchical regression and process macro of SPSS is being used. The results show that there is significant impact of job satisfaction on organization commitment. The relationship between job satisfaction and organizational commitment is further depended up on the experience of the employees. The positive value of the coefficient of the interaction term indicates that job satisfaction becomes more positive as the experience of the employees increases.

INTRODUCTION

Cerebrovascular Accident remains a significant global health issue and is leading cause of mortality and morbidity worldwide. Hypertension and atrial fibrillation remains major modifiable risk factor

The incidence of stroke and associated mortality is also higher in kidney disease patients compared with the general population.

Presence of anemia, hypoalbuminemia, malnutrition, uremia and hyperhomocysteinemia in patients with kidney failure are confirmed factors associated with higher incidence of stroke.[1] Patients with ESRD on dialysis have an 8–10 times greater incidence of stroke compared to the general population, with rates varying across published series from 10 to 33 per 1,000 patient years [2] [3].Stroke occurs more commonly in dialysis patients than general population or CKD patients without need for dialysis. HD patients have a 3 fold higher risk of death following acute stroke.

Vascular risk factors in CKD patients may be the contributing factor for association of renal dysfunction with stroke. With comparison to general population, stroke incidence and death rate due to stroke were higher in CKD and Dialysis population[4-7]. Study from Japan shows stroke was leading cause of death accounting for 12.7% of total CKD death[5].

A recent meta analysis of 83 studies, which included data for more than 30000 strokes demonstrated a linear relationship between decreasing GFR and risk of stroke and between increasing albuminuria and risk of stroke[8]. In the same study 7% increase in relative risk of stroke associated with every 10ml/ min/ 1.73m^2 reduction in GFR, and 10% increase in relative risk of stroke with every 25mg/ mol increase in ACR. Pathophysiological mechanism mediating an elevated stroke risk in CKD maybe related to uremic milleu, accelerated vascular calcification, increase carotid atherosclerosis, prothrombotic tendency and impaired cerebral autoregulation may all play an important role in the development of stroke in CKD patients.

Patient on hemodialysis has higher incidence of stroke when compared with general population. In the study by Sozio *et al*, published in 2009, ischemic stroke was the most common in dialysis patient; ischemic stroke was confirmed in 76% of all 200 events registered in the study [9]. ERA – EDTA registry showed increased age and sex standardized mortality rate for stroke compared with general population [10].

In the DOPPS study, the prevalence of cerebrovascular disease was similar in Japanese and European dialysis patients and was higher in US dialysis patients[11]. Similar prevalence of cerebrovascular disease in US dialysis patient was found in HEMO study[12]. High prevalence of ischemic stroke in patients with ESRD at the start of hemodialysis, as well as high incidence of ischemic stroke in the course of dialysis treatment has been reported[13].

Strokes in patient with peritoneal dialysis are comparatively less. In the largest peritoneal dialysis cohort from United Kingdom (n = 1511 with mean age of 55 years) the overall incidence of stroke was 9.8/ 1000 patients/ year[14]. US registry

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studies reported no differences in stroke risk in patients on peritoneal dialysis compared to those on hemodialysis[11].

Stroke competes with infection as the most frequent neurological complication of kidney transplant. Only a limited number of studies about stroke in transplant patients are available. In a Spanish study, the prevalence of stroke was 7.97% at 10 years and cerebral hemorrhage appears to be more prevalent than in general population[16]. Risk factors identified for predictors of stroke: Diabetic neuropathy, peripheral vascular disease and age older than 40 years[15].

Irrespective of stroke subtype, renal impairment is associated with greater neurological deficit following a ischemic stroke, a poor functional outcome and greater mortality. In CKD with eGFR less than 30ml/min with ischemic stroke has been associated with a higher risk of hemorrhagic transformation[17]. Role of alteplase in CKD from retrospective data suggests that CKD attenuates therapeutic efficacy of alteplase. One study shows an increase risk of symptomatic intracranial hemorrhage with alteplase[18-19].

Overall greater risk of in hospital death (odds ratio-1.63, 95% CI 1.5-1.75, p <0.001) was marked in patient with advancing CKD who presented with acute stroke[20].

Hypertension control is the most important factor in stroke prevention irrespective of antihypertensive agent use, in the general population as well as the patient with CKD.

Guidelines advised the use of antiplatelets to prevent ischemic stroke. Evidence support its use in non dialysis CKD population[21]. But in ESRD and dialysis population there is an element of risk of bleeding.

Anaemia has been shown to increase the risk of stroke in CKD population[22]. Recombinant erythropoietin is indicated for correction of anaemia in CKD.

No randomised trials has shown the use of oral anticoagulants in CKD or ESRD patients with atrial fibrillation. Treatment with oral anticoagulants make cause high risk of bleeding in patients with ESRD[23].

Lowering of hyperlipidaemia with statin therapy did not have a significant effect in reducing stroke risk[24-25]. Carotid endarterectomy is recommended for symptomatic, high grade (>70%) carotid stenosis to reduce subsequent stroke risk. Endarterectomy reduce the risk of stroke by 82% at 2 years in patients with stage 3 CKD.

Aims and Objectives

To study the clinical profile of CerebroVascular Accidents in patients with Chronic Kidney Disease

MATERIALS AND METHODS

Study Design

Cross sectional study

Study Place

Department of Nephrology, SRM Medical college hospital and Research Centre

Study Period

March 2015-August 2016

Study Population

The study would consist of all patients admitted with Cerebrovascular accident with chronic kidney disease from March 2015 to August 2016

Inclusion criteria

Patients ≥18 years old, with cerebrovascular accident (on the basis of history, physical examination and brain imaging)with chronic kidney disease (CKD is defined as kidney damage CKD is defined as kidney damage (generally ascertained from albuminuria, but also including abnormalities in urine sediment, pathology or imaging studies, acid–base and electrolyte disorders due to tubular disorders, or history of kidney transplantation) or estimated glomerular filtration rate (GFR) less than 60 ml/min/1.73 m^2 for 3 months or more, irrespective of cause and classified into stages according to the level of GFR

Exclusion criteria

- Patients with recurrent stroke
- Patients with rheumatic heart disease
- Patients with coagulation disorders

Investigations

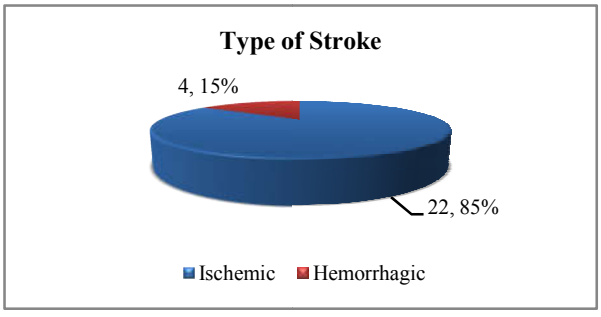
Medical history (including exact duration of diabetes, systemichypertension, atrial fibrillation history of smoking and alcoholism other co-morbid illness, medications and duration of renal insufficiency before starting dialysis and the time under dialysis)

Clinical examination,-Complete neurological examination, BMI, blood pressure; standard 12-lead-electrocardiography (ECG) laboratory investigations including urine routie, urine microalbumin ,urine albumin creatnine ratio, fasting blood glucose, hba1c,blood count, fasting lipid profile, potassium, sodium, aspartate aminotrasferase/alanine aminotransferase (AST/ALT), creatinine and urea levels.

- Echocardiography
- Ultrasonography of Abdomen
- Magnetic Resonance imaging of brain/ computed tomography of brain (Depending on the clinical need)

RESULTS AND DISCUSSION

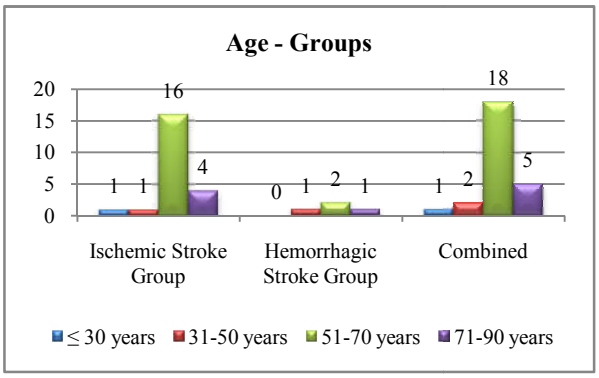
Type of Stroke



Graph 1 Distribution of type of stroke in the study population

Table 1 Distribution of type of stroke in the study population

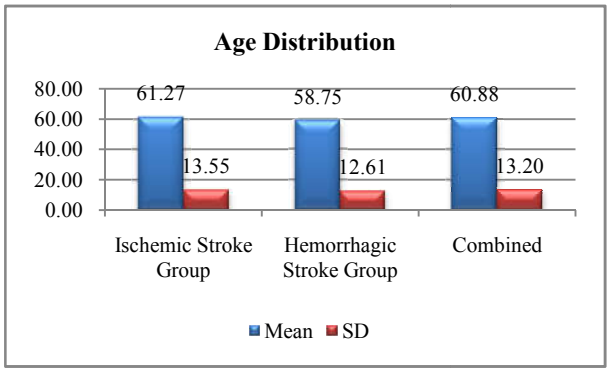
Type of Stroke	Stroke Group	Stroke Group (%)
Ischemic	22	84.62
Hemorrhagic	4	15.38
Total	26	100



Graph 2 Age status of type of stroke in the study population

Table 2 Age status of type of stroke in the study population

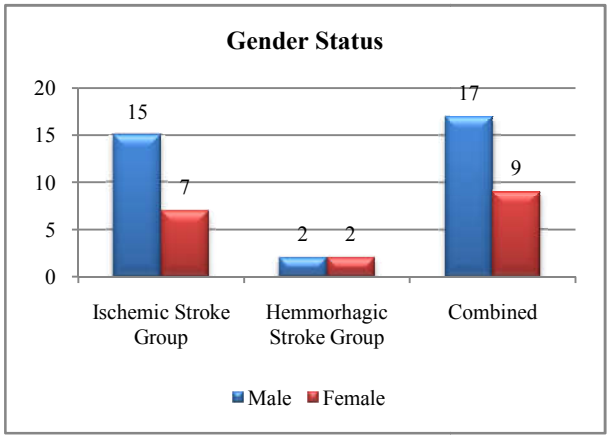
Age – Groups	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
≤ 30 years	1	0	1	4.55	0.00	3.85
31-50 years	1	1	2	4.55	25.00	7.69
51-70 years	16	2	18	72.73	50.00	69.23
71-90 years	4	1	5	18.18	25.00	19.23
Total	22	4	26	100	100	100



Graph 3 Age distribution in the study population

Table 3 Age distribution in the study population

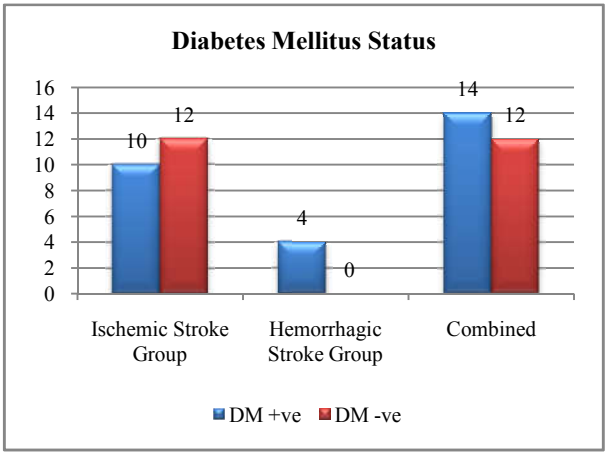
Age Distribution	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined
Mean	61.27	58.75	60.88
SD	13.55	12.61	13.20
	P Value Unpaired t Test		0.7329



Graph 4 Gender distribution in the study population

Table 4 Gender distribution in the study population

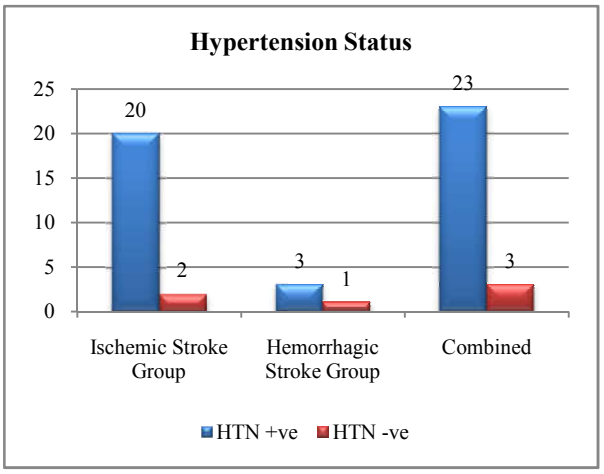
Gender Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Male	15	2	17	68.18	50.00	65.38
Female	7	2	9	31.82	50.00	34.62
Total	22	4	26	100	100	100
	P Value Fishers Exact Test				0.5906	



Graph 5 Diabetes Mellitus status in the study population

Table 5 Diabetes Mellitus status in the study population

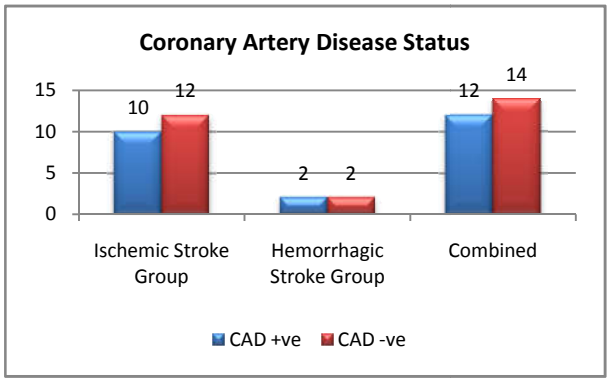
Diabetes Mellitus Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
DM +ve	10	4	14	45.45	100.00	53.85
DM -ve	12	0	12	54.55	0.00	46.15
Total	22	4	26	100	100	100
	P Value Fishers Exact Test				0.0441	



Graph 6 Hypertensive stauts in the study population

Table 6 Hypertensive stauts in the study population

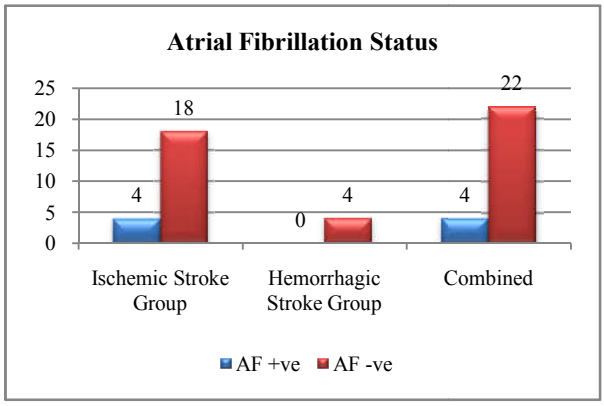
Hyper-tension Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
HTN +ve	20	3	23	90.91	75.00	88.46
HTN -ve	2	1	3	9.09	25.00	11.54
Total	22	4	26	100	100	100
	P Value Fishers Exact Test				0.4007	



Graph 7 Coronary artery disease status in the study population

Table 7 Coronary artery disease status in the study population

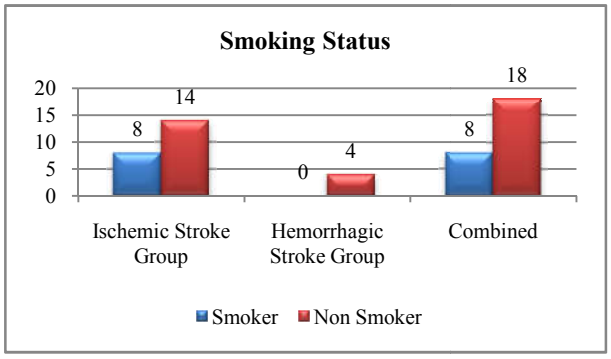
Coronary Artery Disease Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
CAD +ve	10	2	12	45.45	50.00	46.15
CAD -ve	12	2	14	54.55	50.00	53.85
Total	22	4	26	100	100	100
P Value Fishers Exact Test					>0.9999	



Graph 8 Atrial fibrillation status in the study population

Table 8 Atrial fibrillation status in the study population

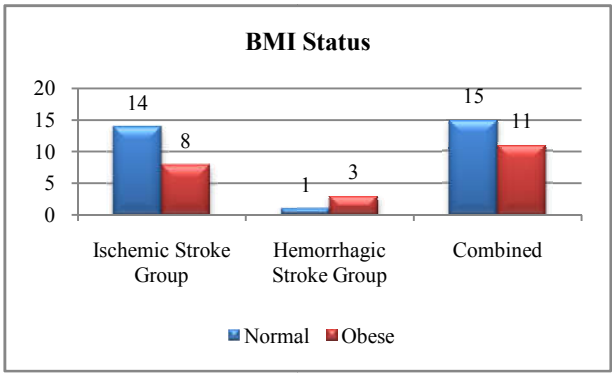
Atrial Fibrillation Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
AF +ve	4	0	4	18.18	0.00	15.38
AF -ve	18	4	22	81.82	100.00	84.62
Total	22	4	26	100	100	100
P Value Fishers Exact Test					>0.9999	



Graph 9 Smoking status in the study population

Table 9 Smoking status in the study population

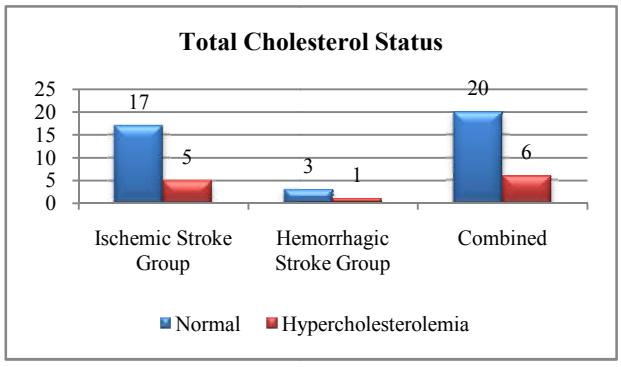
Smoking Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Smoker	8	0	8	36.36	0.00	30.77
Non Smoker	14	4	18	63.64	100.00	69.23
Total	22	4	26	100	100	100
P Value Fishers Exact Test					0.1472	



Graph 10 BMI status in the study population

Table 10 BMI status in the study population

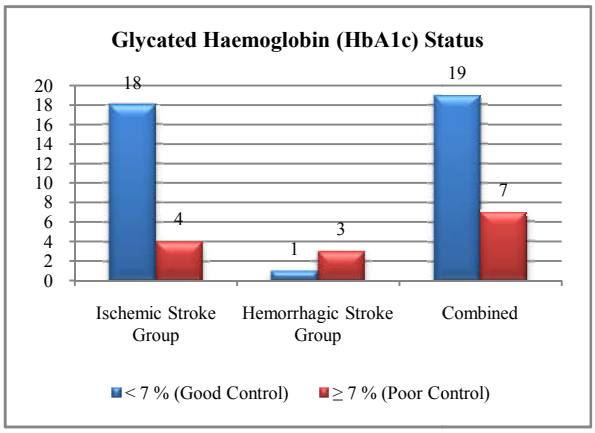
BMI Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Normal	14	1	15	63.64	25.00	57.69
Obese	8	3	11	36.36	75.00	42.31
Total	22	4	26	100	100	100
P Value Fishers Exact Test					0.2789	



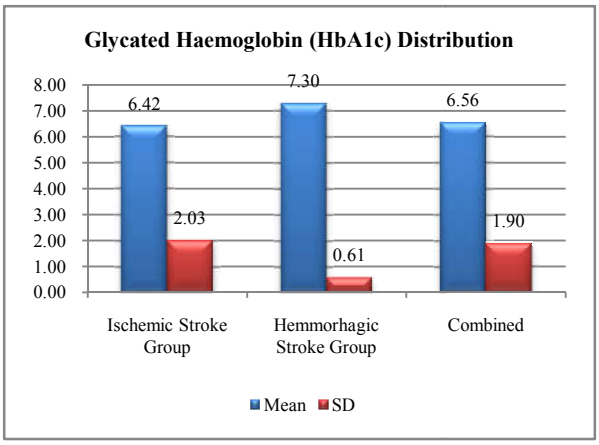
Graph 11 Total cholesterol status in the study population

Table 11 Total cholesterol status in the study population

Total Cholesterol Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Normal	17	3	20	77.27	75.00	76.92
Hypercholesterolemia	5	1	6	22.73	25.00	23.08
Total	22	4	26	100	100	100
P Value Fishers Exact Test					>0.9999	



Graph 12 HbA1C status in the study population

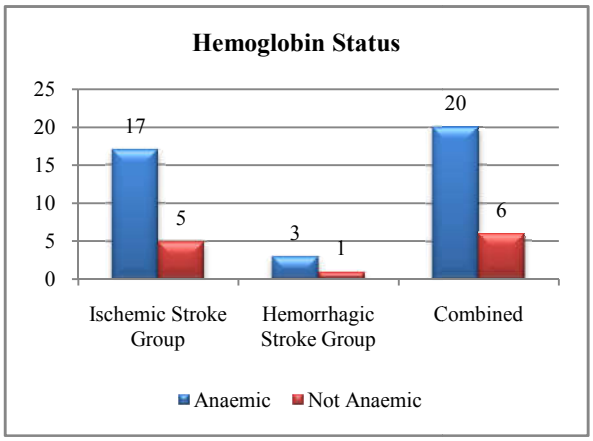


Graph 13 HbA1C distribution status in the study population

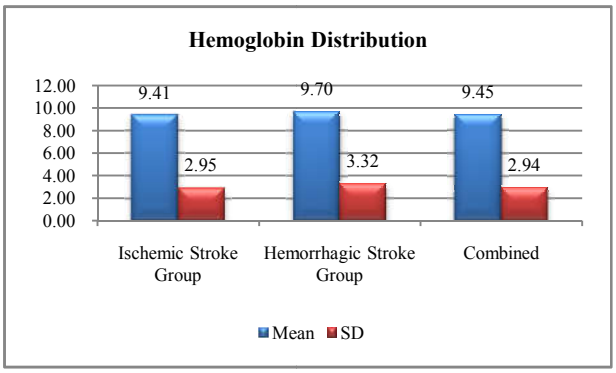
Table 12 HbA1C status in the study population

Glycated Haemoglobin (HbA1c) Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
< 7 % (Good Control)	18	1	19	81.82	25.00	73.08
≥ 7 % (Poor Control)	4	3	7	18.18	75.00	26.92
Total	22	4	26	100	100	100
Mean	6.42	7.30	6.56	P Value		0.0468
SD	2.03	0.61	1.90	Fishers Exact Test		

Hemoglobin



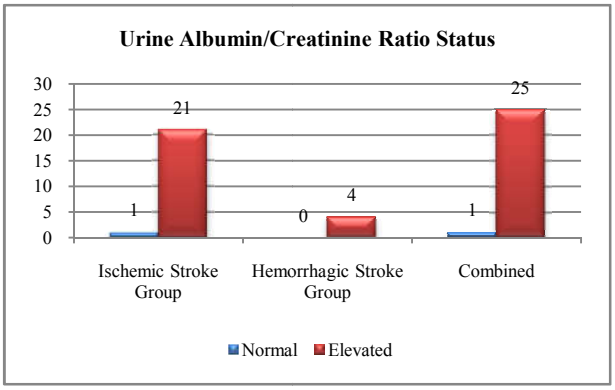
Graph 14 Hemoglobin status in the study population



Graph 15 Hemoglobin distribution in the study population

Table 13 Hemoglobin status in the study population

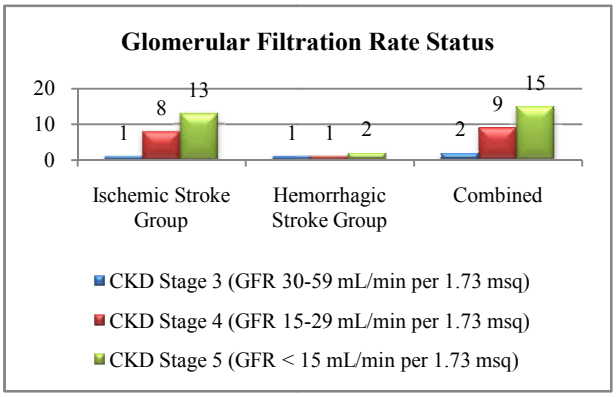
Hemoglobin Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Anaemic	17	3	20	77.27	75.00	76.92
Not Anaemic	5	1	6	22.73	25.00	23.08
Total	22	4	26	100	100	100
Mean	9.41	9.70	9.45	P Value		>0.9999
SD	2.95	3.32	2.94	Fishers Exact Test		



Graph 16 Urine albumin / creatinine ratio status in the study population

Table 14 Urine albumin / creatinine ratio status in the study population

Urine Albumin/ Creatinine Ratio Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
Normal	1	0	1	4.55	0.00	3.85
Elevated	21	4	25	95.45	100.00	96.15
Total	22	4	26	100	100	100
	P Value Fishers Exact Test				>0.9999	



Graph 17 GFR status in the study population

Table 15 GFR status in the study population

Glomerular Filtration Rate Status	Ischemic Stroke Group	Hemorrhagic Stroke Group	Combined	Ischemic Stroke Group (%)	Hemorrhagic Stroke Group (%)	Combined (%)
CKD Stage 3 (GFR 30-59 mL/min per 1.73 msq)	1	1	2	4.55	25.00	7.69
CKD Stage 4 (GFR 15-29 mL/min per 1.73 msq)	8	1	9	36.36	25.00	34.62
CKD Stage 5 (GFR < 15 mL/min per 1.73 msq)	13	2	15	59.09	50.00	57.69
Total	22	4	26	100	100	100
	P Value Fishers Exact Test				0.4732	

DISCUSSION

Chronic kidney disease is associated with high risk of stroke. The risk of stroke was found to be 5 times higher on dialysis in comparison to general population[10-14]. We undertook this study to study the clinical profile of cerebrovascular accident in patients with chronic kidney disease.

In this study 1.82% of CKD patient were found to have stroke which was much higher than the general population. In an Indian study the prevalence of stroke was 0.34% in general population[7]. 26 suitable study subjects with CKD with stroke were selected to participate in the study. The sample group consisted of 22 ischemic stroke patients (84.62%) and 4 hemorrhagic stroke patients (15.38%). The demographic and clinical characteristics of the participants were tested for significant differences. Similar prevalence was observed in cerebrovascular disease in US dialysis patient in HEMO study[21].

Majority of the studies subjects were males in the ischemic group (68.18%) and in hemorrhagic stroke it was equally distributed among males and females. Most affected age group was 51- 70 yrs. Brain infarcts were found to arise from the large arteries in 57.5% and lacunar infarcts were noted in 32.5%. Carotid system involvement was seen in 64.6% and posterior circulation involvement in 36.4%.

While describing the diabetes mellitus status in CKD patients, 45.45% of the study subjects in the ischemic stroke were diabetics (n=10) and 100% of the study subjects in the hemorrhagic stroke were diabetics (n=4). There was a significant association between diabetes and hemorrhagic type of stroke in CKD patients since p value is < 0.05 as per fisher's exact test. The hemorrhagic stroke study group reported higher level of diabetes compared to ischemic stroke study group. There is 2.20 times more increase in diabetes in hemorrhagic study group (p= 0.044). data suggest an association between diabetes and hemorrhagic stroke in CKD patient. Diabetes clearly predicts the future risk of stroke especially hemorrhagic stroke in our study.

While describing the HbA1c status in CKD patients with stroke, 18.18% of the study subjects in the ischemic stroke were under poor glycemic control (n=4, mean=6.42%) and 75% of the study subjects in the hemorrhagic stroke were under poor glycemic control (n=3, mean=7.30%). The hemorrhagic stroke study group reported higher percentage of subjects with poor glycemic control compared to ischemic stroke study group (76% increased). The 4.13 times more increase in poor glycemic control in hemorrhagic stroke study group in CKD patients is true and significant and has not occurred by chance (p=0.0468).

This study exposes an association between poor glycemic control and hemorrhagic stroke in CKD patients and predicts its future risk. Aggressive control of glycemic status allows decreasing the risk of hemorrhagic stroke in CKD patients substantially. This clearly indicates the importance of glycemic control for stroke prevention in CKD patients.

Incidence of hypertension was 90.1% in ischemic stroke and 75% of hemorrhagic stroke. Large epidemiological studies have shown that control of systolic hypertension less than 120 have decreased the incidence of stroke by 2.5 times[33]. Atrial fibrillation in ischemic stroke was 18.18%. the incidence of obesity was 36.36% in ischemic and 75% in hemorrhagic group.

Anemia has shown to increase the risk of stroke in CKD population[35]. 72.7% of the study subject in ischemic stroke were anemic (mean Hb 9.41 gm/dl). 75% of the study subjects in hemorrhagic stroke were anemic in CKD patients. ARIC study showed that the combination of CKD and anemia was associated with substantial increase stroke risk independent of other known risk factors.

Coronary artery disease in ischemic stroke was 45.45% and in hemorrhagic stroke was 50% in CKD population. The incidence of obesity in ischemic stroke group was 36.36% (n=8) and in the hemorrhagic stroke group it was 75% (n=3) in CKD patients. The incidence of hypercholesterolemia among CKD patients in ischemic stroke group was 22.73% (n=5) and in the hemorrhagic stroke group it was 25% (n=1). Urine albumin creatinine ratio was elevated in 94.95% of the patient with ischemic stroke and 100% of the study subjects with hemorrhagic stroke. 59.09% of the study subjects in the ischemic stroke were in CKD stage 5 followed by 36.36% in CKD stage 4. In the hemorrhagic stroke study subject 50% were in CKD stage 5 followed by 25% in CKD stage 4 and 3. Meta analysis of 83 studies demonstrated a linear relationship between decreasing GFR and risk of stroke and increasing albuminuria and risk of stroke[15].

Limitations of our study was low sample size, population restricted to our hospital, only the patient with stroke were evaluated and poor financial support.

CONCLUSION

Out of 1428 CKD patient studied from the period of march 2015 to august 2016, the incidence of stroke presentation was 1.82% in CKD population which is much higher than the general population. Stroke was found to be more in males in the age group of 51 -70 yrs. Brain infarcts were more prevalent than brain haemorrhages. Hypertension, anemia and diabetes were found to be important risk factors for stroke in CKD population than general population. Our study exposes

an association between poor glycemic control and hemorrhagic stroke in CKD patients and predicts its future risk indicating importance of glycemic control for stroke patient in CKD.

Bibilography

1. Power A, Epstein D, Cohen D, Bathula R, Devine J, Kar A, *et al*: Renal impairment reduces the efficacy of thrombolytic therapy in acute ischemic stroke. *Cerebrovasc Dis* 2013; 35: 45-52.
2. Foley RN, Gilbertson DT, Murray T, Collins AJ: Long interdialytic interval and mortality among patients receiving hemodialysis. *N Engl J Med* 2011; 365: 1099-1107.
3. Appraising stroke risk in maintenance hemodialysis patients: a large single-center cohort study. *Am J Kidney Dis* 2012; 59: 249-257.
4. Kawamura M, Fijimoto S, Hisanga S, Yamamoto Y, Eto T. Incidence, outcome and risk factors of cerebro vascular events in patients undergoing maintenance hemodialysis. *Am J Kidney Dis*. 1998; 31:991-6.
5. Abramson JL, Jurkovitz CT, Vacarino V, Weintraub WS, McClellan W. Chronic kidney disease, anemia and incident stroke in a middle aged community based population: The ARIC Study. *Kidney Int.* 2003; 64:610-5.
6. Toyoda K, Fujii K, Fujimi S, Kumai Y, Tsuchimochi H, Ibayashi S, *et al*. Stroke in patients on maintenance hemodialysis 22 year single-center study. *Am J Kidney Dis*. 2005; 45:1058-66.
7. Chronic kidney disease & risk of stroke. A systemic review and Metaanalysis. Philip Masson; Angela C Webstar, Martin Hon; Robin Turnur; Richard Lindley; Jhonathan C. Craig. *Nephro Dial Transplant,* 2015, 30 (7):- 1162 - 1169
8. Sozio SM, Armstrong PA, Coresh J, *et al*. Cerebrovascular disease incidence, characteristics, and outcomes in patients initiating dialysis: the choices for healthy outcomes in caring for ESRD (CHOICE) study. *Am J Kidney Dis* 2009; 54: 468-77
9. Ocak G, van Stralen KJ, Rosendaal FR, *et al*. Mortality due to pulmonary embolism, myocardial infarction, and stroke among incident dialysis patients. *J Thromb Haemost* 2012; 10:2484-93.
10. Iseki K, Kinjo K, Kimura Y, *et al*. Evidence for high risk of cerebral hemorrhage in chronic dialysis patient, KI 1993, 44:- 1869 - 90.
11. Toyoda K, Fujii K, Fujimi S, *et al*. Stroke in patients on maintenance hemodialysis: a 22-year single-center study. *Am J Kidney Dis* 2005; 45: 1058-66.
12. Sanchez-Perales C, Vazquez E, Garcia-Cortes J, *et al*.Ischaemic stroke in incident dialysis patients. *Nephrol Dial Transplant*. 2010; 25: 3343-8.
13. Murray AM, Seliger S, Lakshminarayan K, Herzog CA, Solid CA: Incidence of stroke before and after dialysis initiation in older patients. *J Am Soc Nephrol* 2013; 24: 1166-1173.
14. Oliveras A, Roquer J, Puig JM, *et al*. Stroke in renal transplant recipients: Epidemiology, predictive risk factors and outcome. *Clin Transplant* 2003; 17: 1-8
15. Adams Jr HP, Dawson G, Coffman T J, *et al*. Stroke in renal transplant recipients. *Arch neurology*, 1986: 43: 113 - 115
16. Shimmura H, Tanabe K, Tokumoto T, *et al*. Analysis of cause of death with a functioning graft; a single centre experience. Transplant Proc 2004; 36 2026 - 2029.
17. Ovbiagele B, Sanossian N, Liebeskind DS, Kim D, Ali LK, Pineda S, *et al*: 2009; 28: 582-588.
18. Agrawal V, Rai B, Fellows J, McCullough PA: In-hospital outcomes with thrombolytic therapy in patients with renal dysfunction presenting with acute ischaemic stroke. *Nephrol Dial Transplant* 2010; 25: 1150-1157.
19. Ovbiagele B: Chronic kidney disease and risk of death during hospitalization for stroke. *J Neurol Sci* 2011; 301: 46-50.
20. Ninomiya T, Perkovic V, Gallagher M, JardineM, Cass A, Arima H, *et al*: Lower blood pressure and risk of recurrent stroke in patients with chronic kidney disease: Progress trial. *Kidney Int* 2008; 73: 963-970
21. Jardine MJ, Ninomiya T, Perkovic V, Cass A, Turnbull F, Gallagher MP, *et al*: Aspirin is beneficial in hypertensive patients with chronic kidney disease: a post-hoc subgroup analysis of a randomized controlled trial. *J Am Coll Cardiol* 2010; 56: 956-965
22. Singh AK, Szczech L, Tang KL, Barnhart H, Sapp S, Wolfson M, Reddan D, for the CHOIR investigators: Correction of anemia with epoetin alfa in chronic kidney disease. *N Engl J Med* 355 :2085- 2098, 2006
23. Sood MM, Larkina M, Thumma JR, TentoriF, Gillespie BW, Fukuhara S, *et al*: Major bleeding events and risk stratification of antithrombotic agents in hemodialysis: results from the DOPPS. *Kidney Int* 2013; 84: 600608.
24. Wanner C, Krane V, Marz W, Olschewski M, Mann JF, Ruf G, *et al*: Atorvastatin in patients with type 2 diabetes mellitus undergoing hemodialysis. *N Engl J Med* 2005; 353: 238-248.
25. Mathew A, Eliasziw M, Devereaux PJ, MerinoJG, Barnett HJ, Garg AX, *et al*: Carotid endarterectomy benefits patients with CKD and symptomatic high-grade stenosis. *J Am SocNephrol* 2010; 21: 145-152

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