

A Study of Risk Factor for Delirium in Patients at Tertiary Care Hospital**Palani Swati¹, Ravi Thakkar², Milind Makwana³, Naren Amin⁴**¹Resident doctor, Psychiatry Department, C.U. Shah Medical College and Hospital, Surendranagar, Gujarat²Assistant Professor, Psychiatry Department, C.U. Shah Medical College and Hospital, Surendranagar, Gujarat³Resident doctor, community medicine department, C.U. Shah Medical College and Hospital, Surendranagar, Gujarat⁴Professor and head, Psychiatry Department, C.U. Shah Medical College and Hospital, Surendranagar, Gujarat

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Abstract:**Background:** Delirium is a clinical syndrome that usually develops in elderly patient. It is characterized by disturbance in attention (reduced ability to direct, focus, and sustain attention) awareness (reduced orientation to the environment), and cognition (memory deficit, disorientation, language, visuospatial ability or perception). The disturbance develops over short period of time (usually hours to few days), represents a change from baseline attention and awareness and tends to fluctuate in severity during the course of a day.**Aim and Objective:** To describe the risk factors for delirium in patients at tertiary care hospital.**Material and Methods:** An observational study was conducted from January to June 2023, among the delirious patients admitted at tertiary care hospital of Surendranagar. The delirium status was assessed by clinical observation using DSM-V criteria. Total 50 patients were taken. Data were collected from medical records of patients. Data were entered and analysed using Microsoft excel version 2021.**Results:** The mean age of the patients was 57.11+/-19.63. Around 68% patients were aged above 50 years. Among delirious patient majority were male (74%). Nearly 1/3rd patients were from medicine ward. Among the delirious patients 32% having cardiac disease. Hyponatremia was found in 62% patients.**Conclusion:** It is concluded that majority patients were of older age (>50). Patients having cardiac disease, prior cognitive impairment, operated cases, hyponatremia, low chloride level could be a probable risk factors for development of delirium. It is recommended that prior knowledge of risk factors helps to manage patients efficiently and reduce the risk of delirium development.**Keywords:** Delirium, Risk Factor, Cognition.

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Introduction

Delirium is common in hospitalized patients and may be associated with increased morbidity, length of stay and patient care and cost [1,2]. Delirium characterized as an acute disorder of attention and cognition, has been increasingly recognized as a common, serious, and potentially preventable source of mortality and morbidity for hospitalized persons. [3] Lipowski's study has described classic manifestation of this syndrome which is marked by impaired cognition and decreased ability to maintain attention.

Extrapolating from recent US vital health statistics each year delirium complicates hospital stays for over 2.3 million persons, involving over 17.5 million inpatient days, and accounting for over \$4 billion (1994 US dollars) of Medicare expenditures related to hospital costs alone. Substantial

additional costs accrue after hospitalization because of the increased need for nursing home placement, rehabilitation service, and home health care. [4]

Delirium is rarely caused by a single factor, and is more often the result of multifactorial contributions. Multifactorial model for delirium [3,5] represent the complex nature of delirium etiology, which usually involves the interrelationship of a vulnerable patient (with pertinent predisposing factors such as severe illness, cognitive impairment, multiple sensory impairments, and the like) and precipitating factors or insults occurring during hospitalization. Efforts to prevent this syndrome require a thorough understanding of its causes and the ability to predict who is at risk. The present study uses

standardized instrument DSM V criteria for diagnosing delirium in institutionalized population.

Aim of the study: To describe the risk factors for delirium in patients at tertiary care hospital.

Material and Method

The study was observational. Patients in delirium were detected by clinical observation and using DSM-V criteria. We detected delirium and collected risk factor data from patient medical records. Patients admitted in general medical and surgical wards, medical, surgical and cardiac ICU of the C. U. SHAH medical college and hospital located in Surendranagar were taken in the study. The data was collected from medical record of the patients during January 2023 to June 2023. Patients of all age and both gender in delirium were included.

Inclusion Criteria: Patients with delirium.

Exclusion criteria: Patients with severe language problem, hearing and visual problem were excluded.

Sample size: 50 patients

Informed consent was not taken as it was a part of routine management.

Diagnosis: Diagnosis of delirium was done on the basis of the diagnostic criteria of Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM V), which required clouding of consciousness (disturbed attention) disorientation, memory impairment and two of the following: perceptual disturbance, incoherent speech, disturbed sleep wake cycle or altered psychomotor activity.

DSM V criteria for Delirium: [6]

- A disturbance in attention (reduced ability to direct, focus, sustain and shift attention and awareness (reduced orientation to environment).
- The disturbance develops over a short period of time (hours to few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity during the course of a day.
- An additional disturbance in cognition (memory deficit, disorientation, language, visuospatial ability or perception).
- The disturbances in criteria A and C are not better explained by another preexisting, established or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma.
- There is evidence from history, physical examination, or laboratory findings that the disturbance is a direct physiological

consequence of another medical condition, substance intoxication or withdrawal, or exposure to toxin, or is due to multiple etiologies.

Risk factor analysis: Clinical data were collected during the hospitalization from the patient's chart. We used nursing medication records to determine the medication, dose, date and time that each medication was given. More detailed analysis were done and anticholinergic medications to determine whether the dosage and frequency of this medication had a relationship to the development of delirium. We also recommended laboratory values. We coded whether each patient had an abnormal value during the hospitalization. We used the following criteria to define the abnormal values:

- Na⁺ level less than 135 mosmol/L or more than 146 mosmol/L.
- WBC count more than 10500/ cubic mm.
- Serum urea nitrogen level more than 14.5 mosmol/L.
- Fasting blood glucose level more than 126 mg/dl or less than 90 mg/dl.
- Serum chloride level less than 98 mEq/L or more than 107 mEq/L.
- Data analysis:
- Data were entered and analysed using Microsoft excel version 2021.

Observation and Result

The mean age of the patients was 57.11± 19.63.

Figure 1 depicts age wise distribution of the delirium patient. Out of all delirium patients nearly around 2/3rd patients were aged above 50 yrs. (68%).

Figure 2 showing the gender wise distribution of delirium patients. Almost 3/4th of delirium patients were found to be a male (74%).

Figure 3 illustrate the distribution of the delirium patients according to their admission category. Among delirious patients nearly around 1/3rd patients were admitted to Medical ward (38%) followed by Orthopaedic ward (22%), Surgery ward (20%), Medical Emergency Unit (8%), Cardiac ICU (6%) and pulmonary ward (6%).

Table 1 shows descriptive findings of risk factors of admitted delirium patients.

Disease related variable shows that among delirium patients, around 2/3rd patients had a cardiac disease (32%). Out of all delirious patients nearly 1/4th cases were operated (28%) and nearly 1/4th patients had a prior cognitive impairment (26%). Nearly 1/5th patients had a Respiratory and Gi disease (22%) followed by renal disease (18%). Fractures at admission were present in 1/5th cases

(20%). Depression was least seen in delirium patients (10%). In medical ward some patients also had alcohol withdrawal delirium. Laboratory findings show that out of 50 delirious patients nearly around 2/3rd had a hyponatremia (62%) followed by hypochloreaemia (42%). Delirium with

a high SGPT level was seen in 26% cases. High RBS level was present in 22% cases. High WBC count and high HbA1c was only seen in 14% cases. High cholesterol, high urea level and high creatinine level were least seen findings among delirium patients (12%).

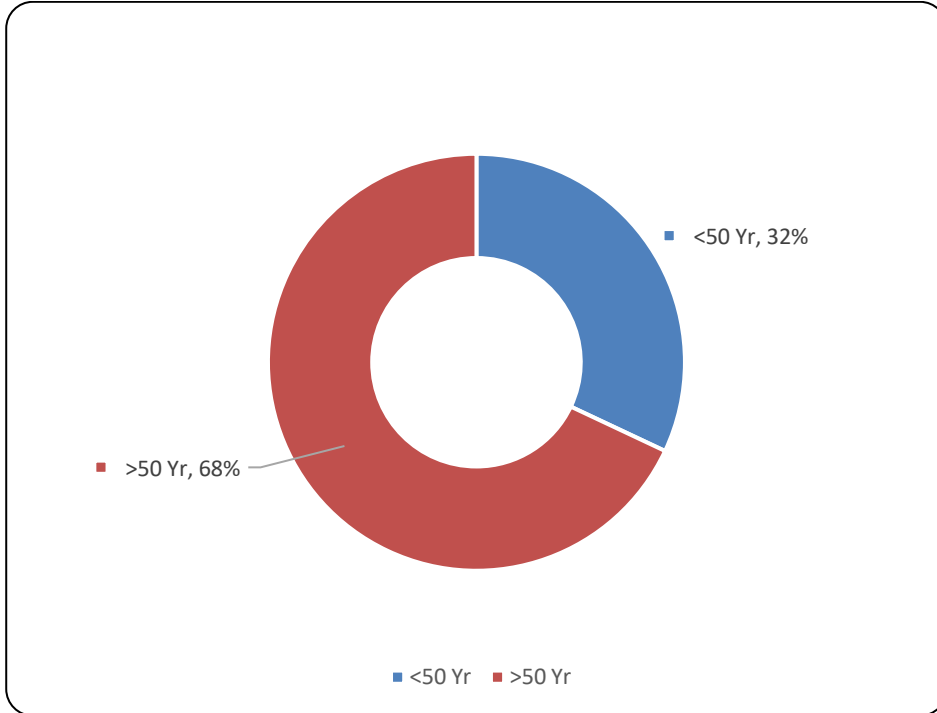


Figure 1: Age wise distribution of delirium patients (n=50)

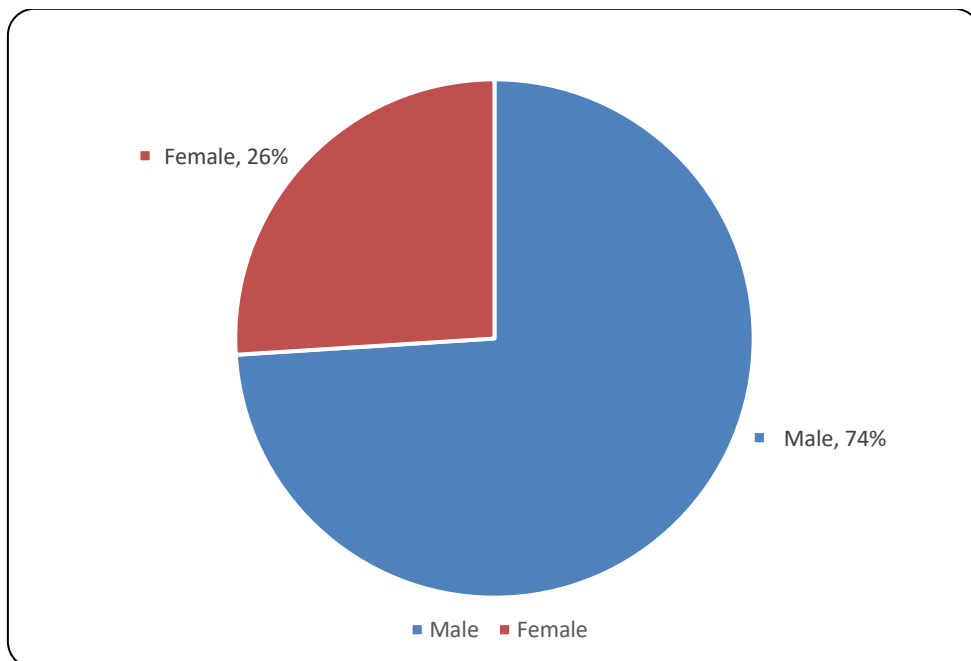


Figure 2: Gender wise distribution of delirium patients (n=50)

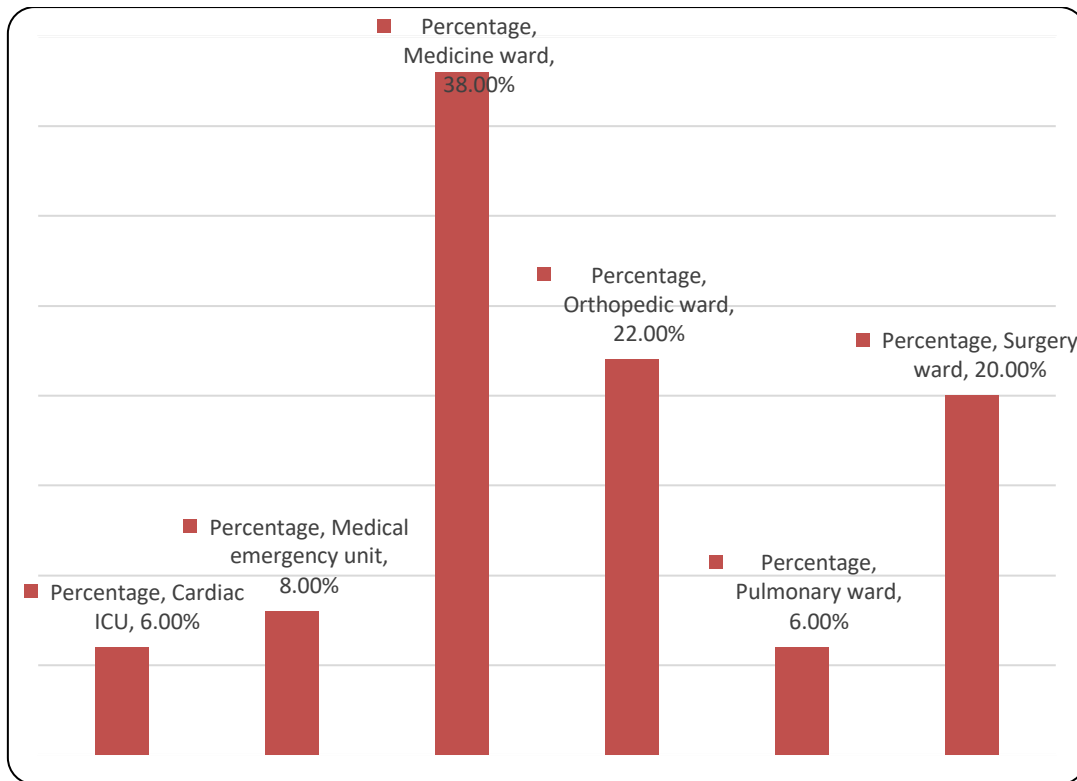


Figure 3: Distribution delirium patients according to admission category (n=50)

Table 1: Descriptive finding of Risk factors for delirium in admitted patient (n=50)

Disease related variables	Yes	No
Prior cognitive impairment	13 (26%)	37 (74%)
Fracture at admission	10 (20%)	40 (80%)
Cardiac disease	16 (32%)	34 (68%)
Renal disease	9 (18%)	41 (82%)
Respiratory disease	11 (22%)	39 (78%)
Depression	5 (10%)	45 (90%)
Operated case	14 (28%)	36 (72%)
GI disease	11 (22%)	39 (78%)
Laboratory variables	Yes	No
Hyponatremia	31 (62%)	19 (38%)
High WBC count	7 (14%)	43 (86%)
High RBS level	11 (22%)	39 (78%)
High cholesterol level	6 (12%)	44 (88%)
High SGPT Level	13 (26%)	37 (74%)
High Creatinine level	6 (12%)	44 (88%)
High HbA1c level	7 (14%)	43 (86%)
High Urea level	6 (12%)	44 (88%)
Low Chloride level	21 (42%)	29 (58%)

Discussion

Delirium can be caused by physical illness, medication and substance abuse or psychological stress. The risk factors for delirium include advanced age, medical conditions, abnormal electrolyte level. Older adults more likely to develop delirium due to age related changes in the brain. Medical condition such as stroke, heart failure, and kidney failure can also increase the risk of delirium. Certain medication, such as sedatives

and pain medications can also increase the risk of delirium.

It is widely accepted that chronic cognitive impairment is associated with increased rates of delirium. [1,2,7,8,9,10]. Less well understood is whether increased age, independent risk factor for delirium. Francis et al 1 did not find age to be an independent risk factor for delirium when they controlled for chronic cognitive impairment. A narrower age range of subjects in their study have accounted for this negative finding. Fracture on

admission also contributes strongly as an independent risk factor for delirium.

Symptomatic infection was another independent predictor of delirium. Inflammation of the brain and /or meninges can result in mental status changes. [11,12] Certainly fever is a concomitant of many infection, and there are experimental data to support a causal link between fever and delirium [13,14]. Some feature of infection other than fever underlies the pathogenesis of delirium in infected patients.

Whereas the pathophysiology of delirium is poorly understood, the weight of the evidence implicates several, variously interrelated biological factors, including neurotransmitters, inflammation, physiological stressors, metabolic derangements, electrolyte disorders, and genetic factors, in disrupting neuronal networks by directly or indirectly interfering with neuronal and glial activity. [15,16,17]

Frequently implicated neurotransmitter systems include acetylcholine and melatonin deficiency, dopaminergic excess, norepinephrine or glutamate release, and alterations in serotonin, histamine, or γ -amino butyric acid levels; however, it is unlikely that any single pattern of neurotransmitter disturbances underlies all instances of delirium. [18] Inflammation may cause delirium by way of stress-induced cytokines [19] and microglial reactivity. [20] Substance abuse such as alcohol or drug use, can also increase the risk of delirium. Other risk factors for delirium include psychological stress, sleep deprivation and malnutrition.

Our results reinforce previously cited risk factors associated with delirium, including advanced age, dementia, cognitive impairment, frailty, history of delirium or other central nervous system disorders, cumulative comorbidities, alcohol use, depression, malnutrition, and functional, visual, or hearing impairment. [15,21,22]

The mean age of delirium patients in our study was 57.11 ± 19.63 years but the higher mean age was observed in study done by Schor JD et al. (80.5 ± 7.6) [23], Pisani MA et al. (74.5 ± 8.6) [24], Evensen S et al. (86.1 ± 5.2) [25] and Mariz J et al. (67.1 ± 16). [26] Mean age difference might be due to different age inclusion criteria.

Among delirium patients around 47% were male in a study done by Pisani MA et al. (24) while in this study proportion of male patients was 74% which was higher than the former study.

Majority of patients were admitted to Medicine ward in a study a study done by Schor JD et al. [23] similar finding was noted in our study.

It is important to be aware of the risk factors for delirium and tend to seek medical attention if person exhibiting signs of delirium. Early diagnosis and treatment can help to reduce the risk of long term complication. Certain risk factors seem consistent. Some are fixed (age, gender, and dementia) but others are potentially modifiable (medical illness, biochemical abnormalities, and medication use) and could permit a clinical intervention to prevent development of this disorder.

Limitations:

- Population of this study was not representative of the general population.
- Our study cannot be generalized to patients with severe sensory impairment.

Conclusion

- The result of this study shows that there are several risk factors that can lead to delirium.
- Old age, prior cognitive impairment, cardiac patients, patients having fracture, infections, electrolyte imbalance are the significant risk factors in our study.
- Our study allows for the identification of these patients at the time of admission. In future, coupling risk identification with proper interventions to prevent or treat delirium could improve the care and shorten the length of stay of these patients.

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