Cross-Sectional Study

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Point prevalence and clinical profile of patients with delirium admitted in internal medicine department at tertiary care centre in eastern Nepal: a descriptive cross-sectional study

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Introduction: Delirium, marked by acute disturbances in consciousness and cognition, remains underdiagnosed despite its significant impact on morbidity and mortality. This study investigates the point prevalence and clinical profile of delirium in patients at an eastern Nepal tertiary care centre.

Methods: A 1-month descriptive cross-sectional study involved 152 Internal Medicine Department patients at BPKIHS, Dharan. Data, collected through face-to-face interviews and the Confusion Assessment Method (CAM), analyzed demographic details, clinical history, and laboratory findings. Ethical clearance and informed consent were obtained.

Results: Among 152 participants, 13.2% exhibited delirium, with notable risk factors identified. Elderly patients ($\geq$65 years) and those with nasogastric tubes faced higher risks. Significant associations were found with cardiovascular diseases ($P = 0.002$), central nervous system diseases ($P = 0.015$), and alcoholism ($P = 0.003$). Laboratory findings revealed correlations with elevated creatinine, hyperuremia, and abnormal aspartate aminotransferase levels. The study emphasizes key contributors to delirium, providing valuable insights for clinicians in identifying, preventing, and managing delirium in a hospital setting.

Conclusions: This study provides critical insights into delirium prevalence and profiles in Eastern Nepal. Identified risk factors underscore the importance of routine screenings and targeted interventions for at-risk populations. Study limitations, including sample size and single-centre focus, call for further research to validate findings and enhance our understanding of delirium's management across diverse healthcare settings. Overall, the study informs clinical practices and prompts broader exploration of delirium in healthcare contexts.

Keywords: alcoholism, clinical profile, delirium, elderlyprevalence

Introduction

Delirium, a severe medical condition characterized by an abrupt onset, a fluctuating course of disturbed consciousness, and cognitive impairment, serves as a crucial indicator of the quality of hospital care. It is often underdiagnosed, contributing to its obscured prevalence, despite being associated with significant mortality and morbidity rate[1–3].

It increases the mortality by 11% every 48 h. Timely identification and early interventions help us to minimize the burden[2]. Delirium is clinically significant, linked to heightened morbidity and mortality rates, prolonged hospital stays, nursing home placements, and impaired functional recovery.

HIGHLIGHTS

- Delirium is a significant concern, with a prevalence of 13.16% among hospitalized patients in eastern Nepal, emphasizing the need for early detection and intervention.
- Advanced age ($\geq$65 years), a history of alcohol intake, and specific medical conditions like cardiovascular and central nervous system diseases are identified as major risk factors for delirium, allowing for targeted risk assessment and preventive measures.
- Delirium increases mortality by 11% every 48 hours, emphasizing the urgency of early recognition and intervention to enhance patient care and safety.
- In resource-limited settings, recognizing high-risk groups and implementing preventive measures can optimize resource allocation, improving patient outcomes without straining limited resources.
- Larger-scale studies, prospective designs, and intervention studies are needed to validate and extend findings. Healthcare professionals should receive training on delirium recognition and effective communication, particularly for at-risk patients, to enhance care in limited resource settings.

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But we are lacking adequate information regarding the exact prevalence and risk factors of it which is a void in current scenario[4].

It is a widespread condition, particularly prevalent among the elderly. The occurrence of delirium varies based on the environment, with elevated rates observed in hospital and ICU settings. Current approximations indicate that delirium impacts around 15–30% of individuals admitted to hospitals and can reach as high as 80% among those in critical care units[5,6].

Despite the recognition of delirium's clinical impact, underdiagnoses remains prevalent, with estimates suggesting that a substantial percentage of cases evade detection[6,7]. To address this gap, guidelines from the Society of Critical Care Medicine advocate routine delirium screening, utilizing tools like the Confusion Assessment Method-ICU (CAM-ICU) or the Intensive Care Delirium Screening Checklist (ICDSC). These screening methods offer a concise yet comprehensive evaluation of delirium, emphasizing the fluctuating nature and assessing key features such as sudden onset, inattention, and disorganized thinking[8,9,10].

Using an easy ,reliable, widely used and user-friendly tool (CAM) ,assessment can be done within five minutes which we have used in our study[10,11].

While global studies have explored delirium and its risk factors, investigations within specific regions, such as Nepal, remain limited. Existing studies in Nepal reveal varying incidence rates, prompting the need for a more extensive, multicentre examination[5,12]. This study aims to contribute to the evolving literature on delirium by focusing on its point prevalence and overview of clinical profiles of patient with delirium in hospital admitted patients.

By unravelling the intricacies of delirium in this unique context, we aspire to provide insights that inform targeted preventive and management strategies. Delirium's complexity is further underscored in developing countries like Nepal, where the disorder is viewed as a medical crisis with far-reaching consequences. The prevalence, risk factors, and outcomes of delirium in resource-scarce settings like Nepal present unique challenges, necessitating a dedicated investigation[5,9,12]. Therefore, we aimed to determine the point prevalence, and clinical profile of patients with delirium admitted in internal medicine at tertiary care centre in Eastern Nepal.

Methodology

Study design and setting

The research employed a hospital-based descriptive cross-sectional study design. The study was conducted over a one-month period (from2022/04/05 to 2022/05/02) within the in-patient ward of the Internal Medicine Department at BPKIHS, Dharan, Nepal.

Study population

The study population comprised patients admitted to the in-patient ward of the Internal Medicine Department at BPKIHS.

Ethical considerations

Ethical clearance was obtained from the Department Research Unit, Department of Internal Medicine at BPKIHS.

Informed consent, ensuring anonymity and confidentiality, was obtained from each participant.

Sampling technique and sample size calculation

Convenient sampling technique was employed.

The sample size was calculated based on a point prevalence rate of 10%, with a 5% level of precision, at a 95% CI, referencing a similar study by Buchat *et al.*[13].

The calculated sample size was 139, with the actual study including a sample size of 152.

Inclusion and exclusion criteria

Inclusion criteria: Patients aged 18 years or older admitted to the Department of Internal Medicine, and providing written informed consent.

Exclusion criteria: Patients not providing informed consent, intubated patients, or those in a comatose state.

Data collection methods

Face-to-face interviews were conducted using structured questionnaires distributed to patients in the Internal Medicine Department ward.

The questionnaire covered demographic variables, and a clear explanation of the research rationale and objectives was provided before the interviews.

The CAM tool, with a sensitivity of 94% and specificity of 89%, was utilized for delirium assessment[14]. The questionnaire included four criteria which are;

1. Acute change or fluctuating course.
2. Inattention.
3. Disorganized thinking.
4. Altered level of consciousness.

(For the diagnosis of delirium 1 and 2 plus either 3 or 4 is required).

Assessment tools

The CAM structured questionnaire format was employed for delirium diagnosis[14].

History and record collection

Risk factor history (predisposing and precipitating) was gathered through face-to-face interviews. For the purpose of this study, individuals were categorized as alcoholics if their self-reported alcohol consumption exceeded 40 g per day, establishing a standardized criterion for the classification utilized throughout the article. At the time of screening the primary medical diagnosis was recorded to represent a particular system involvement.

The study gathered detailed drug history through face-to-face interviews to assess potential drug interactions and the impact of polypharmacy on delirium. Information included prescribed, over-the-counter, and herbal medications. Polypharmacy, defined as the use of five or more medications concurrently, was a central consideration in understanding delirium pathophysiology.

Laboratory investigation findings and hospital diagnosis were extracted from patient files.

Data collection oversight

Data collection occurred over 7 days under close scrutiny by supervisors from the departments of internal medicine and psychiatry.

Proper data collection skills and software entry proficiency were ensured before the research commenced.

Data analysis

Data, coded and entered into Microsoft Excel 10, were analyzed using Statistical Package for Social Sciences (SPSS) software version 25.

Descriptive statistics (mean, SD) were calculated, and inferential statistics, including the chi-square test (P value = 0.05), were employed to determine the significance of risk factors associated with delirious patients.

The work has been reported in line with the STROCSS criteria[15].

Results

The Table 1 provides information on the demographic characteristics of a group of people, based on their age, sex, education level, and occupation. In terms of age, the majority of participants (38.2%) were 65 years and above, followed by 33.6% aged between 41 and 64 years. Regarding sex, females (55.93%) were slightly higher than males (44.07%) in the sample. In terms of education level, the majority of participants were illiterate (45.4%). Finally, in terms of occupation, 57.9% of participants were employed.

The Table 2 present a comparison between delirious and non-delirious subjects with respect to various risk factors. The delirious group consisted of 20 subjects, while the non-delirious group consisted of 132 subjects. The P value indicates the level of significance of the difference between the two groups.

The mean age for delirious subjects were higher (62.5 years) compared to non-delirious subjects (53.20 years). Elderly patients ($\geq$65 years) were more likely to experience delirium (14

Table 1

Demographic variables

Characteristics	Frequency, *n* (%)
Age	
18–40	43 (28.3)
41–64	51 (33.6)
65 and above	58 (38.2)
Sex	
Male	67 (44.07)
Female	85 (55.93)
Education	
Illiterate	69 (45.4)
Primary	32 (21.1)
Secondary	32 (21.1)
Higher secondary	13 (8.6)
Higher	6 (3.94)
Occupation	
Employed	88 (57.9)
Unemployed	64 (42.1)

Table 2

Categorical risk factors

Risk factors	Delirious subjects $n = 20$, *n* (%)	Non-delirious subjects $n = 132$, *n* (%)	*P*
Age	Mean = 62.5 SD = 15.815	Mean = 53.20 SD = 19.68	0.098
Elderly patients ($\geq$65 years)	14	44	0.002
Sex: Male	12 (60)	55 (41.67)	0.124
Female	8 (40)	77 (58.3)	0.124
Predisposing factors			
Length of hospital stay (mean)	4.05	3.48	0.393
Visual impairments	8 (40)	47 (35.6)	0.703
Dementia	2 (10)	5 (3.7)	0.217
Alcoholism	15 (75)	52 (39.39)	0.003
Smoking	11 (55)	48 (36.36)	0.111
Bed Ridden	4 (20)	11 (8.33)	0.103
Dehydration	0	3 (2.27)	0.496
Stroke	3 (15)	3 (2.27)	0.006
Precipitating factors			
Infection	9 (45)	45 (34.09)	0.342
Catheterisation	6 (305)	19 (14.39)	0.79
Oxygen supply	4 (20)	21 (15.9)	0.579
NG- tube	4 (20)	3 (2.27)	0.000
Polypharmacy	5.75 ± 1.943	4.64 ± 2.53	0.354
CVS	13 (65)	40 (30.3)	0.002
Respiratory system involvement	4 (20)	28 (21)	0.901
Urogenital system involvement	10 (50)	37 (28)	0.048
Hepatobiliary involvement	3 (15)	16 (12.12)	0.717
Endocrine system involvement	5 (25)	19 (14.39)	0.225
Multisystem involvement	11 (55)	33 (25)	0.060
CNS involvement	5 (25)	10 (7.57)	0.015
GI system involvement	0	11 (8.33)	0.180
Haematological system involvement	0	11 (8.33)	.0.180
Malignancy	0	21 (15.9)	0.055
Laboratory investigations	9 (45)	81 (61.36)	0.165
Anaemia			
Leucocytosis	7 (35)	29 (21.96)	0.201
Leucopenia	2 (10)	24 (18.16)	0.365
Thrombocytopenia	6 (30)	50 (37.87)	0.496
Hyponatremia	6 (30)	65 (49.24)	0.292
Hypokalemia	8 (40)	28 (21.21)	0.800
Hyperkalaemia	2 (10)	10 (7.57)	0.708
Hyperuremia	12 (60)	47 (35.6)	0.037
Increased level of creatinine	11 (55)	43 (32.57)	0.051
Decreased total protein	6 (30)	27 (20.45)	0.335
Hypoalbuminemia	8 (40)	47 (35.6)	0.753
Hyperbilirubinemia	5 (25)	28 (21)	0.702
Congugated hyperbilirubinemia	5 (25)	40 (30.3)	0.628
Deranged level of ALT	8 (40)	39 (29.54)	0.346
Deranged level of AST	11 (55)	47 (35.6)	0.096
Deranged level of ALP	8 (40)	38 (28.78)	0.309

The Normal lab value of the respective hospital has been used.

ALP, Alkaline phosphatase; ALT, alanine transaminase; AST, aspartate aminotransferase; CNS, central nervous system; CVS, cardiovascular system; GI, gastrointestinal NG, nasogastric.

out of 20 delirious subjects vs. 44 out of 132 non-delirious subjects, $P = 0.002$).

The term 'alcoholism' in this study pertains to individuals who self-reported alcohol consumption surpassing 40 g per day, thereby providing a precise criterion for participant categorization. Alcoholism was significantly more prevalent among delirious subjects (75%) compared to non-delirious subjects (39.39%, $P = 0.003$). Delirious subjects were also more likely to have a history of stroke (15% vs. 2.27%, $P = 0.006$), history diseases involving CVS, NG tube (20% vs. 2.27%, $P = 0.000$), and renal system involvement (50% vs. 28%, $P = 0.048$). The study meticulously examined the connection between delirium and diseases representing a particular system, emphasizing the primary medical diagnosis involving a system rather than focusing solely on specific diseases. This approach was adopted to acknowledge the interrelated nature of medical conditions within a system, as delirium can result from complex interactions between various health factors rather than being solely attributed to individual diseases. The study aimed to capture a more holistic understanding of the relationship between systemic medical diagnoses and delirium incidence.

In terms of laboratory investigations, delirious subjects were more likely to have hyperuremia (60% vs. 35.6%, $P = 0.037$) and increased level of creatinine (55% vs. 32.57%, $P = 0.051$). They were also more likely to have deranged level of AST (11 out of 20 delirious subjects vs. 47 out of 132 non-delirious subjects, $P = 0.096$).

Overall, the results suggest that age, alcoholism, stroke, history of CVS diseases and renal system involvement are important risk factors for the development of delirium in hospitalized patients.

It's important to note that some of the findings are not statistically significant (i.e. $P > 0.05$), but they may still be clinically relevant. Overall, this study highlights several risk factors for delirium in hospitalized patient.

Discussion

The study, investigating the point prevalence and clinical profile of delirium in an Eastern Nepal tertiary care centre, utilized a seven-day point prevalence approach with the CAM screening tool among 152 admitted patients. The observed delirium prevalence of 13.16% aligns with the range reported in diverse settings (16–53.6%), consistent with estimates that 10–30% of hospitalized patients develop delirium[7–11].

While numerous studies explore delirium risk factors, this study uniquely delves into the clinical profile of delirious patients in specific settings. Significant risk factors identified encompassed advanced age (≥ 65 years), alcoholism, urogenital system involvement, nasogastric tube placement, and central nervous system involvement, aligning with existing literature.

Advanced age has been consistently reported as a significant risk factor for delirium due to a number of reasons. The study found that elderly patients (≥ 65 years) were more likely to develop delirium than younger patients. This finding is consistent with previous studies that have identified age as a significant risk factor for delirium[2,3].

Older adults are more vulnerable to delirium due to age-related changes in the brain, including decreased cerebral blood flow, changes in neurotransmitter systems and increased susceptibility to stress. Additionally, older adults are more likely to have multiple medical comorbidities and to be taking multiple medications, which can further increase their risk of delirium due to their increased vulnerability to medical comorbidities[16,17,18].

In the present study delirium is more prevalent in patients with previous history of alcohol intake showing statistical significance (P value-0.003) which is consistent with previous studies that have identified alcoholism as a risk factor for delirium[19]. Early detection and recognition of delirium is essential in patients with history of alcohol intake to improve the quality of care of the patient and for this purpose it is also required to have an adequate knowledge on various patient and hospital care related risk factors causing delirium. In this regard alcoholism can contribute in developing delirium in patients which is a potential predisposing risk factors for delirium[20,21]. Alcohol inhibits N-methyl-D-aspartate (NMDA) neuro-receptors, and chronic alcohol exposure results in upregulation of these receptors. Alcohol withdrawal abruptly increases glutamate action, causing excitatory effects. Some people are more susceptible to withdrawal symptoms, leading to severe symptoms such as confusion, autonomic hyperactivity, and cardiovascular collapse, known as delirium tremens (DT). Alcoholism can lead to electrolyte imbalances, dehydration, hepatic encephalopathy, malnutrition, and liver dysfunction, all of which can contribute to the development of delirium[21,22,23]. Thus patient with the history of alcohol intake regardless of duration, amount of intake, screening for delirium is required at the time of admission and need careful screening and monitoring as they are more predisposed to delirium as shown by our study.

The study found that high levels of creatinine and blood urea, indicating renal impairment, were positively correlated with delirium, which is consistent with existing literature where acute kidney injury and chronic kidney disease have been found to increase the risk of delirium due to uraemic encephalopathy and electrolyte imbalances[24]. This study's result contributes to the existing evidence that accumulation of waste products in kidney impairment can affect the brain by inducing inflammation and releasing pro-inflammatory markers, leading to the development of delirium. Urinary tract infections can cause systemic inflammation and alter neurotransmitter systems, leading to delirium. Additionally, patients with urinary tract infections may have other risk factors for delirium, such as advanced age, catheterization, and medication use[25]. Thus interpretation of deranged of laboratory parameters in renal diseases may aid in the detection of delirium. This finding is consistent with previous studies that have identified urinary tract infections as a risk factor for delirium[26].

The insertion of a nasogastric tube is recommended for patients with severe diseases, which is a significant risk factor for the development of delirium. However, it should be noted that regular assessment for the need of such lines is necessary to promote early removal. Recent studies have shown that patients with nasogastric tubes are more prone to develop delirium, which is consistent with the findings described in previous literatures[18,26,27]. The insertion of an NG tube can indirectly contribute to delirium due to physical discomfort, stress, anxiety, and disruptions to sleep patterns. Underlying medical conditions, medication effects, and complications like dehydration may also play a role together with this procedure in precipitating the condition. Delirium is often multifactorial, and the procedure is just one potential contributor[28,29].

Contrarily, the study did not find significant associations between delirium and factors like visual impairments, dementia, smoking, bedridden status, dehydration, infection, catheterization, oxygen supply, anaemia, and various laboratory parameters. One

possible explanation for the lack of association found in our study may be the relatively small sample size, which may have limited the statistical power to detect significant differences. Additionally, other factors such as cultural differences and variations in the prevalence of medical comorbidities in different populations and settings may have contributed to the differences in findings between our study and previous studies.

The findings hold vital implications for clinical practice in resource-limited settings. Early identification of high-risk groups enables routine screenings, timely interventions, and tailored treatments. Clinical guidelines or protocols, risk assessment, and patient education programs may optimize resource utilization. However, acknowledging the study's limitations, such as a small sample size and single-centre focus, is crucial. Future research should explore larger-scale, prospective studies to validate findings and enhance understanding of delirium pathophysiology and management. Training healthcare professionals on delirium recognition and effective communication is essential for improved care and outcomes in resource-limited settings.

The findings of this study have important implications for clinical practice in a resource-limited setting like Eastern Nepal's Internal Medicine Department. Healthcare providers can benefit from these findings by focusing on three key areas: screening and early detection, preventive measures, and tailored treatment strategies. Identifying high-risk groups, including the elderly, individuals with a history of alcoholism, and those with specific medical conditions, can guide clinicians in implementing routine screenings for these risk factors. This can lead to the early identification of delirium or patients at risk, enabling timely intervention and improving patient outcomes. Based on these findings, the potential exists for developing clinical guidelines or protocols, including risk assessment protocols and patient education programs. Additionally, recognizing the public health implications of delirium, such as resource allocation challenges, underscores the importance of public awareness campaigns to educate healthcare providers, patients, and families.

Overall, our findings suggest that delirium is a common problem among hospitalized patients, and its clinical profile is complex and multifactorial. The identification of risk factors associated with delirium can help healthcare providers to implement preventive measures and develop targeted interventions to manage delirium. However, further studies with larger sample sizes and more comprehensive assessments of risk factors are needed to validate our findings and to better understand the pathophysiology and clinical management of delirium.

Conclusion

In conclusion, this study reveals a 13.16% point prevalence of delirium in an eastern Nepal tertiary care centre's Internal Medicine Department. Advanced age, alcoholism, renal impairment, and nasogastric tube placement emerged as significant risk factors. These findings underscore the importance of routine screenings and targeted interventions for at-risk populations. While acknowledging study limitations, the results inform immediate clinical practices in resource-limited settings. Enhanced awareness and education are crucial, and further research is warranted for validation and comprehensive understanding of delirium's pathophysiology and management in diverse healthcare contexts.

Ethical approval

Ethical clearance letter was obtained from Departmental Research Unit(DRU), Department of Internal Medicine, B.P. Koirala Institute of Health Sciences, Reference No: internal Medicine/717/2022.

Consent

Written informed consent was obtained from the patient /legal guardian for the documentation/disseminations of any information's. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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