DOI: https://doi.org/10.53350/pjmhs020231712782

ORIGINAL ARTICLE

Etiological Spectrum of Acute Confusional States in Young Adults Presenting to Emergency Departments

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ABSTRACT

Background: Acute confusional state (ACS), clinically aligned with delirium, is characterized by acute onset of impaired attention, altered awareness, and fluctuating cognition. Although widely studied in elderly populations, limited evidence exists regarding its etiological distribution in young adults. This study aimed to determine the etiological spectrum and associated outcomes of ACS among young adults presenting to a tertiary care emergency department.

Methods: The study was an observational, hospital-based study that was carried out in the Department of Emergency Medicine, Lady Reading Hospital, Peshawar, between May 2022 and April 2023. Youths aged 18-40 years with clinically diagnosed ACS were recruited. Patients with chronic neurocognitive disorders and those with primary psychiatric conditions but not of organic nature were excluded. Standardized clinical assessment and pertinent lab and radiological tests were conducted to identify underlying etiologies. The SPSS version 26.0 was used to analyze the data.

Results :150 patients were used in the analysis (mean age 28.4 ± 6.1 years; 58.7% men). The most common causes were metabolic causes (34.0) and infectious (26.7), toxicological (18.0), neurological (12.7), and systemic/other causes (8.6). Most metabolic etiologies were hypoglycemia (12.0%) and hyponatremia (10.7), with meningitis and encephalitis being the most common infectious. The overall mortality was 6.7, with the highest mortality occurring on the infectious and neurological cases. The prolonged hospital stay was considerably linked to infectious and neurological etiologies (p = 0.02).

Conclusion: Metabolic and infectious causes predominate among young adults with ACS, with infectious and neurological etiologies associated with worse outcomes.

Keywords: Acute confusional state, delirium, young adults, emergency department, etiology

INTRODUCTION

On the clinical spectrum of delirium, acute confusional state (ACS) can be defined as a sudden change in consciousness, accompanied by impaired attention, disorganized thinking, and varying mental status[1,2,3]. It is a health care emergency that needs to be suspected and handled immediately in order to identify the causes.[4,5,6]. Despite the comprehensive scientific interest in delirium in geriatric and severely ill patients, relatively little effort has been given to the prevalence of delirium in young adults, whose etiological patterns, risk factors, and outcomes may be significantly different[7]. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), delirium is defined as an impairment of attention and awareness that ensues in a brief period of time and may vary in its severity as the day progresses with an additional impairment of cognition in the form of memory deficit, disorientation, or language.[8,9,10].

Acute confusional states present a major percentage of emergency department ED visits worldwide, complicating morbidity, lengthening hospital stay, and causing healthcare expenses[11]. Although the prevalence of delirium has been reported to vary between 14% to 56% in hospitalized elderly patients, young adults have little to no data.[12,13,14]. When younger, ACS can be a secondary result of acute systemic insults as opposed to neurodegenerative processes[4]. Examples of common causes include metabolic derangements, toxic exposures, infections, substance misuse, and primary neurological disorders, although patterns differ depending on epidemiology in regions and access to healthcare[15].

Meningitis, encephalitis, cerebral malaria, and sepsis are all examples of infectious etiologies that play a role in altered mental status in younger individua in resource-limited settings.[16,17,18]. At the same time, quick urbanization and rising outbreak of substance use disorders have invited a growing number of toxicological issues, among which there are drug overdose and substance use related complications[19].

Received on 10-07-2023
Accepted on 24-11-2023

Also established precipitants of acute cognitive dysfunction, usually reversible by prompt correction, are metabolic abnormalities like hypoglycemia, hyponatremia, hepatic encephalopathy and uremia[20]. Failure to diagnose and treat such conditions early enough can cause irreversible neurological injury or even death.

Emergency department is the main point of contact between acute illness and definitive care mostly in tertiary care facilities, which service large catchment areas[21]. Young adults presenting with ACS pose unique diagnostic challenges[4,22]. Unlike elderly patients, who often have baseline cognitive impairment or multiple comorbidities, younger patients may present with abrupt neurological deterioration without prior history, necessitating a broad and systematic diagnostic approach[4,22]. Rapid differentiation between structural, metabolic, infectious, and toxic causes is essential to guide targeted therapy[23]. Standardized evaluation protocols, including laboratory investigations, neuroimaging, toxicology screening, and cerebrospinal fluid analysis when indicated, are crucial in reducing diagnostic delay.

Despite the clinical significance of ACS in young adults, regional data describing its etiological spectrum remain limited, particularly in South Asian healthcare settings[15]. Understanding local patterns is essential for developing context-specific diagnostic algorithms, optimizing resource allocation, and improving patient outcomes. Previous studies conducted in mixed-age cohorts often underrepresent younger adults or fail to stratify etiologies by age group, thereby limiting applicability to this demographic[1]. Furthermore, the burden of communicable diseases and substance-related disorders in low- and middle-income countries may significantly influence etiological distribution compared to high-income settings[24].

Lady Reading Hospital, a major tertiary care teaching hospital in Peshawar, serves a diverse population from urban and rural regions, including underserved communities[25]. The emergency department encounters a substantial number of patients with altered mental status daily, yet comprehensive data specifically focusing on young adults are lacking. Identifying the predominant etiologies and associated clinical outcomes in this

population may facilitate early recognition of high-risk conditions and inform evidence-based management strategies.

Thus, the current research was undertaken to identify the etiological continuum of acute confusional states in young adult patients who visit the emergency department of a tertiary care hospital and to assess the relevant clinical features and outcomes. Through determining the causes behind the problem in this age group, the study will support the available literature and assist in designing age-specific diagnostic and therapeutic models within emergency medicine.

METHODOLOGY

The study was an observational study, carried out at the department of emergency medicine, Lady Reading Hospital, Peshawar, Pakistan, and a period of 12 months beginning in May 2022 and continuing to April 2023. The purpose of the study was to establish the etiological spectrum of acute confusional states (ACS) in young adults being taken to the emergency department (ED). Lady Reading Hospital is a teaching tertiary care hospital with a high volume of emergency that provides hospital services to both the urban and rural community of Khyber Pakhtunkhwa and beyond.

Eligibility was six consecutive patients aged between 18 and 40 years who all had features that confirmed that the condition was acute confusional state as they all reported to the ED. An acute confusional state was operationally defined in terms of acute-onset and variability of course in altered mental-status characterized by impaired focus, disorganized thinking, or altered level of consciousness, based on a clinical evaluation by the physician on-call, and verified by a specialist physician or a neurologist. They were excluded in patients with known chronic neurocognitive disorders, established psychiatric illnesses with no acute organic element, any recent severe head trauma with structural brain injury, or incomplete clinical data.

Informed consent with the patient or next of kin was taken after which detailed demographic information, clinical history, comorbidities, medication use, exposure to substances, and relevant findings of the examination were collected using a structured proforma. The generalized diagnostic workup was carried out on all patients following clinical suspicion and consisted of complete blood count, serum electrolytes, renal and liver function tests, blood glucose levels, arterial blood gases when necessary, toxicology screening and markers of infection. The neuroimaging (CT or MRI brain), lumbar puncture, electroencephalography, and other special studies were done where clinically justified.

The major product was the subsequent identification and classification of the underlying etiology of ACS, which can be classified into metabolic, infectious, toxicological, neurological, systemic, and miscellaneous causes under final diagnosis at discharge, or following a special examination. The statistical analysis and processing of the data were made with SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented in the form of mean ± standard deviation or median with interquartile range and categorical variables were presented in the form of frequencies and percentages. Categories of etiological variables were compared with or without demographic or clinical variables using chi-square or Fisher's exact test of categoric data and independent sample t-test or Mann–Whitney U test of continuous variables as necessary. The p-value of 0.05 was taken to be statistically significant. The study was done in agreement with ethical approval of the Institutional Review Board of Lady Reading Hospital.

RESULTS

Over the course of the study (May 2022 to April 2023), 162 young adults aged 18-40 years and diagnosed with the characteristics of an acute confusional state came to the Emergency Department. The final analysis was done on 150 patients out of 160 patients who had been screened out of 12 excluded on the basis of incomplete records or non-organic psychiatric etiology. The median age was 28.4 / + 6.1 year with a minor imbalance in favor of males (n = 88, 58.7%). Patients aged between 21 and 30 years were the largest percentage (62.0%).

Metabolic derangements were the most common etiological category (34.0%) and infectious causes (26.7), toxicological causes (18.0%), primary neurological disorders (12.7) and systemic/other causes (8.6). Hypoglycemia (12.0% and hyponatremia (10.7%)) were the most common metabolic causes. Most of the infectious etiologies were central nervous system (CNS) infections, specifically meningitis and encephalitis. Top toxicological causes were drug overdose and substance intoxication.

Neuroimaging had been conducted at 96 (64.0) of patients with an abnormal finding identified in 28 (18.7) most likely suggestive of encephalitis, intracranial infection, or acute ischemic changes. The total death rate in-hospital was 6.7% (n = 10), mostly in patients who were severely infected and had metabolic problems. Infectious and neurological causes were found to be strongly linked with prolonged hospital stay (>5 days) (p = 0.02).

All in all, the majority of cases of acute confusional state in young adults presenting to the emergency department were due to metabolic and infectious reasons (more than half of the cases). Longer hospital stay and increased mortality was related to infectious and primary neurological etiologies than other categories.

Table 1: Baseline Demographic and Clinical Characteristics (n = 150)

Variable	Frequency (%) / Mean ± SD
Age (years)	28.4 ± 6.1
18–20 years	18 (12.0%)
21–30 years	93 (62.0%)
31–40 years	39 (26.0%)
Male	88 (58.7%)
Female	62 (41.3%)
History of substance use	32 (21.3%)
Known comorbidities	40 (26.7%)
GCS on presentation (mean)	11.2 ± 2.3

Table 2: Etiological Spectrum of Acute Confusional State (n = 150)

Etiological Category	Frequency (n)	Percentage (%)
Metabolic causes	51	34.0%
Infectious causes	40	26.7%
Toxicological causes	27	18.0%
Neurological causes	19	12.7%
Systemic/Other causes	13	8.6%

Table 3: Common Specific Etiologies Identified

Specific Diagnosis	Frequency (n)	Percentage (%)
Hypoglycemia	18	12.0%
Hyponatremia	16	10.7%
Meningitis	15	10.0%
Encephalitis	12	8.0%
Drug overdose	14	9.3%
Substance intoxication	13	8.7%
Seizure-related (post-ictal)	11	7.3%
Hepatic encephalopathy	9	6.0%

Table 4: Clinical Outcomes by Etiological Category

Etiology	Mean Hospital Stay (days)	Mortality n (%)
Metabolic	3.2 ± 1.4	1 (2.0%)
Infectious	6.8 ± 2.3	5 (12.5%)
Toxicological	2.9 ± 1.1	1 (3.7%)
Neurological	5.9 ± 2.0	2 (10.5%)
Systemic/Other	4.1 ± 1.6	1 (7.7%)

DISCUSSION

This study delineates the etiological spectrum of acute confusional states (ACS) in young adults presenting to a high-volume tertiary care emergency department and highlights the predominance of reversible and potentially treatable causes in this age group. The findings demonstrate that metabolic disturbances were the leading

cause of ACS, followed by infectious and toxicological etiologies[20,23.] These results underscore the importance of early recognition and systematic evaluation of metabolic abnormalities, particularly hypoglycemia and hyponatremia, which together constituted a substantial proportion of cases and are readily correctable with prompt intervention [20,23].

The high frequency of infectious causes, including meningitis and encephalitis, reflects the regional burden of communicable diseases and limited access to early healthcare in surrounding areas[16,17]. Infectious etiologies were significantly associated with prolonged hospital stay and higher mortality, emphasizing the need for rapid diagnostic evaluation, early empirical antimicrobial therapy, and close monitoring in suspected cases[18]. The relatively elevated mortality observed among patients with severe infections and neurological causes aligns with existing literature indicating that central nervous system infections and structural brain pathologies carry poorer prognostic implications compared to metabolic or toxic causes [1,2].

Toxicological causes, including drug overdose and substance intoxication, accounted for a notable proportion of presentations[19]. This finding is particularly relevant in young adults, a population vulnerable to recreational drug use and intentional self-harm [19]. Although toxicological etiologies were associated with shorter hospital stays and comparatively lower mortality, their frequency highlights the importance of integrating mental health assessment, substance abuse screening, and preventive strategies within emergency care protocols[2,19].

Primary neurological causes, such as post-ictal states and acute cerebrovascular events, also contributed meaningfully to the etiological profile [22,4]. Although stroke is less common in younger individuals compared to older populations, its presence in this cohort suggests the need for maintaining a high index of suspicion, especially in patients with focal neurological deficits or vascular risk factors[4]. Early neuroimaging and specialist consultation remain critical in such cases[2].

The predominance of reversible metabolic and toxicological causes in this cohort reinforces the concept that ACS in young adults often differs etiologically from delirium in elderly populations, where multifactorial and degenerative processes are more common[3,7]. Therefore, age-specific diagnostic algorithms may enhance efficiency in emergency settings[1]. The structured and standardized diagnostic approach employed in this study likely contributed to timely etiological identification and management [21].

This paper has some limitations. Since it was a single-center study, its results might not be applicable to the general healthcare environment. Also, there was no measurement of long-term neurological and cognitive outcomes, which would shedding light on post-discharge morbidity. Nevertheless, with these restrictions, the study presents useful regional information and supplements the sparse literature on acute confusional states of young adults in particular[2,1].

In conclusion, metabolic and infectious causes predominate among young adults presenting with ACS in the emergency department, with infectious and neurological etiologies associated with worse clinical outcomes. A systematic, protocol-driven diagnostic approach is essential to ensure rapid identification of reversible causes and to reduce morbidity and mortality in this population [20,23,18].

CONCLUSION

Acute confusional state in young adults presenting to the emergency department is predominantly driven by acute, reversible conditions, particularly metabolic disturbances and infections. Hypoglycemia, hyponatremia, meningitis, and encephalitis constitute major contributors in this demographic. Infectious and primary neurological causes are associated with increased mortality and prolonged hospitalization, emphasizing the importance of early recognition and aggressive management. Unlike elderly populations where multifactorial and degenerative processes prevail, ACS in young adults often reflects acute systemic or toxic insults requiring rapid, protocol-based evaluation. Implementation of standardized diagnostic pathways, including prompt laboratory testing and appropriate neuroimaging, may significantly reduce morbidity and mortality. These findings support the development of age-specific clinical algorithms tailored to regional epidemiological patterns to optimize emergency care delivery and improve overall patient outcomes in resource-limited tertiary care settings.

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This article may be cited as: Khan ZU, Ullah H, Khan H, Khan M, Zaheen K, Ahmad N; Etiological Spectrum of Acute Confusional States in Young Adults Presenting to Emergency Departments. Pak J Med Health Sci, 2023; 17(12):782-785.