

Research Article**A STUDY OF CLINICAL AND ETIOLOGICAL PROFILE IN ELDERLY PATIENTS PRESENTING WITH ALTERED MENTAL STATUS****Nahil Najfi^{1*}, Sagar Bagodi², Aslam Basha K³**

^{1*} Assistant Professor, Department of General Medicine, Koppal Institute of Medical Sciences, Koppal, Karnataka.

² Senior Resident, Department of General Medicine, Koppal Institute of Medical Sciences, Koppal, Karnataka.

³ Assistant Professor, Dept of General Surgery, Mahavir Institute of Medical Sciences, Vikarabad.

*Corresponding author: Dr. Nahil Najfi, Assistant Professor, Department Of General Medicine, Koppal Institute of Medical Sciences, Koppal, Karnataka, India.

Received date: 05-07-2026, Date of Acceptance: 23-07-2026,

Date of Publication: 12-08-2026

Abstract:**Background**

Altered mental status (AMS) is a challenging diagnosis in elderly patients and has a wide range of Etiologies.

Objectives: To know the clinical and etiological profile in elderly, so that physicians will be better aware of AMS backgrounds and thus improving morbidity and mortality rates of the patients.

Methodology: This is a prospective observational study conducted at Emergency department (ED) or Medical ICU (MICU) of SDM hospital, Dharwad, from 1st November 2019 to 30th December 2020. Patients aged 65 years and older who presented to the ED or MICU with AMS, with symptoms ranging from comas and combativeness, were eligible for inclusion in this study. They were examined, necessary investigations were done to know the Etiologies and were recorded.

Results: Among 100 elderly patients most of the patients i.e 64% belonged to young old [65-74 age group], 30% belonged to old [75-84 age group] and 6% belonged to oldest old (>85years). 61% were males and 39% were females. Etiological profile showed most common cause for AMS as neurological cause(40%) among them CVA being most common; followed by metabolic encephalopathy(29%) among them most common being hyponatremia; followed by AMS due to multiple causes (2 or more – 24%); followed by infectious cause (6%) and lastly 1 case of hypertensive encephalopathy. Most common comorbidities found were hypertension (71%) and type 2 diabetes mellitus (50%) overall; 28% had both diabetes mellitus and hypertension whereas 24% had multiple comorbidities.

Conclusion: In this study the most common cause for altered sensorium in elderly was neurological cause (40%) followed by metabolic encephalopathy (29%) followed by

multifactorial causes (24%) and lastly infectious cause. Most of the patients clinically presented as drowsy to lethargic as part of AMS. The findings in this study is consistent with all other studies except infectious causes. The elderly patients who present with AMS must be screened for above etiologies on priority by the physicians. This study helps the physicians to have an idea regarding common causes of AMS in elderly patients at presentation. Hence approach, necessary investigations required for diagnosing the patient is known so that appropriate treatment is initiated as early as possible, thus reducing morbidity and mortality.

Keywords: Elderly, Altered Mental Status, Etiology, RASS Score

INTRODUCTION

Altered Mental Status (AMS) is a state which encompasses various states of level of consciousness ranging from combativeness to a completely unresponsive state coma.

The elderly population is defined as those 65 and older.(1)

Altered mental status is present in 10% of all elderly patients who present to emergency departments, yet it is only recognized 20% of the time.(2)

Altered Mental Status (AMS) is more common in elderly patients than younger patients admitted to Emergency Departments (Eds). The diagnosis of AMS in younger patients most of the times can be attributed to obvious toxicological or organ-specific disorders, whereas diagnosis in elderly is more difficult. However, mortality rates are higher in

elderly.(3-5) Hence, such patients need immediate care and accurate diagnosis.

Physicians on daily basis deal with patients presenting with AMS to ED or ICU or on outpatient basis. A patient with AMS presents a unique challenge to the physician as he will not be in a position to give history and most of the times his attendants may not give a reliable history.(6)

Major challenge faced by the attending physician is time constraint, as few conditions leading to AMS are reversible and if not reversed immediately will lead to permanent damage and in some cases death.(7)

Patients with AMS present with various levels of consciousness, ranging from coma to combativeness; these levels of consciousness are categorized by the Richmond Agitation and Sedation Scale (RASS).(8)

The terminologies like stupor, confusion, unconsciousness, and coma have been endowed with many meanings that it is most of the times not possible to avoid uncertainty in their usage. These terms are not strictly medical but literary, philosophic and psychological ones as well.(9)

Stupor and coma mean advanced brain failure. If it lasts for a long time the margin between recovery and development of permanent neurologic injury becomes narrower.(10)

There is always urgency to determine the underlying disease process causing AMS/ coma and the direction in which it is evolving so that physicians can protect the

brain against irreversible or more serious damage.(9)

Management of AMS in elderly is difficult as cognitive impairment among these patients usually results from acute illnesses unrelated to the central nervous system.(11-13)

This study was aimed to identify the clinical and etiological profile of acute AMS in elderly patients for better understanding of AMS, thereby properly treating the patient and reducing the mortality.

A study of AMS in elderly is important in developing countries like India as it is going to help in predicting outcome and also preventing vegetative state or coma. This will help in reducing financial burden on the family.

As there are very few studies regarding AMS in elderly, there is a need for large scale studies for better understanding of the pathophysiology, clinical profile, etiological profile, prognosis, morbidity and mortality due to various causes.

MATERIAL AND METHODS

This Prospective Observational Study was conducted in the Elderly patients presenting to SDMEmergency Department (ED) or Medical ICU (MICU) with Altered Mental Status (AMS).Duration of study was 1st November 2019 – 30th October 2020.

Inclusion criteria

Elderly individuals (65 years or more) presenting with altered mental status.

Exclusion criteria

- Terminally ill patients at baseline (long standing comatose bedridden patients)
- Trauma patients

Sampling Method: Simple Random Sampling.

Sample Size: 100

Method of collection of data: A printed proforma meeting the objectives of the study is prepared. The cases of the study are selected based on the above-mentioned inclusion and exclusion criteria. The data is collected according to proforma in terms of details of patient, history, clinical examination with necessary investigations.

Method:

After getting an informed consent from each patient in the study, relevant investigations are done.

- Preformed proforma is filled meeting objective of the study.
- RASS score is calculated for each patient.

Statistical Analysis: Data was entered in the excel spread sheet. Descriptive statistics of the explanatory and outcome variables were calculated by frequency and proportions for qualitative variables.

RESULTS

In this study most of the patients i.e 64% belonged to young old [65-74 age group], 30% belonged to old [75-84 age group] and 6% belonged to oldest old (>85years).In this study (n=100) males were 61% and females 39%.

TABLE 1 : Distribution of etiology of altered mental status (AMS)

ETIOLOGY OF AMS	Frequency	Percent (%)
CVA – infarct	25	25
CVA – infarct + ME – Hypoglycemia – Multifactorial	1	1
CVA – infarct+Septic encephalopathy – Pneumonia	6	6
CVA – infarct+Septic encephalopathy –Urosepsis	2	2
CVA – infarct+ME –Hyponatremia– drug induced	1	1
CVA – infarct+ME – Hypoglycemia – drug induced	1	1
CVA – infarct+ME – Hypoglycemia – sepsis induced	1	1
CVA – Bleed	10	10
Septic encephalopathy – Pneumonia	1	1
Septic encephalopathy – Pneumonia +ME –Hyponatremia	1	1
Septic encephalopathy – Pneumonia+ Urosepsis	1	1
Septic encephalopathy –Pneumonia andUrosepsis+ME – Hyponatremia– GI loss	1	1
Septic encephalopathy – Pneumonia andUrosepsis+ME – Uremia	1	1
Septic encephalopathy – Pneumonia+ME – Hypoglycemia – sepsis	2	2
Septic encephalopathy –Urosepsis	5	5
Septic encephalopathy –Urosepsis+ME –Hyponatremia– drug induced	1	1
Septic encephalopathy –Urosepsis+ME – Uremia	1	1
ME –Hyponatremia– drug induced	15	15
ME –Hyponatremia– SIADH	3	3
ME –Hyponatremia– GI loss	1	1
ME –Hyponatremia– Multifactorial	2	2
ME – Hyponatremia – CCF	1	1
ME – Hypoglycemia – drug induced	2	2
ME – Hypoglycemia – sepsis	4	4
ME – Hypoglycemia – Hepatocellular Carcinoma	1	1
Meningoencephalitis– Tubercular	1	1
Meningoencephalitis– Tubercular+Septic encephalopathy – Pneumonia	1	1
Meningoencephalitis– Viral	2	2
Meningoencephalitis– Viral+Septic encephalopathy –	1	1

Urosepsis		
Seizure – Metabolic + Septic encephalopathy – Pneumonia and Urosepsis	1	1
Seizure – Breakthrough	2	2
Seizure – Scar epilepsy+Septic encephalopathy – Urosepsis and Pneumonia	1	1
Hypertensive Leucoencephalopathy	1	1
Total	100	100

In this study (n=100) 40% of patients had AMS due to Neurological cause, which is most common cause of AMS.

TABLE 2 : Distribution of Associated Comorbidities

ASSOCIATED COMORBIDITIES	Frequency	Percent(%)
Nil	13	13
HYPOTHYROIDISM	1	1
HYPOTHYROIDISM+T2 DM+HTN	2	2
T2 DM	4	4
T2 DM+HTN	28	28
T2 DM+HTN+BPH	1	1
T2 DM+HTN+Old CVA	2	2
T2 DM+HTN+SEIZURE DISORDER	1	1
HTN	20	20
HTN+BPH+Old CVA	1	1
HTN+Old PTB	1	1
HTN+Old CVA	2	2
HTN+MALIGNANCY	1	1
BPH	2	2
Old PTB	1	1
MALIGNANCY	1	1
IHD	2	2
IHD+T2 DM+HTN	6	6
IHD+HTN	1	1
IHD+COPD+BPH+Old CVA+SEIZURE DISORDER	1	1
PARKINSONISM	1	1
PARKINSONISM+T2 DM+HTN	2	2
PARKINSONISM+HTN	1	1
PARKINSONISM+Old CVA	1	1

COPD	1	1
COPD+HYPOTHYROIDISM+ACUTE ON CKD+HTN	1	1
COPD+T2 DM+HTN	1	1
COPD+HTN+MALIGNANCY	1	1
Total	100	100

In this study 28% were both Diabetic and Hypertensive, 26% had multiple comorbidities (2 or more), 20% were Hypertensive only, 13% had no comorbidities, 4% had diabetes mellitus only, 2% BPH only, 2% IHD only, 1% COPD only, 1% PTB only, 1% - Hypothyroidism only, 1% - parkinsonism only, 1% - Malignancy only.

Number of Diabetics overall were 50% and Hypertensive were 71% (including multiple comorbidities)

TABLE 3: Distribution of Pulse Rate

PR (BPM)	Frequency	Percent(%)
NORMAL (60-100)	68	68.0
TACHYCARDIA(>100)	28	28.0
BRADYCARDIA(<60)	4	4.0
Total	100	100.0

In this study 68% had normal heart rate, 28% had tachycardia and 4% had bradycardia. Also 78% had normal spo2 levels and 22% had hypoxia. 41% had normal hemoglobin level whereas 59% had anemia (mild – 27, moderate- 28, severe – 4). 47% had normal leucocyte count, 51% had leukocytosis and 2% had leucopenia. 80% had normal platelet count and 20% had thrombocytopenia. 49% had normal sodium levels and 51% had hyponatremia (<135 mmol/L). 13% had normal albumin levels and 87% had hypoalbuminemia.

TABLE 4 : Distribution of Systolic Blood Pressure

SBP	Frequency	Percent(%)
NORMAL (100 -119 MMHG)	15	15.0
ELEVATED (120-129 MMHG)	14	14.0
HYPERTENSION STAGE 1 (130 – 139 MMHG)	4	4.0
HYPERTENSION STAGE 2 (140 MMHG OR HIGHER)	50	50.0
HYPERTENSIVE CRISIS (>180MMHG)	13	13.0
HYPOTENSION (<100MMHG)	4	4.0
Total	100	100.0

TABLE 5: Distribution of Diastolic Blood Pressure

DBP	Frequency	Percent(%)
-----	-----------	------------

NORMAL (60-79MMHG)	17	17.0
HYPERTENSION STAGE 1 (80-89 MMHG)	35	35.0
HYPERTENSION STAGE 2 (90MMHG OR HIGHER)	42	42.0
HYPERTENSIVE CRISIS (>120MMHG)	2	2.0
HYPOTENSION (<60MMHG)	4	4.0
Total	100	100.0

TABLE 6: Distribution of SPO2 levels

SPO2 (% @ RA)	Frequency	Percent
NORMAL (94-100%)	78	78.0
HYPOXIA (<94%)	22	22.0
Total	100	100.0

TABLE 7: Distribution of RAAS (Richmond Agitation and Sedation Scale) index

RAAS	Frequency	Percent
-5	4	4.0
-4	10	10.0
-3	7	7.0
-2	12	12.0
-1	38	38.0
1	24	24.0
2-4	5	5.0
Total	100	100.0

DISCUSSION

Chronic changes in mental status usually occurs over months to years, and usually not require urgent intervention. Acute changes in mental status occurs within hours to days, and require critical care due to life-threatening sequelae. Appropriate approach and accurate diagnosis is crucial for providing proper treatment. As Emergency Department or Medical ICU are usually the first point of contact with physicians, accurate diagnosis and critical care in these locations are very important for elderly AMS patients. (14, 15)

In a survey of Emergency Department residency program directors, majority reported that evaluation and management of acute mental status changes was more difficult for elderly than younger patients.(16)

In this study most of the patients i.e 64% belonged to young old [65-74 age group], 30% belonged to old [75-84 age group] and 6% belonged to oldest old (>85years). Similarly in other studies like John B et al (17) (n=251), 74.1% aged 60-75years, 20.3% aged 76-85years, 5.58% >85 years. Median age was 77 years in aslaner mehmat ali et al (n=822) study. Median age was 78.7 years in L.wofford et al (18) study. 41.2% were >60 years in xiao et al (4) study.

In this study (n=100) males were 61% and females 39%.

Similarly in other studies like John B et al (17) (n=251), 46.18% were males and 43.82% were females. 47.7% male and 52.3% females in aslaner mehmat ali et al (42) (n=822) study. 34% were males and

66% females in L.wofford et al (18) (n=153).

Etiologies:

Diagnosis of AMS is a lengthy process; hence, physicians must be aware of the differential diagnoses and should consider a range of clinical possibilities. However, if the initial diagnosis is incorrect, the consequences are detrimental and can lead to mortality.(19)

In this study (n=100) 40% of patients had AMS due to Neurological cause, which is most common cause of AMS.

Similarly in study by John B et al (17) (n=251), 38.65% of AMS was due to neurological cause and was most common cause. 36.5% in aslaner mehmat ali et al (20) and was most common cause. Findings were consistent with this study.(20)

Whereas 1934 patients were studied in Xiao et al(4), where 797 were elderly. 35% had Neurological cause for AMS in total (2nd common cause) and 49.3% were elderly among total. Neurological causes for altered mental status in study conducted by L. Wofford et al(18) (n=153) was 20.2% which was 3rd common cause for AMS.

In this study (n=100) 35% of patients had CVA, among them 25% had infarct and 10% had intraparenchymal bleed, whereas in the study conducted by aslanermehmat ali et al(20) (n=822)28.5% of patient had CVA among which 23.1% had infarct (ischemia) and 5.4% had bleed. 59.79% had CVA in study by John B et al(17), among them 72.24% had ischemic stroke.

In this study CVA is the most common neurological cause whereas in study

conducted by aslaner mehmat ali et al (20) CVA is second most common cause.

Previous studies have shown that stroke is rarely a cause of the acute confusional state. (47,48). However in this study CVA is one of the most common cause for AMS in elderly and above studies go in favour of CVA as common cause for AMS.

In this study (n=100) only 3% had AMS due to meningoencephalitis and 2% as seizures, whereas 2.4% had meningoencephalitis and 3.3% had seizures in xiao et al(4) and findings are consistent with this study.

In this study (n=100) 29% had Metabolic Encephalopathy, among them 22% were because of hyponatremia (most common cause is drug induced) and 7% were because of hypoglycemia due to various causes.

Similarly in study conducted by John B et al (17) (n=251) 33.47% had metabolic encephalopathy, among them 45.24% was due to hyponatremia, 29.76% due to hypoglycemia and rest due to other causes. Findings are consistent with our study.

Other studies like aslaner mehmat ali et al (20) (n=822), 17.3% had metabolic cause for encephalopathy. 22.9% in study conducted by L.wofford et al (44). 7.9% (among them 6.3% were elderly) in study by xiao et al (4) had metabolic encephalopathy.

In this study (n=100) only 6% had AMS secondary to septic encephalopathy, whereas 39.5% in aslaner mehmat ali et al(42), 26.1% in L.wofford et al(44), 9.1% (10.4% among elderly) in xiao et al(4).36.65% in john B et al (17). All the comparative studies had infective etiology as one of the most common cause whereas in this study only 6% is the only cause for septic encephalopathy. The reason being

most of the patients had multiple etiologies along with sepsis, which were grouped under multifactorial etiology for AMS.

In this study (n=100) 24% had AMS secondary to multiple causes, similarly 19.3% in aslanermehmatali et al (20). 29.88% in John B et al (17). Findings are consistent with other studies.

Our study has no patients with unknown etiologies like other studies (4, 16);

COMORBIDITIES

In this study 28% were both Diabetic and Hypertensive, 26% had multiple comorbidities (2 or more), 20% were Hypertensive only, 13% had no comorbidities, 4% had diabetes mellitus only, 2% BPH only, 2% IHD only, 1% COPD only, 1% PTB only, 1% - Hypothyroidism only, 1% - parkinsonism only, 1% - Malignancy only.

Number of Diabetics overall were 50% and Hypertensive were 71% (including multiple comorbidities)

It is comparable with study conducted by John B et al (17). Mainly 60.96% were hypertensive, 45.42% were diabetic and 10.76% had no comorbidities.

In this study 68% had normal heart rate, 28% had tachycardia and 4% had bradycardia. Also 78% had normal spo2 levels and 22% had hypoxia. 41% had normal hemoglobin level whereas 59% had anemia (mild-27, moderate- 28, severe-4). 47% had normal leucocyte count, 51% had leukocytosis and 2% had leucopenia. 80% had normal platelet count and 20% had thrombocytopenia. 49% had normal sodium levels and 51% had hyponatremia (<135 mmol/L). 13% had normal albumin levels and 87% had hypoalbuminemia.

Similarly study by John B et al (17) had 59.57% anemia in males and 72.73%

anemia in females, 59.76% had leukocytosis, 23.11% had thrombocytopenia. 49% had hyponatremia. All the values are consistent with the present study.

RAAS index

In this study Coma-stupor (RASS -5 and -4) was observed in 15% of the patients (4% and 10% respectively); lethargy (RASS -3,-2,-1) was observed in 57% of the patients (7%,12%,38% respectively); and awakesness-hyperalertness (RASS +1,+2 to+4) was observed in 29% of the patients (25% and 5% respectively)

Similarly Coma-stupor (RASS -5 and -4) was observed in 17.3% of the patients (3.2% and 14.1%, respectively); lethargy (RASS -3 -2 -1) was observed in 59.6% patients (17.0%, 22.3%, and 20.3%, respectively); and awakesness-hyperalertness (RASS 0 +1 +2 +3 +4) was observed in 23.1% of the patients (7.2%, 10.7%, 4.9%, 0.4%, and 0.0%, respectively) (17).

LIMITATION

- Sample size of this study is small and large scale study is required for its application to the general population.
- Covid Pandemic situation has come during the study period. Due to fear of Covid Pandemic, elderly patients with AMS especially with sepsis avoided hospital care resulting in less number of patients with septic encephalopathy.

CONCLUSION

In this study the most common cause for altered sensorium in elderly was neurological cause (40%) followed by metabolic encephalopathy (29%) followed by multifactorial causes (24%) and lastly infectious cause. Most of the patients

clinically presented as drowsy to lethargic as part of AMS. The findings in this study is consistent with all other studies except infectious causes. This study helps the physicians to have an idea regarding common causes of AMS in elderly patients at presentation. Hence approach, necessary investigations required for diagnosing the patient is known so that appropriate treatment is initiated as early as possible, thus reducing morbidity and mortality.

REFERENCES

1. Gower LE, Gatewood MO, Kang CS. Emergency department management of delirium in the elderly. *West J Emerg Med*, 2012 May; 13(2): 194–201.
2. Fitch MT. Altered Mental Status in the Elderly: Neurologic Nightmares. Presentation at Boston Scientific Assembly, October 2009, www.acep.org/workarea/downloadasset.aspx?id=46370
3. Kekec Z, Senol V, Koc F, Seydaoglu G. Analysis of altered mental status in Turkey. *Int J Neurosci*. 2008;118(5):609-17
4. Xiao HY, Wang YX, Xu TD, Zhu HD, Guo SB, Wang Z, et al. Evaluation and treatment of altered mental status patients in the emergency department: Life in the fast lane. *World J Emerg Med*. 2012;3(4):270-7
5. Leong LB, Jian KH, Vasu A, Seow E. Prospective study of patients with altered mental status: clinical features and outcome. *Int J Emerg Med*. 2008;1(3):179-82.
6. Yerasi V, Reddy MBBS, College JJMM. “clinical study of non traumatic state of altered sensorium” department of general medicine. 2015.
7. David bates. Predicting recovery from medical coma. *Journal of applied medicine* 1989Nov; 719-723.
8. Sessler CN, Gosnell MS, Grap MJ, Brophy GM, O'Neal PV, Keane KA, et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care unit patients. *Am J Respir Crit Care Med*. 2002;166(10):1338-44.
9. Coma and Related Disorders of Consciousness. In: Allan H. Ropper, Martin A. Samuels, eds. *Adams & Victor's Principles of Neurology*, 9e. New York, McGraw Hill. 2009.339-362
10. Pathophysiology of signs and symptoms in coma. In: Jerome B. Posner, Clifford B. Saper, Nicholas D. Schiff, Fred Plum, eds. *Plum and Posner's The diagnosis of stupor and coma*, 4e. New York, Oxford University Press, Inc. 2007. 3-4
11. Francis J: Delirium in older patients. *J Am Geriatr Soc* 1992;40: 829-838
12. Purdie FR, Honigman B, Rosen P: Acute organic brain syndrome: A review of 100 cases. *Ann Emerg Med* 1981 ;10:455-461
13. Fields SD, MacKenzie R, Charlson ME, Perry SW: Reversibility of cognitive impairment in medical inpatients. *Arch Intern Med* 1986; 146:1593-1596
14. Han JH, Wilber ST. Altered mental status in older patients in the emergency department. *Clinics in geriatric medicine*. 2013;29(1):101-36
15. Aslaner MA, Akkaş M, Eroğlu S, Aksu NM, Özmen MM. Admissions of critically ill patients to the ED intensive care unit. *The American Journal of Emergency Medicine*. 33(4):501-5
16. Jones JS, Rousseau EW, Schropp MA, Sanders AB: Geriatric training in

emergency medicine residency programs.

Ann Emerg Med 1992;21:825-829

17. John B, Loomba V, John M. Etiology, Clinical Profile and Outcome of Encephalopathy in Elderly. J Assoc Physicians India. 2020 Mar;68(3):63-66. PMID: 32138487.

18. Wofford JL, Loehr LR, Schwartz E. Acute cognitive impairment in elderly ED patients: etiologies and outcomes. Am J Emerg Med. 1996 Nov;14(7):649-53. doi: 10.1016/S0735-6757(96)90080-7. PMID: 8906762.

19. Odiari EA, Sekhon N, Han JY, David EH. Stabilizing and Managing Patients with Altered Mental Status and Delirium. Emerg Med Clin North Am. 2015;33(4):753-64

20. Aslaner Mehmet Ali, Boz Mustafa, C, elik Ali, Ahmedali Asliddin, Eroğlu Serkan, Aksu Nalan Metin, Eroğlu Serkan Emre, Etiologies and Delirium Rates of Elderly ED Patients with Acutely Altered Mental Status: A Multicenter Prospective Study, American Journal of Emergency Medicine (2016).