

# Acute confusional state in hospitalised older adults; a preliminary study of the causes and associated factors

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## ABSTRACT

**Introduction:** Acute confusional state is common among hospitalized elderly. It causes considerable expenses to the healthcare system and distress to the patients and caregivers. Identification of causes of acute confusional state can facilitate its timely and optimal management, thereby reducing its adverse consequences. The objectives of this study were to determine the causes and associations of acute confusional state among hospitalised older adults in Teaching Hospital, Karapitiya.

**Methods:** A cross-sectional study was conducted among 105 patients, aged 50 years or more, with acute confusional state admitted to Teaching Hospital, Karapitiya. An interviewer-administered questionnaire was used to collect data from patients and other relevant data were extracted from patients' records. Chi-square test was used to assess the association between variables.

**Results:** Mean (SD) age of the sample was 70.9 (6.5) years, with nearly equal numbers of males and females. Approximately 37% had some chronic disease. Cerebral causes accounted for 52.4% of the cases of acute confusional state, including meningitis (14.3%), intra-cerebral haemorrhage (10.5%) and cerebellar infarction (9.5%). Common non-cerebral causes included urinary tract infections (15.2%) and hepatic encephalopathy (8.6%). Majority (59%) required inward care for 1-2 weeks. There was no significant difference between the proportion of cerebral and non-cerebral causes. Acute confusional state due to cerebral causes was associated with prolonged hospital stay ( $p < 0.01$ ).

**Conclusions:** This study identified common causes for acute confusional state among hospitalized elderly. Health professionals can use this information for early identification of predisposing factors, facilitating timely diagnosis and management of these patients.

**Keywords:** Acute confusional state, delirium, elderly

## Introduction

Acute confusional state is a common occurrence among the elderly patients admitted to hospitals and a significant course of distress to the patients and their caregivers (1, 2). It is a disorder of consciousness which is also identified by several synonyms including 'delirium', 'organic brain syndrome', and 'acute cerebral insufficiency' (2).

Patients with confusional state have deterioration of cognitive functions and the level of consciousness (3), which may be a residual effect of an organic disease (4).

The prevalence of acute confusional state reported in the literature varies from 14% to over 50% (2,5). In Intensive Care Units (ICU), this figure may even go up to 80% (5). Although often overlooked,

acute confusional state or delirium is now considered to be a major contributory factor for increased morbidity and mortality among patients treated in ICU, making it necessary to monitor all ICU patients for this condition (5).

The consequences of acute confusional state can affect not only the patients and their caregivers, but also the health care system of a country (2). Patients with acute confusional state cause the healthcare system considerable expenses as they may need prolonged hospital stays (5-7). The development of delirium in a hospitalised patient can cause disturbances in his or her management, disrupt ward routine and may result in injury to the patient leading to medico-legal complications (7-9). These patients can have lower six-month survival compared to patients without delirium (5). According to Girard *et al.*, recent evidence point to an association between acute confusional state and cognitive impairment which persists months to years following discharge from the hospital (5). Thus, in addition to individual suffering, this condition causes a significant impact on their caregivers due to these consequences. Therefore, early diagnosis and treatment of its underlying cause/s are essential to prevent the excess burden on patients, carers and health systems (9).

Lorenzl *et al.*, describe common precipitating factors of acute confusional state or delirium among elderly patients. They include noxious substances and hospitalization-related factors (triggers) such as acute illnesses (infections), operations, catheters, diagnostic procedures, sedatives, anticholinergic drugs, sensory deprivation, psychosocial stress, physical restraints, moves from one room to another, changes of the treating staff, surgical complications, iatrogenic complications of any kind (new pressure sores, catheter-related complications), acute metabolic derangements, and more than three new medications (2). Other co-morbid conditions such as dementia, cerebrovascular and cardiopulmonary disease and cancers are also known to aggravate the risk of delirium in patients (10).

The diagnosis of delirium is based on clinical observations, cognitive assessment, physical, and neurological examination (2,9). Despite the increasing understanding of pathophysiological mechanisms and risk factors of this clinical condition, delirium is frequently under recognised and often misdiagnosed by health professionals (9).

Timely and optimal management of delirium in hospitalised patients is of paramount importance in reducing its adverse outcomes and minimising the unnecessary costs to the patients and the healthcare system. Early identification of possible underlying causes contributes to the successful management of these patients (9). This study aimed to describe the underlying causes of acute confusional state among older adults admitted to medical and surgical wards in a Sri Lankan setting and to identify their association with some factors such as age, gender and presence of co-morbid conditions. Studies on the causes and associated factors of acute confusional state among patients in general medical and surgical wards are sparse even in the western literature; therefore, the findings of this study will add further evidence to the existing knowledge. This information will be useful to make health professionals aware about the common causes of this grave and debilitating condition in the local settings and facilitate identification of high risk groups, early diagnosis and timely management.

## Methods

This cross-sectional study was conducted in the Teaching Hospital (TH), Karapitiya, as a preliminary study to identify the causes of acute confusional state and some of its associations. The patients with acute confusional state admitted to the medical and surgical wards of TH, Karapitiya over a period of one year were recruited. The sample included 105 patients with a confirmed diagnosis of acute confusional state, aged above 50 years. The standard diagnostic algorithm from Practical Geriatric Assessment authored by Howard M. Fillit and Gloria Picariello was used to diagnose acute confusional state. Investigations such as mid-stream urine sample, urine culture, full blood count, erythrocyte sedimentation rate, serum electrolytes, serum calcium, TSH, T4, renal function, liver function, blood glucose, CT scan brain, EEG and ECG were carried out in all patients selected for the study.

An interviewer-administered questionnaire was used to collect data on sociodemographic characteristics of the participants. Data pertaining to the clinical condition including cause for the acute confusional state, co-morbidities and the duration of hospital stay were extracted from case notes and other relevant clinical records using a data extraction sheet.

The data collection team comprised of the principal investigator and two post-intern medical officers. All data collectors were adequately trained prior to data collection, to minimise interviewer bias and to ensure quality of data.

All medical and surgical wards were visited daily by the data collecting team to identify the patients fulfilling diagnostic criteria. Identification was done using the information available in the Case notes, diagnosis cards and/or clinic records. The socio-demographic details of the patients were obtained from the principal caregiver, after obtaining written informed consent. Other relevant clinical details were extracted from the Case notes and relevant clinical records. The study was carried out after obtaining ethical clearance from the Ethical Review Committee, Faculty of Medicine, Galle.

## Results

**Sample characteristics:** Nearly 95% of patients with acute confusional state in this sample were above 60 years. The majority came from rural areas (61.0%). The sample consisted of approximately equal numbers of males and females. Further, 34.3% of patients had no formal education. Nearly 37% of patients had some co-morbidity such as diabetes mellitus, hypertension or liver disease (Table 1).

**Causes of acute confusional state:** The causes of acute confusional state among these patients were determined according to the clinical presentation of the patients, examination findings and investigation results. According to the findings, the causes were categorised into six main categories, i.e. intracranial infections, intracranial haemorrhage, intracranial infarctions, cerebral metastasis, infections of other (non-cerebral) sites and metabolic causes. The cases that did not come under above categories

**Table 1: Distribution of basic characteristics of the patients admitted with acute confusional state (N=105)**

Basic characteristics	No.	%
Age (in completed years)		
50-60	6	5.7
61-70	51	48.6
Above 70	48	45.7
Mean (SD) age = 70.9(6.5) years, Median = 70 years		
Gender		
Male	53	50.5
Female	52	49.5
Sector		
Urban	41	39.0
Rural	64	61.0

Permission was obtained from the Director, Teaching Hospital, Karapitiya and the consultants in charge of the medical and surgical wards, prior to data collection.

All data were coded and entered in to a database created using SPSS (version 17.0). Chi square test was used to determine the statistical significance of the associations between variables.

were included as a miscellaneous group under non-cerebral causes (Table 2).

Nearly 48% of the cases of acute confusional state were due to non-cerebral causes, while 52% were due to cerebral causes, thus making it the more prevalent form. To determine whether the cerebral causes were more prevalent than the non-cerebral causes among the patients admitted to medical and surgical wards, we used Chi-square test assessing 'Goodness of fit'. According to the analysis, there was no statistically significant difference in the prevalence of cerebral causes and non-cerebral causes of acute confusional state ( $p > 0.05$ ).

A miscellaneous group of causes including acute myocardial infarction, deep vein thrombosis, acute urine retention and multiple medical problems accounted for acute confusional state in 9.5% of the patients.

**Association between selected patient characteristics and causes of acute confusional state:** The associations between causes of acute confusional state (cerebral vs non-cerebral) and selected patient characteristics such as age, gender, presence of co-morbid conditions and duration of hospital stay were assessed using Chi-square test (Table 3).

According to the findings, there were no significant associations between the cause of acute confusional state and age or gender of the patient ( $p > 0.05$ ). Similarly, the presence of co-morbidities did not show an association with the cause. However, there was a statistically significant association between the cause of acute confusional state and the duration of hospital stay of the patient ( $p < 0.01$ ). Patients who had a cerebral cause for acute confusional state were more likely to be hospitalised for a longer duration.

**Table 2: Distribution of causes of acute confusional state among the sample (N = 105)**

Causes of acute confusional state	No.	%
Intracranial infections (N = 24)		
Meningitis	15	14.3
Encephalitis	9	8.6
Intracranial haemorrhage (N = 19)		
Intracerebral haemorrhage	11	10.5
Subarachnoid haemorrhage	5	4.8
Subdural haemorrhage	3	2.9
Intracranial infarctions (N = 11)		
Cerebral infarction	1	0.9
Cerebellar infarction	10	9.5
Cerebral metastasis	1	0.9
Infections of other sites (N = 28)		
Pneumonia	7	6.7
Urinary tract infections	16	15.2
Cellulites	5	4.8
Metabolic causes (N = 12)		
Hypoglycaemia	1	0.9
Diabetic ketoacidosis	2	1.9
Hepatic encephalopathy	9	8.6
Miscellaneous (N = 10)		
Acute myocardial infarction	2	1.9
Deep vein thrombosis	2	1.9
Acute urine retention	1	0.9
Multiple medical problems	5	4.8

**Table 3: Association between the cause of acute confusional state (cerebral and non-cerebral) and selected patient characteristics**

Characteristic	Cause of acute confusional state		Total	p value
	Cerebral	Non-cerebral		
	N (%)	N (%)	N (%)	
Age				
Between 50-70 years	34 (59.6)	23 (40.4)	57 (100.0)	<i>p&gt;0.05</i>
Above 70 years	21 (43.8)	27 (56.2)	48 (100.0)	
Gender				
Male	32 (60.4)	21 (39.6)	53 (100.0)	<i>p&gt;0.05</i>
Female	23 (44.2)	29 (55.8)	52 (100.0)	
Co-morbidities				
Absent	36 (54.5)	30 (45.5)	66 (100.0)	<i>p&gt;0.05</i>
Present	19 (48.7)	20 (51.3)	39 (100.0)	
Duration of hospital stay				
1-2 weeks	24 (38.7)	38 (61.3)	62 (100.0)	<i>p&lt;0.001</i>
3-4 weeks	31 (72.1)	12 (27.9)	43 (100.0)	
<b>Total</b>	<b>55 (52.4)</b>	<b>50 (47.6)</b>	<b>105 (100.0)</b>	

## Discussion

Acute confusional state or delirium is a common occurrence among hospitalised elderly patients, which can have serious consequences for the well-being of the patient. Reported prevalence of acute confusional state varies from 14% to as high as 80% (2, 5), which could partially explain the increasing attention of researchers on the subject. However, different investigators have used different assessment scales such as NEECHAM scale and DSM-III-R criteria to diagnose this condition (7, 10, 11), which would have contributed to the reported variation in prevalence in different settings. In contrast to above methods of diagnosis, the present study used the standard diagnostic algorithm from Practical Geriatric Assessment authored by Howard M. Fillit and Gloria Picariello (12).

Despite being a familiar condition in a clinical setting, there are only a few studies published on this subject; virtually none among the Sri Lankan medical literature. In many of the published studies, the main objective of the authors was to identify the predictors for development of acute confusional state

(7, 13). Although this aspect was not looked into in the present study, its findings would undoubtedly shed light on an unknown facet - the causes and associations of acute confusional state among the patients receiving care from general medical and surgical wards in the local setting.

In our sample, the majority of patients who had developed acute confusional state were above 60 yrs (95%), from rural areas (61%) and were of lower socio-economic status. The sample consisted of same number of males and females. Presence of co-morbid conditions was seen only among 37.2% of patients suggesting that patients without co-morbidity are also susceptible to this condition. However, we were unable to find previous local studies for a meaningful comparison.

The common causes of acute confusional state described in the literature include, prescription medications (anticholinergic, narcotics and benzodiazepines), drug abuse (alcohol, opiates, ecstasy, ketamine and cocaine), metabolic conditions (hypoglycaemia, hyperglycaemia, hyponatraemia, hypothermia, hyperthermia,

pulmonary failure, cardiac failure, hepatic encephalopathy, vitamin deficiencies, dehydration and anaemia), infections (urinary tract infections, pneumonia, skin and soft tissue sepsis), endocrine conditions (hyper and hypothyroidism, hyperparathyroidism and adrenal insufficiency), cerebrovascular disorders (global hypoperfusion states, hypertensive encephalopathy, ischaemic and haemorrhagic strokes and cerebral metastasis), autoimmune disorders, seizure related disorders, neoplastic disorders and prolong hospitalisation (14). In the present study, among infections, the majority were due to urinary tract infections (15.2%), followed by meningitis (14.3%). Metabolic conditions accounted for 11.4% of all cases. In 4.8% of the cases, multiple medical problems were observed, which could have lead to the acute confusional state.

Several researchers have attempted to find predictors of acute confusional state or its associated factors. Williams *et al.* and Nikoletti *et al.* found a significant association of age with development of delirium (11, 13). Errors on a mental status test or cognitive impairment, level of pre-injury activity, presence of urinary catheter, presence of co-morbidities, depression and alcoholism were also found to be associated with this condition (7, 10, 11, 13,). Aldemir and co-researchers found a significant association of male sex with development of acute confusional state among patients in surgical intensive care units of a hospital in Turkey (10). Their study also revealed that there is a significant association between the development of delirium and the duration of hospital stay. However, there were no comparable studies that looked into the association between causes of acute confusional state and patient characteristics such as age, gender, presence of co-morbidities and the duration of hospital stay as described in the present study.

### Conclusions

This study was conducted as a pilot study to identify common causes of acute confusional state and associated factors. According to the findings, nearly half of patients had an extracranial etiology. Clinicians can use this information for early identification of predisposing factors, facilitating timely diagnosis and management of these patients. Although limited by the small sample size, the

findings of this study will guide the researchers to design methodologically superior studies in future involving increased sample sizes and more variables which are relevant for the management of the patient.

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