Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Epidemiology of Delirium in Elderly Inpatients: Prevalence and Associated Factors in a Sri Lankan Tertiary Hospital

Shane Jayasundara

dmshane24@gmail.com

Teaching Hospital Anuradhapura

Chathura Abeyrathna

Teaching Hospital Anuradhapura

Kavindu Dharmarathne

Rajarata University of Sri Lanka

Amal Samarasinghe

Rajarata University of Sri Lanka

Dileepa Ediriweera

University of Kelaniya

Amila Isuru

Rajarata University of Sri Lanka

Research Article

Keywords:

Posted Date: April 8th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8983646/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background:

Delirium is a common yet under-recognised neuropsychiatric syndrome among older inpatients, associated with substantial morbidity, mortality, and healthcare burden. As hospital admissions among older adults continue to rise globally, understanding the prevalence and contributing factors is essential to improving geriatric care.

Aims:

To estimate the prevalence and associated factors of delirium among surgical and medical inpatients aged 65 years or older at Teaching Hospital Anuradhapura, Sri Lanka.

Methods:

A descriptive cross-sectional study was conducted among patients aged 65 and older admitted to general medical and surgical wards at the Teaching Hospital, Anuradhapura. Systematic random sampling was applied using ward admission registries. Dilirium screening was performed using the Confusion Assessment Method (CAM), followed by diagnostic confirmation with clinical DSM-5 criteria. Potential determinants of delirium were identified using binary logistic regression.

Results:

Of 233 older adult inpatients, the majority were male (54%, n = 126), married (95%, n = 223), unemployed (90%, n = 210), and 48% (n = 110) had at least a primary-level education. The overall prevalence of delirium was 18% (95% CI = 13.3–33.6%). It was 20.3% (95% CI = 14.8–25.2) in general medical wards, and 11.5% (95%CI = 6.88–15.1) in general surgical wards. Hypoactive delirium was the most common subtype (40.5%, n = 17), followed by hyperactive (33.3%, n = 14) and mixed types (26.2%, n = 11). Of those diagnosed with delirium, 54.8% (n = 23) were females, the mean age was 76.6 (SD = 6.6), and the mean duration of hospital stay was 6.7 days (SD = 6.1). Multivariable logistic regression analysis identified following independent associated factors; age > 65 years (OR = 1.19, 95%CI = 1.08–1.35, P = 0.002), current infections (OR = 10.17, 95%CI = 3.1-41.41,P < 0.001), catheterization (OR = 3.85, 95%CI = 1.16 -13, P = 0.027), nasogastric feeding (OR = 49.99, 95%CI = 5-826.64, P = 0.002), assisted ventilation (OR = 6.75, 95%CI = 1.74–28.32, P = 0.007), history of delirium (OR = 9.44, 95%CI = 2.45–41.08, P = 0.002), longer hospital stay (OR = 1.10, 95%CI = 1.003–1.21, P = 0.042) and sleep disturbances (OR = 6.44, 95%CI = 2.02–23.97, P = 0.003).

Conclusions:

Nearly one in five older inpatients in medical and surgical wards had delirium. The associations observed with infection, invasive procedures, prior delirium, prolonged hospital stay, and sleep disturbances. These findings highlight the need for routine screening, early identification, and targeted prevention strategies in geriatric inpatient care settings.

Introduction

Delirium is a common condition among hospitalised older adults aged over 65 [1]. Research shows that delirium is associated with increased mortality and a higher risk of developing dementia[2, 3]. The estimated healthcare cost of delirium ranges from 38 to 152 billion per year [1]. Moreover, infections, stroke, dehydration, metabolic disturbances, pain, and surgery are recognised as common precipitating factors of delirium in older adults [1].

The number of older people admitted to hospitals has also increased over the past two decades [1]. Research evidence shows that around 29% to 64% of older patients admitted to the hospital experience delirium [1]. Delirium in older adults is associated with increased hospital costs, prolonged hospital stays, slower physical recovery, and other healthcare complications [1, 2]. It has also been reported that up to 80% of cases of delirium go undetected [4, 5]. This finding has been replicated in many studies and across a wide range of facilities, including acute care hospitals (72%), palliative care settings (61%), and emergency departments (84%). Researchers have found this could be due to many reasons, including the heterogeneous and transient nature of symptoms, the absence of objective tests, and the lack of clinical skills among healthcare professionals to diagnose delirium [5]. It was also found that there is substantial variability in delirium prevalence across the wards [4]

Lack of adequate knowledge on screening and diagnosis of delirium is an identified barrier attributed to poor detection and management [5]. Published research evidence on this area in inpatient settings is scarce. Furthermore, published data relevant to the Sri Lankan setting is even less. In this context, research evidence on the prevalence and associated factors of delirium above the age of 65 years will help raise awareness and identify risk factors which are vital in the prevention, identification and management of delirium in the elderly population in Sri Lankan inpatient settings. Addressing this gap is critical, as context-specific epidemiological evidence is essential for informing local screening protocols, risk-reduction strategies, and capacity-building among healthcare workers. In this context, the present study aims to estimate the prevalence and associated factors of delirium in surgical and medical inpatients aged more than 65 years at the Teaching Hospital, Anuradhapura, Sri Lanka.

Methods

Study Design

This is a descriptive cross-sectional study.

Study population

Anuradhapura Teaching Hospital is the third-largest tertiary care hospital in Sri Lanka, with a bed capacity of 2029 in 2017. It has three general medical units and three general surgical units, and medical and surgical ICUs additionally support these wards. The number of patients admitted to each ward varies by day of the week, with the highest density on casualty days, around 100 inpatients. Approximately every ward has a bed capacity of 50–70, but the number of patients treated in these wards can range from 70 to 120.

Patients aged 65 years or older who were admitted to general medical or general surgical wards and received inpatient care for more than 12 hours were eligible for inclusion in the study. Patients were excluded if they were comatose, unconscious, or medically unstable, or if they had any physical or psychiatric condition severe enough to preclude meaningful participation. Individuals with acute severe physical illnesses requiring strict bed rest or limited communication, such as dengue fever, recent myocardial infarction, acute severe asthma or COPD exacerbations, and septic shock were also excluded. Patients with injuries that impaired effective communication.

Sample size

The calculated sample size was 223 to detect the prevalence of delirium among patients admitted to medical and surgical wards above the age of 65, based on the findings of mataanalysis on the prevalence of delirium among geriatric inpatients at 15.2% [6] accounting for a margin of error of 5%, an alpha error of 5%, and a 10% dropout rate.

Sampling Method

The study was carried out from August 2023 to February 2024. A systematic random sampling method was used for this study. In each selected ward, every other patient, in the order of registration each day, was considered. They were assessed by a trained doctor using a Confusion Assessment Method screening tool to screen for delirium following consent until the desired sample size was achieved. Those patients screened positive for delirium were further assessed by a psychiatrist based on DSM 5 diagnostic criteria to clinically diagnose delirium.

The study instruments.

Screening for patients with delirium was carried out by the interviewer, who administered the Confusion Assessment Method Screening Tool[7]. The sensitivity of the CAM screening tool is 94–100% and a specificity of 90–95% for the diagnosis of delirium [7]

Statistical analysis

Descriptive statistics summarised patient characteristics. Continuous variables are reported as means with standard deviations and compared using two-tailed independent-samples t-tests. Categorical variables are presented as frequencies and percentages and compared using chi-square tests. The prevalence of delirium is reported as a percentage with 95% confidence intervals.

Based on a review of previously published evidence, 38 clinically relevant risk factors were initially identified as potential predictors of delirium. To manage this large number of variables and reduce the risk of multicollinearity and model overfitting, data analysis was conducted in several structured stages. First, univariable analyses were performed using independent-samples t-tests for continuous variables and Chi-square tests for categorical variables to assess the crude association of each variable with delirium.

Fourteen variables demonstrated statistically significant associations ($p < 0.05$). These were subsequently grouped into six clinically meaningful domains: (1) social and demographic factors, (2) physical illnesses, (3) hospitalisation-related factors, (4) laboratory investigations and interventions, (5) medications and substances, and (6) mental status and related factors to enhance interpretability and minimise confounding.

Within each domain, simple (unadjusted) binary logistic regression analyses were undertaken to identify independent associations with delirium. Only variables that retained statistical significance within their domain were included in multivariable modelling, while domains without significant predictors were excluded from further analysis. This staged, domain-based screening approach is particularly valuable in complex clinical datasets with numerous interrelated predictors, as it promotes model stability and parsimony. Variables included in each domain are detailed in Table 1. The final models were evaluated using the Hosmer–Lemeshow goodness-of-fit test, with $p < 0.05$ considered statistically significant. All analyses were performed using IBM SPSS Statistics (version 26).

Table 1
Clinically meaningful domains

Domain	Candidate variables
1. Social and demographic factors	Age, gender, civil status, educational level, employment status, and social support
2. Physical illnesses	Dehydration, current infections, constipation Stroke, comorbid medical illnesses, any functional decline, visual impairment, hearing impairment, sleep disturbances, stroke, pain-related conditions, and pressure ulcers
3. Hospital-related factors	Duration of hospital stay
4. Laboratory Investigations and interventions	Abnormal blood test, assisted ventilation, surgical interventions, anaesthesia given, bladder catheterisation, Naso Gastric feeding and Intensive Care Unit care
5. Medications and substances	Opioid pain relief, medication for dementia, sedative drugs, alcohol use and psychoactive substances use
6. Mental status and related factors	Past history of delirium, depression, psychiatric disorder, dementia and uninvestigated cognitive impairment

Ethical considerations

Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka. Administrative approval was obtained from the director of Teaching Hospital, Anuradhapura, and the consultant physicians and surgeons in charge of the respective wards.

Results

Socio-demographic characteristics of patients

A total of 233 patients admitted to general medical and general surgical wards were interviewed in this study. The majority of the patients in the study sample were males, 54% (n = 126, 95% CI = 9–21). Most of the patients in the sample were married (95%; n = 223), 90% (n = 210) were unemployed, and 49.4% (n = 115) were educated at least to secondary education level. Sample characteristics are outlined in Table 2.

Table 2
Sample Characteristics of the study sample

Characteristic	Category	Frequency N (%)
Age	65–70	80(34%)
	70–75	74(31%)
	75–80	54(23%)
	> 80	29(12%)
Gender	Male	126(54%)
	Female	107(46%)
Civil status	Single	10(4.3%)
	Married	223(95.7%)
Educational Level	Not attended to school	25(10.7%)
	Primary	87(37.3%)
	Secondary	115(49.4%)
	University	5(2.1%)
	Vocational	1(0.4%)
Employed	Yes	23(9.9%)

Prevalence of delirium

Out of 233 patients, 42 were clinically diagnosed as having delirium. The mean age of the patients who were suffering from delirium is 76.69(SD = 6.639), and there were 19 (45.24%) males. Among the patients diagnosed with delirium, 83.3% (n = 35) were reported from general medical wards, while 16.7% (n = 7) were from general surgical wards. The overall prevalence of delirium was 18% (95% CI = 13.3% – 33.6%). It was 20.3% (95% CI = 14.8–25.2) in general medical wards, and 11.5% (95% CI = 6.88–15.1) in general surgical wards. Among them, 40.5% (n = 17, 95%CI = 25.7–55.3) were found to have the hypoactive type, while 33.3% (n = 14, 95%CI = 19.1–47.6) and 26.2% (n = 11, 95%CI = 12.9–39.5) were the hyperactive and mixed types, respectively.

Sociodemographic factors

Age differed significantly between the two groups, with patients who developed delirium being older on average (mean 76.69 years; SD = 6.64) than those without delirium (mean 73.06 years; SD = 5.12) (p = 0.001, t-test). In contrast, gender distribution did not differ significantly between groups, although a higher proportion of females was observed among those with delirium (54.8% vs. 44%; p = 0.204). Civil

status also showed no meaningful association, with similar proportions of married individuals in both the delirium (95.2%) and non-delirium (95.8%) groups (p = 0.868). Educational attainment did not significantly influence the occurrence of delirium. The distribution across educational levels ranging from no formal schooling to university or vocational training was comparable between the two groups (p = 0.962). Similarly, employment status showed no association with delirium, with the majority in both groups being unemployed or retired (92.6% vs. 89.5%; p = 0.513).

These findings collectively indicate that, among sociodemographic variables assessed, advancing age was the only factor significantly associated with delirium. Full details are presented in Table 3.

Table 3
Sociodemographic factors and their association with delirium.

Variable name	Category	Delirium absent	Delirium present	P value Chi-Square test/t-test
Age	Age	73.06(SD = 5.119)	76.69(SD = 6.639)	0.001(t test) *
Gender	Male	107(56%)	19(45.2%)	0.204
	Female	84(44%)	23(54.8%)	
civil status	Single	8(4.2%)	2(4.8%)	0.868
	Married	183(95.8%)	40(95.2%)	
Educational level	Not attended to school	20(10.5%)	5(11.9%)	0.962
	Primary	70(36.5%)	17(40.5%)	
	Secondary	96(50.3%)	19(45.2%)	
	University	4(2.1%)	1(2.4%)	
	Vocational	1(0.5%)	0(0%)	
Employment status	NoUnenployed	171(89.5%)	39(92.6%)	0.513

Logistic regression analysis of sociodemographic factors revealed that age was the only variable independently associated with delirium, with each additional year increasing the odds of delirium (OR = 1.118; 95% CI: 1.052–1.189; p = 0.001).

Physical illnesses and physiological states

Several acute and chronic medical conditions were significantly associated with delirium (Table 4). Dehydration was markedly more common in patients with delirium (78.6%) than in those without (3.1%)

(p = 0.001). Current infections were also substantially more frequent in the delirium group (81%) than in the non-delirium group (29.3%) (p = 0.001). Comorbid medical illnesses were more prevalent among delirious patients (92.9%) than among non-delirious patients (79.1%) (p = 0.037). Functional decline showed a similarly strong relationship, with 50% of the delirium group affected compared with 19.9% of those without delirium (p = 0.001). Sleep disturbance was associated with delirium, occurring in 59.5% of those with delirium versus 29.8% of those without (p = 0.001). In contrast, other conditions, including constipation (19%), history of stroke (19%), sensory impairments (visual 2.4%; hearing 16.7%), and pain-related conditions (47.6%), did not show associations with delirium. Similarly, the type of functional decline (activities of daily living support, instrumental support needs, or immobility) was not associated with delirium.

Table No 4. Physical illnesses and their association with delirium

Variable name	Category	Delirium absent	Delirium present	P value Chi-Square test/t-test
Dehydration	Yes	6(3.1%)	9(21.4%)	0.001
Current infection	Yes	56(29.3%)	34(81%)	0.001
History of Stroke	Yes	27(14.1%)	8(19%)	0.420
Constipation	Yes	36(18.8%)	8(19%)	0.976
Comorbid medical illnesses	Yes	151(79.1%)	39(92.9%)	0.037
Functional decline	Yes	38(19.9%)	21(50%)	0.001
Visual impairment	Yes	101(52.9%)	16(38.1%)	0.083
Hearing impairment	Yes	48(25.1%)	7(16.7%)	0.242
Sleep disturbances	Yes	57(29.8%)	25(59.5%)	0.001
Pain related conditions	Yes	69(36.1%)	20(47.6%)	0.165
nature of functional decline	Activities of daily living need support	29(74.4%)	19(90.5%)	0.301
	Instrumental activities of daily living need support	7(17.9%)	1(4.8%)	
	Immobile or bed bound	3(7.7%)	1(4.8%)	

Altogether, six (6) variables were positively associated with delirium, including patient dehydration, current infections, comorbid medical illnesses, any functional decline, sleep disturbances and pressure

ulcers.

Multivariate analysis revealed that dehydration (OR 6.13, 95% CI 1.57–23.91, P = 0.09), current infections (OR 7.84, 95% CI 3.26–18.82, P = 0.001), functional decline (OR 2.67, 95% CI 1.19–5.98, P = 0.17), and sleep disturbances (OR 2.51, 95% CI 1.13–5.56, P = 0.02) remained significant and were considered for inclusion in the final model from this category.

Hospitalisation-related factors

The duration of hospital stay has remained significant after multivariate analysis.

Patients who developed delirium had a longer mean hospital stay of 6.7 days (SD = 6.1) compared to those without delirium, 3.81 (SD = 4.35), and the mean difference was significant (p = 0.005). Logistic regression analysis indicated that prolonged hospitalisation increases the risk of developing delirium (OR-1.10, 95% CI- 1.03–1.18, P = 0.005)

Laboratory Investigations and Interventions

Several hospital-related interventions demonstrated associations with delirium (Table 5). Abnormal laboratory test results were markedly more common among patients with delirium (69%) than among those without delirium (38.2%) (p = 0.001). Similarly, assisted ventilation was required more frequently in the delirium group (35.7%) than in the non-delirium group (8.9%) (p = 0.001). 59.5% of delirious patients were catheterised compared to only 8.9% of those without delirium (p = 0.001). Nasogastric (NG) feeding was more common among delirious patients (31%) than non-delirious patients (1%) (p = 0.001). Intensive Care Unit (ICU) admission was more common among patients with delirium (9.5% vs. 1.6%; p = 0.006).

In contrast, undergoing a surgical procedure was not associated with delirium (p = 0.546). Among the subset who underwent anaesthesia, the type of anaesthetic (general, local, or regional) did not differ between delirium and non-delirium groups (p = 0.213).

Table 05
Laboratory Investigations and interventions and their association with the prevalence of delirium

Variable name	Category	Delirium absent	Delirium present	P value Chi-Square test/t-test
Abnormal blood test	Yes	73(38.2%)	29(69%)	0.001
Assisted ventilation	Yes	17(8.9%)	15(35.7%)	0.001
Surgical intervention carried out	No	170(89%)	36(85.7%)	0.546
Type of Anaesthesia given	General	11(55%)	1(16.7%)	0.213
	Local	6(30%)	4(66.7%)	
	Regional	3(15%)	1(16.7%)	
bladder catheterization	Yes	17(8.9%)	25(59.5%)	0.001
ICU care	Yes	3(1.6%)	4(9.5%)	0.006
NG feeding	Yes	2(1%)	13(31%)	0.001

Multivariable logistic regression identified the following independent predictors of delirium among elderly inpatients: assisted ventilation (OR = 5.199; 95% CI: 1.984–13.621; p = 0.001), bladder catheterisation (OR = 6.799; 95% CI: 2.723–16.980; p = 0.001), and nasogastric (NG) feeding (OR = 18.348; 95% CI: 3.308–101.769; p = 0.001).

Medications and substances

Medication and substance-related factors showed no statistically significant associations with delirium in this cohort (Table 7). The use of opioid analgesics was similar between patients with and without delirium (9.5% vs. 8.9%; p = 0.777). Likewise, the use of sedative drugs showed no significant association with delirium (2.4% vs. 4.7%; p = 0.454).

Alcohol use was reported at comparable frequencies in both delirium (7.1%) and non-delirium groups (7.3%). Similarly, the prevalence of psychoactive substance use did not differ significantly between groups (2.4% vs. 5.8%; p = 0.370). Table 06 presents a summary of the distribution of participants by their association with delirium prevalence.

Table 06
Distribution of participants based on medications and substances and their association with the prevalence of delirium.

Variable name	Category	Delirium absent	Delirium present	P value Chi-Square test/t-test
Opioid pain relief medication	Yes	17(8.9%)	4(9.5%)	0.777
Sedative drugs	Yes	9(4.7%)	1(2.4%)	0.454
Alcohol use	Yes	14(7.3%)	3(7.1%)	0.966
Psychoactive substance use	Yes	11(5.8%)	1(2.4%)	0.370

Table 08
Results of final model – factors predicting delirium.

Significant Variable	P value	Odds Ratio	95% Confidence Interval	
Age	0.002	1.198	1.071	1.339
Current infections	0.001	10.204	2.840	37.037
Bladder catheterization	0.001	3.840	1.162	12.658
NG feeding	0.001	50.00	4.032	500.000
Assisted ventilation	0.001	6.750	1.700	27.020
Past history of delirium	0.001	9.433	2.347	38.461
Duration of hospital stay	0.046	1.102	1.003	1.210
Sleep disturbance	0.006	6.451	1.901	21.739

As none of the variables within this category demonstrated a statistically significant association with delirium in the univariable analysis, no regression modelling was performed. Therefore, none of these factors was included in the final multivariable model.

Mental status and related factors

Past psychiatric and cognitive history demonstrated mixed associations with delirium (Table 8). The current episode of delirium was associated with prior episodes, with only 61.9% of delirious patients having no prior episodes, compared with 96.9% of those without delirium (p = 0.001). A diagnosed

depressive disorder was uncommon overall but occurred more frequently among patients with delirium (2.4%) than those without (0%), reaching statistical significance (p = 0.033).

In contrast, a history of any other diagnosed psychiatric disorder did not differ significantly between groups (p = 0.908). Uninvestigated memory impairment was reported at similar frequencies in both delirium (16.7%) and non-delirium groups (15.2%), with no significant association (p = 0.810).

Table No 07. Distribution of participants based on mental status and related factors

and their association with the prevalence of delirium

Variable name	Category	Delirium absent	Delirium present	P value Chi-Square test/t-test
Past history of delirium	Yes	6(3.1%)	16(38.1%)	0.001
History of diagnose depressive disorder	Yes	0(0%)	1(2.4%)	0.033
History of diagnosed psychiatric disorder	Yes	4(2.1%)	1(2.4%)	0.908
Cognitive related factors				
History of uninvestigated memory impairment	Yes	29(15.2%)	7(16.7%)	0.810

In this category only, the history of delirium had a significant association for predicting delirium, while it remained significant after logistic regression analysis in this group (OR-18.97, 95% CI-6.81-52.83, P = 0.001).

Results of the final Model

In the final multivariable logistic regression model, eight variables remained significant independent predictors of delirium. Increasing age was associated with delirium (OR = 1.198, 95% CI: 1.071–1.339, p = 0.002). Current infections showed a strong association (OR = 10.204, 95% CI: 2.840–37.037, p = 0.001). Several hospital-related interventions also contributed independently to delirium risk. Bladder catheterisation increased the likelihood of delirium (OR = 3.840, 95% CI: 1.162–12.658, p = 0.001), whereas assisted ventilation increased the odds more than sixfold (OR = 6.750, 95% CI: 1.700–27.020, p = 0.001). Nasogastric feeding was associated with a higher risk (OR = 50.00, 95% CI: 4.032–500.000, p = 0.001). A history of delirium was also associated with recurrence (OR = 9.433, 95% CI: 2.347–38.461, p = 0.001). In addition, each additional day of hospitalisation increased the risk of delirium (OR = 1.102, 95% CI: 1.003–1.210, p = 0.046). Sleep disturbance remained an important contributor (OR = 6.451, 95% CI: 1.901–21.739, p = 0.006).

Table no 08. Results of final model – factors predicting delirium.

Significant Variable	P value	Odds Ratio	95% Confidence Interval	
Age	0.002	1.198	1.071	1.339
Current infections	0.001	10.204	2.840	37.037
Bladder catheterization	0.001	3.840	1.162	12.658
NG feeding	0.001	50.00	4.032	500.000
Assisted ventilation	0.001	6.750	1.700	27.020
Past history of delirium	0.001	9.433	2.347	38.461
Duration of hospital stay	0.046	1.102	1.003	1.210
Sleep disturbance	0.006	6.451	1.901	21.739

Discussion

Prevalence of delirium and associated factors

This study reported a 18% prevalence of delirium among elderly patients admitted to general medical and surgical wards at Teaching Hospital Anuradhapura. Among patients diagnosed with delirium, 40.5% had the hypoactive type, while 33.3% and 26.2% had the hyperactive and mixed types, respectively.

A similar cross-sectional descriptive study conducted in India reported a delirium prevalence of 16% among elderly inpatients in medical and surgical units of a tertiary hospital in Kerala, comparable with the prevalence rates in our study[8, 9]. A study conducted in the United Kingdom across 45 hospitals found a point prevalence of delirium in elderly inpatients, excluding critical care admissions, of 14.7%[4], slightly lower than the figure in our study. This illustrates that the prevalence of delirium in the elderly inpatient population in our study is comparable with that reported in many studies.

The prevalence of delirium in elderly patients varies significantly across hospital ward settings, particularly between general medical and general surgical wards. Numerous studies conducted in different countries have highlighted these variations, which are influenced by patient profiles, clinical complexity, and environmental factors, with prevalence ranging from 10% to 35% among hospitalized elderly patients. In our study, the prevalence of delirium in medical wards is around 20.3%, and around 11.5% in surgical wards, comparable with a point prevalence study conducted at a university hospital in Southern Ireland using 358 eligible patients to determine delirium prevalence across an acute care facility, which reported 22% and 7.2% in medical and surgical wards, respectively [4]. A systematic review and meta-analysis conducted in 2025 reported a pooled prevalence of delirium in elderly patients admitted to medical wards of 23.6%, which is compatible with the prevalence of elderly patients in

medical wards, 20.3% (95% CI = 14.8–25.2), reported in this study [10]. When it comes to delirium in surgical wards, prevalence generally ranges from 10% to 50%, depending on the type of surgery, with higher prevalence in orthopaedic, cardiothoracic, and abdominal surgeries [11].

This study found that a longer hospital stay predicts delirium among elderly inpatients on medical and surgical wards. Delirium is both a cause and a consequence of prolonged hospital stays. A meta-analysis reported that patients who developed delirium stayed on average 6.5–8.7 days longer than those without delirium. Similarly, elderly patients hospitalised for more than 5–7 days show significantly higher rates of delirium [11]. A prospective multicentre study in the UK reported that delirium prevalence in older hospital inpatients was associated with increased length of stay [12]. Furthermore, a Canadian study showed a positive linear correlation between duration of hospitalisation and delirium prevalence in geriatric wards [13]. These studies support the bidirectional relationship between longer hospital stays and increased risk of delirium, in which delirium can prolong hospital stay by delaying recovery, increasing complications, and reducing functional independence. On the other hand, longer hospital stays increase delirium risk through greater exposure to hospital-related stressors, cumulative sleep deprivation, and greater use of medications and restraints [11, 13].

The hypoactive type of delirium is the most common in this study, accounting for around 40% of the sample. Research shows that hypoactive delirium is the most prevalent, with rates ranging from 31% to 70%[14]. Hypoactive delirium tends to be easily missed by clinicians compared with the hyperactive type, which may also contribute to the under-recognition and underdiagnosis of delirium[2]. Previous evidence also suggests that patients with hypoactive delirium are least likely to survive, although those who do have a better outcome than with other types[15]. Therefore, early detection and intervention are important to improve outcomes for this group of patients with delirium.

Advanced age is a recognised risk factor for delirium in this study. It was also reported that among patients with delirium, more than 50% of those hospitalised were over 65 years old [8]. In hospitalised subjects, delirium prevalence may rise from 3% in the young to 14% and 36% in those aged 65 years and over, with an approximate 2% increase per year after age 65. A study conducted in the UK reported that the prevalence of delirium among elderly patients was an independent risk factor for delirium [12]. In keeping with other published research, our study found that patients' age is an independent risk factor for delirium. For each year of age after 65, the odds of delirium increased by 20% (95% CI = 7.1–39.9). A study by Inouye et al. (1996) also reported that each 5-year increase in age beyond 65 increases the risk by approximately 1.5 times [7].

A history of delirium is a well-established predictor of future delirium, indicating underlying vulnerability. The history of delirium was a statistically significant independent risk factor in this study. A similar result was demonstrated in a study conducted in 2016 to find out the major risk factors for delirium, which included 260 patients diagnosed with delirium [16].

In a psychogeriatric population, current infection was identified as one of the most common risk factors (42%)[17], and our study also identified current infection as a risk factor. However, we could not

demonstrate any significant relationship with other medical conditions, such as constipation, stroke, comorbid medical illnesses, and pain-related conditions, despite several other studies demonstrating a significant association [17–19]. This may be due to the relatively small number of patients with each of these conditions in the study sample, making it difficult to detect a meaningful association. Although theoretically dehydration is identified as a precipitating factor for delirium, we could not prove this in our study. This may be due to several factors, including the possibility that the development of delirium depends on the severity of dehydration, which we did not grade, and the potential influence of interpreter bias. Furthermore, delirious patients may develop dehydration in the background of poor oral intake and malnutrition.

Rates of assisted ventilation among patients with delirium (n = 15, 35.7%) are significantly higher in our study. A similar association reported in many other published studies. [20–22]Although assisted ventilation is an independent predictor of delirium, the presence of delirium may result in increased duration of assisted or mechanical ventilation, as there is a bidirectional relationship[20]. A study reported delirium in up to 80% of mechanically ventilated elderly ICU patients[21]. This could be due to many factors reported by the same study, such as hypoxia, CO_2 retention, immobilization, sleep deprivation and use of sedatives.

A meta-analysis reported that the risk factors causing delirium demonstrated factors such as sensory impairments like visual impairment, bladder catheterization, diminished activities of daily living and immobility, excess use of alcohol, recent surgical procedures, and certain abnormal blood investigations as statistically independent risk factors. However, among these factors, we could only replicate bladder catheterization and assisted ventilation as risk factors [23]. A study reported that catheter use doubled the risk of delirium post-surgery. The Presence of bladder catheterisation increases the risk of delirium, which may be secondary to urinary tract infections, lack of mobility and physical discomfort [23].

Contrary to many other studies, interventions like Naso Gastric feeding have become a statistically significant factor. Insertion of a nasogastric tube indicates the severity of the disease which the patient is suffering, and the more severe the patient's underlying disorder, the more likely the patient will develop delirium. Naso Gastric tubes can cause physical discomfort, contribute to sleep disturbances, and increase the risk of aspiration pneumonia, all of which are known totrigger delirium. It may also indicate poor baseline nutrition and swallowing dysfunction, adding to risk. A study identified nasogastric feeding as a non-pharmacologic iatrogenic factor associated with delirium, particularly in patients with dementia[24].

This study did not identify surgical interventions as a risk factor for developing delirium. This may be because elderly people are less likely to undergo more complex surgical procedures than younger people. Furthermore, these variations in the literature may also be related to several factors such as patient population, study setting, source of the sample, sample size, and data collection methods [24].

Strengths

Screened-positive patients from CAM were further evaluated by a psychiatrist to make a clinical diagnosis of delirium based on DSM 5 diagnostic criteria. This will improve the diagnostic validity of the delirium diagnosis.

Limitations

Cross-sectional study design limits the establishing the cause-and-effect relationships of associated factors. Furthermore, the sample size may not be adequate for regression analysis of 38 variables. This study was conducted only in general medical and general surgical wards; it would have been better to include as many different types of wards as possible, as well as more hospitals in different areas rather than in one hospital. The CAM screening tool was applied to each patient once daily, only during the data collection period. However, delirium has a fluctuating course over the day; therefore, some patients with delirium may have been missed during the assessment, leading to an underestimation of the prevalence rates.

The variables that were clearly identified as risk factors for delirium in previous studies did not become significant in this study, which is probably due to a smaller number of cases of these variables in the study sample, making it inadequate to detect an association.

Conclusion

The prevalence of delirium is high among older adult inpatients. Nearly 40% of them have the hypoactive type of delirium. Hence, regular staff training in identifying delirium is highly important. Risk factors identified in older adult patients developing delirium included increased age, longer duration of hospital stay, history of delirium, poor sleep, and interventions such as urinary catheterisation, nasogastric tube insertion, and assisted ventilation.

Abbreviations

CAM
Confusion Assessment Method
ICU
Intensive Care Unit
OR
Odds Ratio
CI
Confidence Interval
DSM
5-Diagnostic and Statistical Manual of Mental Disorders, 5th Edition

Declarations

Data Availability

All data supporting our findings have been presented in the manuscript. The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgement

The study team would like to thank all the participants for their contribution to this research. In addition, we would like to thank the Director of the Teaching Hospital Anuradhapura, the Consultant Neprologists, and the Nursing in charge at the Nephrology Clinic, Teaching Hospital Anuradhapura.

Funding

This is self-funded research

Author information

Author affiliations

1. Dr. Shane Jayasundara

Senior registrar in Psychiatry, University Psychiatry Unit, Teaching Hospital Anuradhapura, Anuradhapura, Sri Lanka

*Corresponding author - dmshane24@gmail.com

2. Dr. Chathura Abeyrathna

Registrar in Psychiatry, University Psychiatry Unit, Teaching Hospital Anuradhapura, Anuradhapura, Sri Lanka.

3. Dr. Kavindu Dharmarathne

Temporary Lecture, Department of Psychiatry, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka, Minintale, Anuradhapura, Sri Lanka.

4. Dr. Amal Samarasinghe

Temporary Lecture, Department of Psychiatry, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka, Mihintale, Anuradhapura, Sri Lanka.

5. Prof. Dileepa Ediriweera

MBBS, MSc (BioStat), MSc (BioMed Info), PhD, FRSS (UK)

Professor in Health Data Science,

Health Data Science Unit,

Faculty of Medicine, University of Kelaniya, Kelaniya, Sri Lanka

6. Prof. Amila Isuru

MBBS, MD, MRCPsych

Professor in Psychiatry

Faculty of Medicine and Allied Sciences

Rajarata University of Sri Lanka, Mihintale, Anuradhapura, Sri Lanka

Contributions

SJ wrote the protocol and the manuscript, with editing and revisions suggested by the DE and AI. C SJ, K, and M are involved in data collection and curation. DE, SJ, and AI are involved in data analysis and interpretation of data. All authors have approved the final version of the manuscript.

Ethics approval and consent to participate

The study was approved by the Ethics review committee, Rajarata University of Sri Lanka (Reference:). All participants gave informed written consent for participation in the study. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Competing interests

Authors declare no competing interests

Corresponding author

Shane Jayasundara - dmshane24@gmail.com

Consent for publication

All participants provided informed consent for the publication of anonymised data and results derived from their publication.

References

1. Kalish VB, Gillham JE, Unwin BK. Delirium in Older persons: Evaluation and Management. Am Fam Physician. 2014;90:150–8.
2. van Velthuijsen EL, Zwakhalen SMG, Mulder WJ, Verhey FRJ, Kempen GIJM. Detection and management of hyperactive and hypoactive delirium in older patients during hospitalization: a retrospective cohort study evaluating daily practice. Int J Geriatr Psychiatry. 2018;33:1521–9. https://doi.org/10.1002/gps.4690.
3. Goldberg TE, Chen C, Wang Y, Jung E, Swanson A, Ing C, et al. Association of Delirium With Long-term Cognitive Decline A Meta-analysis Supplemental content. JAMA Neurol. 2020;77:1373–81. https://doi.org/10.1001/jamaneurol.2020.2273.
4. Ryan DJ, O'Regan NA, Caoimh RÓ, Clare J, O'Connor M, Leonard M, et al. Delirium in an adult acute hospital population: Predictors, prevalence and detection. BMJ Open. 2013;3:1–9. https://doi.org/10.1136/bmjopen-2012-001772.
5. Jayasinghe Arachchi TM, Pinto V. Understanding the barriers in delirium care in intensive care unit: A survey of knowledge, attitudes, and current practices among medical professionals working in intensive care units in teaching hospitals of central province, Sri Lanka. Indian Journal of Critical Care Medicine. 2021;25:1413–20. https://doi.org/10.5005/jp-journals-10071-24040.
6. Chen F, Liu L, Wang Y, Liu Y, Fan L, Chi J. Delirium prevalence in geriatric emergency department patients: A systematic review and meta-analysis. Am J Emerg Med. 2022;59:121–8. https://doi.org/10.1016/j.ajem.2022.05.058.
7. Inouye SK. Clarifying Confusion: The Confusion Assessment Method. Ann Intern Med. 1990;113:941. https://doi.org/10.7326/0003-4819-113-12-941.
8. Instenes I, Eide LSP, Andersen H, Fålun N, Pettersen T, Ranhoff AH, et al. Detection of delirium in older patients—A point prevalence study in surgical and non-surgical hospital wards. Scand J Caring Sci. 2024;38:579–88. https://doi.org/10.1111/scs.13270.
9. B. T. V. A, Saleem TK, Ramesh K. Prevalence of delirium among older adults in a tertiary care referral hospital in Kerala. Kerala Journal of Psychiatry. 2021;34. https://doi.org/10.30834/KJP.34.1.2021.232.
10. Wu CR, Chang KM, Tranyor V, Chiu HY. Global incidence and prevalence of delirium and its risk factors in medically hospitalized older patients: A systematic review and meta-analysis. International Journal of Nursing Studies. 2025;162. https://doi.org/10.1016/j.ijnurstu.2024.104959.
11. Siddiqi N, House AO, Holmes JD. Occurrence and outcome of delirium in medical in-patients: a systematic literature review. Age Ageing. 2006;35:350–64. https://doi.org/10.1093/ageing/afl005.
12. Welch C, McCluskey L, Wilson D, Chapman GE, Jackson TA, Treml J, et al. Delirium is prevalent in older hospital inpatients and associated with adverse outcomes: Results of a prospective multi-centre study on World Delirium Awareness Day. BMC Med. 2019;17. https://doi.org/10.1186/s12916-019-1458-7.
13. Marcantonio ER. A Clinical Prediction Rule for Delirium After Elective Noncardiac Surgery. JAMA: The Journal of the American Medical Association. 1994;271:134.

https://doi.org/10.1001/jama.1994.03510260066030.

14. Morandi A, Di Santo SG, Cherubini A, Mossello E, Meagher D, Mazzone A, et al. Clinical Features Associated with Delirium Motor Subtypes in Older Inpatients: Results of a Multicenter Study. The American Journal of Geriatric Psychiatry. 2017;25:1064–71. https://doi.org/10.1016/j.jagp.2017.05.003.
15. Yang FM, Marcantonio ER, Inouye SK, Kiely DK, Rudolph JL, Fearing MA, et al. Phenomenological Subtypes of Delirium in Older Persons: Patterns, Prevalence, and Prognosis. Psychosomatics. 2009;50:248–54. https://doi.org/10.1176/appi.psy.50.3.248.
16. Lee J, Chung S, Joo Y, Kim H. The major risk factors for delirium in a clinical setting. Neuropsychiatr Dis Treat. 2016;Volume 12:1787–93. https://doi.org/10.2147/NDT.S112017.
17. Quispel-Aggenbach DWP, Schep-de Ruiter EPR, van Bergen W, Bolling JR, Zuidema SU, Luijendijk HJ. Prevalence and risk factors of delirium in psychogeriatric outpatients. Int J Geriatr Psychiatry. 2021;36:190–6. https://doi.org/10.1002/gps.5413.
18. Peralta-Cuervo AF, Garcia-Cifuentes E, Castellanos-Perilla N, Chavarro-Carvajal DA, Venegas-Sanabria LC, Cano-Gutiérrez CA. Delirium prevalence in a Colombian hospital, association with geriatric syndromes and complications during hospitalization. Rev Esp Geriatr Gerontol. 2021;56:69–74. https://doi.org/10.1016/J.REGG.2020.10.007.
19. Sidoli C, Zambon A, Tassistro E, Rossi E, Mossello E, Inzitari M, et al. Prevalence and features of delirium in older patients admitted to rehabilitation facilities: a multicenter study. Aging Clin Exp Res. 2022;34:1827–35. https://doi.org/10.1007/s40520-022-02099-8.
20. Nimali Lochanie PA, Ranawaka NMD. Assessment of incidence and risk factors for intensive care acquired delirium in mechanically ventilated patients in surgical intensive care unit – National Hospital of Sri Lanka. Sri Lankan Journal of Anaesthesiology. 2018;26:131–6. https://doi.org/10.4038/slja.v26i2.8339.
21. Pandharipande P, Shintani A, Peterson J, Pun BT, Wilkinson GR, Dittus RS, et al. Lorazepam Is an Independent Risk Factor for Transitioning to Delirium in Intensive Care Unit Patients. Anesthesiology. 2006;104:21–6. https://doi.org/10.1097/00000542-200601000-00005.
22. Zhang R, Bai L, Han X, Huang S, Zhou L, Duan J. Incidence, characteristics, and outcomes of delirium in patients with noninvasive ventilation: a prospective observational study. BMC Pulm Med. 2021;21:157. https://doi.org/10.1186/s12890-021-01517-3.
23. Ahmed S, Leurent B, Sampson EL. Risk factors for incident delirium among older people in acute hospital medical units: A systematic review and meta-analysis. Age Ageing. 2014;43:326–33. https://doi.org/10.1093/ageing/afu022.
24. Al-Hoodar RK, Lazarus ER, Al Omari O, Al Zaabi O. Incidence, Associated Factors, and Outcome of Delirium among Patients Admitted to ICUs in Oman. Crit Care Res Pract. 2022;2022. https://doi.org/10.1155/2022/4692483.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table01.docx
- Table2.docx
- Table03.docx
- Table04.docx
- Table05.docx
- Table06.docx
- Table07.docx
- Table08.docx