

# Magnitude and associated factors of delirium among patients attending emergency department at Jimma medical center, Jimma, southwest Ethiopia, 2022

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## Research Article

**Keywords:** Delirium, Emergency patients, associated factors, Jimma, Ethiopia

**Posted Date:** August 12th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1932106/v1>

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# Abstract

**Background:** Delirium is a complex neuropsychiatric syndrome commonly encountered across all healthcare settings. It is associated with adverse outcomes including more prolonged hospitalization, institutionalization and increased mortality. In contrast to its frequent occurrence and negative consequences, delirium is missed by emergency physicians (EPs) in 57% to 83% of cases. Furthermore despite to its clinical importance, there is little documentation regarding delirium prevalence and physician detection rates within the emergency setting.

**Objectives:** This study aimed to assess magnitude and associated factors of delirium among patients attending emergency department at Jimma medical center, Jimma, southwest Ethiopia, 2022.

**Methods:** A hospital based cross-sectional study was conducted from August 1st up to September 30, 2022. 422 study participants were enrolled who were selected by systematic random sampling. The presence or absence of delirium was assessed by using Confusion Assessment Method (CAM) and Richmond Agitation Sedation Scale (RASS) was employed to assess distinct subtypes of delirium and level of arousal. The data was entered using Epi Data V3.1 and exported to Statistical Package for Social Scientists Version 20(SPSS V20). To find associated factors, bivariate and multivariable logistic regressions were used. Variables having a p-value of less than 0.05 were deemed statistically significant.

**Result:** The prevalence of delirium was found to be 26.6%(n=107), current use of alcohol (AOR=3.6, 95 percent CI (2.5-8.1), visual impairment (AOR=2.34, 95 percent CI (1.89-3.68), frequent admission (AOR=3.47(1.24-7.34), bladder catheterization (AOR=1.4, 95 percent CI (1.21-2.89), 15.993), and benzodiazepine exposure (AOR=1.5, 95 percent CI (1.01-2.3) had significant association with delirium.

**Conclusion:** This study shows the prevalence of delirium was high among patients in emergency ward. Current use of alcohol, visual impairment, frequent admission, bladder catheterization, and benzodiazepine exposure had significant association with delirium. Early recognition is important to correct identifiable cause and improve health outcome of patients.

## Introduction

Delirium is among the most prevalent neurocognitive disorders, with a sudden onset, rapidly changing cognitive decline, and an impairment of conscious experience. It is characterized by abnormalities of orientation, memory, communication skills, reasoning, awareness, motor behavior, sleep wake pattern, and abnormal attention as the key cognitive disturbance that is not better explained by pre-existing, identified, or other progressing neurobiological disorders (2)(3)(4).

Delirium develops suddenly and swings over the course of a day (4)(7). Even though its manifestation is often linked to hyperactive delirium symptoms (instability, restlessness) (4), there are two distinct subgroups, notably mixed and hypoactive delirium (6). Lack of energy, diminished alertness, and

indifference are the hallmarks of hypoactive delirium, while mixed delirium combines elements of both delirium subtypes (7). Despite having negative clinical effects, delirium is often treatable (8), (9).

Delirium is a considerable problem in clinical settings. About 20 to 30 percent of medical inpatients experience delirium, and 10 to 50 percent of surgical patients do as well (3). According to research reports, delirium occurs in between 70 and 87 percent of all hospitalizations to intensive care units and in as many as 83 percent of cases that are considered to be "end of life" treatment (10)(11).

In contrast to its frequent occurrence and negative impact on prognosis, delirium is missed by emergency physicians (EPs) in 57–83% of cases. There is some evidence to suggest that missing delirium in the ED poses higher-risk compared to patients whose delirium is detected by the ED(13). In addition, for example, ED doctors in several countries diagnosed only 28–38% of all cases of mental status impairment and only 9–35.3% of patients with delirium were detected by the ED physicians(14).

Delirium is associated with adverse outcomes including more prolonged hospitalization and increased mortality (16) (17). In a recent study, mortality was shown to increase by 11% for every additional 48 hour of active delirium, highlighting the need for timely detection and treatment(18).

The risk factors of delirium as reported from different literatures such as different physiological factors associated with ageing, use of physical restraints (bed rails), urinary catheterization and malnutrition have been identified (4). Furthermore other risk factors identified for the development of delirium include nutritional deficiency, dementia, medical illness, alcohol misuse and sensory impairments have also been cited as contributory factors in the development of delirium (4).

Contrary, it appears that the ED's responsiveness for spotting delirium is inadequate. (20) (21). There are a variety of potential causes for the inadequate recognition of delirium in this situation This may include the subtype of delirium, specifically the hypoactive subtype has been identified (22). Additional factors include the complexity, infrequent usage, and inadequate staff training of mental status screening methods (14)(23). Factors like a rise in ED visits, and a high need for decision-making efficiency may also be involved (24).

Even if delirium is usually temporary and reversible, patients who developed delirium had longer hospital stays, increased short-term mortality and a much higher frequency of dementia diagnosis at follow-up, compared with similar patients without delirium (25–28). Furthermore, it is also linked to negative patient and institutional outcomes including hospital length of stay (LOS) (29), (30–33), higher mortality rates (33), (31), (34–36), cognitive decline or impaired cognitive functions (34, 37–39) restrictions in motor functionality(39, 40), ongoing need for care in long-term care institutions(32, 33). The above mentioned outcomes are even more worrisome in low income countries(41).

Increasing delirium rates would be expected to have complementary relation with lower quality of hospital care. Total national costs related to preventable adverse events are estimated to be between \$17 billion and \$29 billion per year, and delirium may account for at least a quarter of these costs (10).

Furthermore, patients discharged to home from the emergency department (ED) after completing their treatment with unidentified delirium have 6-month mortality rates almost 3-fold greater (30.8% versus 11.8%) than their counterparts in whom delirium is detected(44).

## Methods

### Study setting

The study was conducted in Jimma medical center, emergency department, which is found in Jimma town, Oromia regional state in the south west Ethiopia which is 352 km away from the capital. It provides services for about 15 million populations in south west catchment area. Around 2000 patients attend emergency department per month.

### Eligibility criteria

All patients attending emergency department at Jimma medical center during the study period were included in the study. Patients who are comatose with RASS score of -4 or -5 and patients with severe dementia were excluded from the study.

### Sample size and sampling technique

Single population proportion formula was used to determine sample size and p-value of 50% was taken since there is no study conducted on the area of interest specific to the study setting and 95% confidence interval, a margin of error of 5%, a non-response rate of 10% was used to get the total sample size of 422. A systematic Random sampling technique was employed to select study subjects. Selection skip interval (k) was calculated by taking total of patients attending the emergency department per month 2000(N) to the sample size (n) 422 =  $N/n$ ,  $k=2000/422=4.74=5$ , so the participants were selected every 5th interval, who visited the emergency department during the data collection period. The first respondent was selected by lottery method and the next respondent was chosen at regular intervals.

### Study variables

#### Dependent variable

- Delirium (yes/no)

#### Independent variables

- **Demographic factors** :- Age, sex, religion, marital status, ethnicity, educational status, and economic status
- **Substance use**:- Alcohol use, Khat use, Cigarette smoking
- **Chronic physical illness** :- Heart diseases, diabetic mellitus, and others chronic physical illness
- **Physical Impairment** :- Visual, Hearing and Cognitive

- **Medication related:-** Previous or current anticholinergic, benzodiazepines, polytherapy and antipsychotics use
- **Hospital related factors:-** Bladder catheterization, Intravenous fluid, severity of illness and frequent Admissions

### Operational definition

- **Delirium:** For a diagnosis of delirium by CAM, the patient must display: Presence of acute onset and fluctuating discourse and Inattention and either disorganized thinking or altered level of consciousness
- **Hearing Impairment:** defined as correctly hearing 6 or fewer of 12 numbers with both ears on whisper test.
- **Visual Impairment:** defined as corrected binocular near vision worse than 20/70 on standard jaeger test
- **Current substance use:** use of alcohol, khat, tobacco one or more in the past three month.
- **Confusion Assessment Method scale:** For a diagnosis of delirium by CAM, If features 1 and 2 and either 3 or 4 are present (CAM +/-positive), a diagnosis of delirium is suggested.
- **Richmond Agitation Sedation Scale:** was used to assess level of arousal and to indicate the delirium subtype of the psychomotor variety. Hyperactive delirium was defined as a patient's RASS score falling between +1 and +4. Hypoactive delirium was defined as those with a RASS score between 0 and 3. Patients with mixed-type RASS scores at 0 and 3 were those who displayed both positive and negative RASS scores.
- **Apache II score:** acute physiology score+ age points+ chronic health points , higher scores corresponded to more severe disease and higher risk of death
- **Charlson Comorbidity Index:** this scores consists of 21 variables and with total score of 39 points score of 2, representing mild to moderate comorbidity ,and a score of 8, representing severe comorbidity(69)

### Data Collection Tools and procedures

A structured interviewer administer questionnaire was used to collect data. Questionnaires in this study about demographic, socio-economic were developed after extensive review of literatures and similar study tools used in similar studies.

For the assessment of delirium, CAM was used which is validated for emergency setting. CAM has been translated into 10 languages where published articles are available. In literature from the ED, this tool has been cited to have sensitivity of 94-100%, specificity of 90-95% and high inter-rater reliability. Several studies have been done to validate clinical usefulness. For a diagnosis of delirium by CAM, If features 1 and 2 and either 3 or 4 are present (CAM +/-positive), a diagnosis of delirium is suggested (59,60).

In section 2, DRS-R-98 is a 16-item observational clinician rated scale with a maximum total severity score of 39 points was used to assess severity of delirium and total diagnostic score of 46 points show sensitivity and specificity levels of 91% to 100% and 85% to 100% respectively. It is divided into two components. The first section has a 13-item severity scale that is utilized for continuous measurement throughout an episode of established delirium. A score of 12 points or more denotes complete delirium syndrome. The severity ratings vary from zero (no impairment) to 3 (severe impairment), and a severity score is >15 points; it shows no severe delirium in the range of 12–15, less severe delirium in the range of 16–20, and severe delirium in the range of >20 (severe delirium) (61, 62).

For assessing cognitive status short portable mental status questioner(SPMSQ) was used, appropriate cut-off for SPMSQ was found to be 5 or more errors (sensitivity 78%, specificity 75%) , regarding the scoring :0-2 errors: normal mental functioning,3-4 errors: mild cognitive impairment,5-7 errors: moderate cognitive impairment and 8 or more errors: severe cognitive impairment (63–66).

Furthermore, for assessing level of arousal and to categorize the psychomotor subtype of delirium, RASS was used, a 10 point scale which scores from +4 to -5. RASS was 84.0% sensitive (95% CI = 73.8% to 94.2%) and 87.6% specific (95% CI = 84.2% to 91.1%) for delirium. Patients will be evaluated for delirium by CAM if they will be responsive to verbal commands (a RASS score of other than -4 and -5), patients with a RASS score between +1 and +4 will be considered to have hyperactive delirium. Patients with a RASS score between 0 and 3 were considered to have hypoactive delirium. Patients exhibiting both positive and negative RASS scores at 0 and 3 hours were considered to have the mixed type(67).

In addition for assessing severity of illness ,Acute physiology and chronic health evaluation (APACHE II), Severity of Illness Scoring Systems was used ,this scores was observed from chart, it consists of 12 variables with age points and chronic health points which gives a total score of 71 points and the total physiological derangement score is the sum of the individual scores (0-4),higher scores corresponded to more severe disease and higher risk of death(68).

For the assessment of comorbidity charlson comorbidity index was used, this scores was observed from chart, which consists of 21 variables and with total score of 39 points score of 2, representing mild to moderate comorbidity ,and a score of 8, representing severe comorbidity(69).

## **Data processing and analysis**

After data collection was completed and the necessary information was obtained, data was checked for completeness. Study variable was coded in Epidata manager Version 2.0.8.56 and data was entered, edited by Epidata entry client version 2.0.7.22. Data was analyzed using SPSS version 20. For the analysis of obtained data simple descriptive statistics (mean, percentage, frequencies, and standard deviation) was used. Bivariate analysis was done to see the association of each independent variable with the outcome variable. Variables with p-value  $\leq 0.25$  in bivariate analysis were entered into multivariate logistic regression model to identify the effect of each independent variable with the

outcome variables. Finally a p-value of less than 0.05 was considered statistically significant, and adjusted odds ratio with 95 % CI was calculated to determine the strength association.

### **Data quality control**

Pre-test was conducted on 24 participants (10% of the sample size) before the main study is done to identify impending problems in the proposed study and it was done one week before day of actual data collection after training was given to the data collectors in Awetu primary hospital and a questionnaire translated into local language was used for data collection.

## **Chapter 5: Result**

### **5.1. Socio- demographic and economic characteristics of respondents**

From the expected 422 respondents, 401 agreed to be enrolled in the study giving response rate of 95%. Among 401 patients which participated in the study majority of them were males 65.8% (n=264). The mean age of the respondents was 41.14(SD = ±15.92 years) with minimum and maximum ages ranging from 10 to 79 years respectively. From the study participants enrolled in the study majority of them were oromo by ethnicity 69.8% (n=280), 60.9% (n=241) of them were married, self-employed 56.6% (n=227) and were illiterate 33.7% (n=135). Regarding the patients distribution within the emergency ward, most of the patients were in surgical room 40.9% (n=164). (Table 1)

**Table 1:- Socio- and demographic characteristics of participants among Jimma university medical center, emergency ward, August 2022 (N=401)**

<b>Variable</b>		<b>Frequency (n)</b>	<b>Percentage %</b>
Gender	Male	264	65.8
	Female	137	34.2
Age	Less than 30	108	26.9
	30-39	82	20.4
	40-49	84	20.9
	50-59	61	15.2
	60-69	37	9.2
	70-79	29	7.2
Ethnicity	Oromo	280	69.8
	Amhara	23	5.7
	Tigre	2	0.5
	Afar	3	0.7
	Other	93	23.2
Marital status	Married	241	60.1
	Single	89	22.2
	Divorced	44	11.0
	Widowed	27	6.7
Economic Status	<2000	150	37.2
	2001-2999	15	3.7
	3000-4999	107	26.6
	>5000	31	7.7
Occupation	Government Employed	65	16.2
	Self-Employed	227	56.6
	NGO	3	0.7
	No Job	24	6.0
	Private employed	82	20.4
Educational Status	Illiterate	135	33.7
	Primary School	114	28.4

	Secondary School	86	21.4
	Diploma and above	66	16.5
Emergency Ward	Medical	132	32.9
	Surgical	164	40.9
	Resuscitation	105	26.2

The study also revealed that 16.2% (n=65) of the study participants chewed khat at least once in their lifetime. Regarding drinking alcohol habit, 14.7% (n=59) reported that they drink alcohol at least once in their lifetime while 6.7% (n=27) were drinking alcohol over the last 30 days prior to the study. The study showed that 3.2 % (n=13) of the respondents smoked cigarettes at least once in their life time whereas 3.2 % (n=13) of the respondents have been smoking cigarettes in the past 30 days.

Furthermore, the study also revealed that 4% (n=16) of participants had previous exposure to antipsychotics and also it was found from the research that 5.2 % (n=21) of study participants also were exposed to benzodiazepines. Regarding history of polytherapy around 40.4 % (n=162) of the participants were on polytherapy.

In addition, 8.2% (n=33) of study participants had history of hearing impairment whereas 13.5 % (n=54) had history of visual impairment. It is also found that 39.2% (n=157), 82.3 % (n=330), 14.5 % (n=58) of the participants had bladder catheterization, intravenous fluid and frequent admission respectively. (Table 2)

**Table 2 Substance use, clinical and medication related characteristics among patients admitted in emergency ward, Jimma medical center, August 2022 (N=422)**

Variable			Frequency(n)	Percent (%)
Alcohol use	Lifetime	Yes	59	14.7
		No	342	85.3
	Current use	Before 1 month	32	8.0
		During the past 1 month	27	6.7
Cigarette smoking	Lifetime	Yes	13	3.2
		No	388	96.8
	Current use	Before 1 month	6	1.5
		During the past 1 month	8	2.0
Khat use	Lifetime	Yes	65	16.2
		No	336	83.8
	Current use	Before 1 month	31	7.7
		During the past 1 month	35	8.7
Previous or current use of antipsychotics	Yes		16	4
	No		385	96
Previous or current use of benzodiazepines	Yes		21	5.2
	No		380	94.8
History of polytherapy	Yes		162	40.4
	No		239	51.6
Bladder catheterization	Yes		157	39.2
	No		244	60.8
Intravenous fluid	Yes		330	82.3
	No		71	17.7

Frequent Admission	Yes	58	14.5
	No	343	85.5
Previous Hearing impairment	Yes	33	8.2
	No	368	91.8
Previous Vision impairment	Yes	54	13.5
	No	347	86.5

## 5.2. Prevalence of Delirium

Approximately one third (26.6 %, n=107) of the patients in the study had delirium. 3.0 % (12) had mild delirium; 5.0% (n=20) had moderate delirium, while 18.6% (n=75) had severe delirium.

Furthermore, among patients who were found to be positive for delirium 10.9 % (n=44) had hyperactive subtype, while 14.8% (n=60) had hypoactive delirium and those who had mixed type were 0.7% (n=3).

In addition regarding cognitive status, it was revealed from the study that 94(87.8%) had severe cognitive impairment, 10(9.3%) had moderate cognitive impairment, 6(5.6%) had mild cognitive impairment while none had normal mental functioning.

From study participants with delirium 67(62.6%) of them had severe comorbidity, and while 40(37.3%) had mild to moderate comorbidity.

## 5.3. Factors associated with delirium

Socio-demographic and economic characteristics of patients like age ,ethnicity, occupation and economic status didn't show any association with delirium on bivariate analysis while sex, educational status and sub-wards in emergency ward were associated with delirium. (Table 3)

**Table 3:- Bivariate analysis of socio-economic characteristics of study participants among Jimma medical center, August 2022. (N=422)**

		Delirium		COR &95%CI	P-value
Variable		No (N%)	Yes (N%)		
Gender	Male	178(44.39%)	81(20.2%)	2.030(1.232-3.347)	0.05*
	Female	116(28.92%)	26(6.48%)	1	1
Age	Less than 30	74(18.45%)	34(8.47%)	1	1
	30-39	63(15.71%)	19(4.73%)	0.65(0.34-1.26)	0.207
	40-49	69(17.2%)	15(3.74)	3.47(2.237-6.94)	0.034*
	50-59	45(11.22%)	16(3.99%)	0.774(0.384-1.559)	0.473
	60-69	24(5.98%)	13(3.24%)	1.179(0.536-2.592)	0.682
	70-79	19(4.73%)	10(2.48%)	1.146(0.481-2.725)	0.759
Ethnicity	Oromo	213(53.1%)	67(16.7%)	1.444(0.148-4.051)	0.533
	Amhara	13(3.24)	10(2.49%)	1.880(0.736-4.805)	0.187
	Tigre	1(0.25%)	1(0.25%)	0.769(0.455-1.300)	0.327
	Afar	1(0.25%)	2(0.49%)	2.889(0.425-5.619)	0.203
	Other	66(16.46%)	27(6.73%)	1	1
Marital status	Married	180(44.88%)	61(15.21%)	1	1
	Single	67(16.7%)	22(5.48%)	0.969(0.552-1.700)	0.912
	Divorced	31(7.73%)	13(3.24%)	1.237(0.609-2.516)	0.556
	Widowed	16(3.99%)	11(2.74%)	2.029(0.813-4.610)	0.091
Economic Status	<2000	107(26.68%)	49(12.21%)	1	1
	2001-2999	16(3.99%)	2(0.49%)	2.486(1.317-4.692)	0.998
	3000-4999	75(18.7%)	33(8.22%)	2.285(1.16-	0.016*

				4.488)	
	>5000	22(5.48%)	9(2.24%)	2.097(0.87-5.381)	0.124
Occupation	Government Employed	54(13.46%)	11(2.74%)	0.779(0.336-1.880)	0.560
	Self-Employed	157(39.15%)	70(17.45%)	1.705(0.932-3.18)	0.083
	NGO	2(0.49%)	1(0.25%)	1.912(0.163-2.357)	0.606
	No Job	16(3.99%)	8(1.99%)	1.912(0.70-5.211)	0.205
	Private employed	65(16.2%)	17(4.23%)	1	1
Educational Status	Illiterate	88(21.9%)	47(11.72%)	1.984(0.497-3.948)	0.05*
	Primary School	84(20.94%)	30(7.48%)	1.327(0.644-2.732)	0.443
	Secondary School	70(17.45%)	16(3.99%)	0.894(0.381-1.893)	0.689
	Diploma and above	52(12.96%)	14(3.49%)	1	1
Emergency Ward	Medical	108(26.93%)	24(5.98%)	1	1
	Surgical	124(30.92)	40(9.97%)	3.121(1.752-5.625)	0.003*
	Resuscitation	62(15.46%)	43(10.72%)	1.452(0.823-2.562)	0.198

Bivariate analysis indicated that, khat chewing and Intravenous fluid were not significantly associated with delirium while cigarette smoking, hearing impairment, visual impairment, alcohol use, antipsychotic, bladder catheterization, benzodiazepine use and poly therapy were associated with delirium and entered to multivariate logistic regression model (Table 4).

**Table 4:- Bivariate analysis of Substance use, clinical and medication related characteristics among patients admitted in emergency ward, Jimma medical center, August 2022 (N=422)**

Variable		Delirium		COR &95%CI	P-value	
		No(N%)	Yes(N%)			
Alcohol use	Lifetime	No	267(66.58%)	75(18.7%)	1	1
		Yes	27(6.733%)	32(7.98%)	0.237(0.134-0.420)	0.00
	Current use	No	21(20.8%)	11(2.74%)	1	1
		Yes	6(1.49%)	21(5.23%)	6.68(2.08-3.201)	0.01
Cigarette smoking	Lifetime	No	291(72.56%)	97(24.18%)	1	1
		Yes	3(0.75%)	10(2.49%)	3.100(1.27-5.371)	0.001*
	Current use	No	6(1.49%)	1(0.25%)	1	1
		Yes	3(0.75%)	3(0.75%)	2.052(1.060-3.972)	0.033*
Khat use	Lifetime	No	268(66.83%)	68(16.95%)	1	1
		Yes	26(6.48%)	39(9.72%)	0.169(0.096-0.297)	0.004*
	Current use	No	17(4.24%)	14(3.49%)	1	1
		Yes	10(2.49%)	25(6.23%)	0.410(0.287-0.585)	0.031*
Previous or current use of antipsychotics	Yes		3(0.75%)	18(4.48%)	0.051(0.015-0.177)	0.013*
	No		291(72.56%)	89(22.19)	1	1
Previous or current use of benzodiazepines	Yes		3(0.75%)	18(4.48%)	0.051(0.15-0.77)	0.0043*
	No		291(72.56%)	89(22.19%)	1	1
History of polytherapy	Yes		70(17.45%)	92(22.94%)	0.051(0.028-0.094)	0.0023*
	No		224(55.86%)	15(3.74)	1	1
Bladder catheterization	Yes		80(19.95%)	77(19.2%)	0.146(0.089-0.239)	0.002*
	No		214(53.36%)	30(7.48)	1	1
Intravenous fluid	Yes		223(55.61%)	107(26.68)	0.23(0.874-1.652)	0.99

	No	71(17.7)	0(0%)	1	1
Frequent Admission	Yes	15(3.74%)	43(10.72)	0.080(0.042-0.153)	0.0021*
	No	279(69.57%)	64(15.96%)	1	1
Hearing impairment	Yes	14(3.49%)	19(4.73%)	0.232(0.112-0.481)	0.0033*
	No	280(69.82%)	88(21.94%)	1	1
Vision impairment	Yes	26(6.48%)	28(6.98%)	0.274(0.152-0.494)	0.0015*
	No	268(66.83%)	79(19.7%)	1	1

From Multivariate logistic regression analysis it was found that current use of alcohol, visual impairment, frequent admission, bladder catheterization, and benzodiazepine exposure had significant association with delirium. In to their respective odd ratio, The odds of having delirium among patients with bladder catheterization was 7.7 fold higher in contrast to patients without bladder catheterization. The odds of participants with benzodiazepine exposure to had delirium were 7 times the odds of those without benzodiazepine exposure. Visual impairment was also associated with delirium; those participants with visual impairment were 2.7 times more likely to have delirium as compared with their counter parts current alcohol users 2.1 fold risk of having delirium than their counter parts and those participants who had frequent admission were 4.8 times more likely to have delirium as compared with their counter parts. (Table-5)

**Table 5:- Multivariate analysis of factors associated with delirium among patients at Jimma medical center ,August,2022. N=422**

Variable		Delirium		AOR & 95%CI	P-value	
		No (N%)	Yes (N%)			
Alcohol use	Current use	No	21	11	1	0.001*
		Yes	6	21	0.216(0.086-0.542)	
Previous or current use of benzodiazepines	Yes		3	18	6.503(1.57-29.558)	0.034*
	No		291	89	1	1
Bladder catheterization	Yes		80	77	7.746(3.752-15.993)	0.026*
	No		214	30	1	1
Frequent Admission	Yes		15	43	4.838(2.068-11.316)	0.013*
	No		279	64	1	1
Vision impairment	Yes		26	28	0.273(0.115-0.651)	0.004*
	No		268	79	1	1

## Discussion

The study finding revealed that the prevalence of delirium among patients attending emergency department, jimma medical center was 26.6%.the study finding is largely supported by other studies done in Jos, Nigeria(36.2%) and Chicago (8.3%).The current study finding was slightly lower than that of the study done in Ethiopia(27.3%) the most proposed reason is difference in the study setting and data collection tools. The study results are also higher than that of study done in Brazil( 10.7%) the possible reasons might be e difference in study participants which had different sociodemographic and economic characteristics.

In addition, from the study 3.0%(12) had no severe delirium; While 5.0% (n = 20) had less severe delirium, while 18.6% (n = 75) had severe delirium the findings were lower than that of Nigeria revealing 48 (45.7%) had severe delirium, 41 (39.1%) developed less severe delirium while 16 (15.2) presented with no severe delirium the probable reason for the difference might be study setting and the use of different cut off points while they used it also for diagnostic tool which comprises 46 points while in this study it was out of 39 points.

Regarding factors associated with delirium, current use of alcohol, visual impairment, frequent admission, bladder catheterization, and benzodiazepine exposure had significant association with delirium.

From this study it was found that current use of alcohol was significantly associated with delirium. A study done in Ethiopia stands in favor of this finding. This might be explained by the fact that alcohol is the independent cause of delirium tremens further complications of chronic alcohol use like, chronic liver disease may have association with delirium.

Visual impairment was also found to be significantly associated with delirium from this study, these findings were also projected from the research done in Ethiopia and Chicago, some literatures propose sensory deprivation preceding delirium.

This study also showed that there was significant association between bladder catheterization and delirium which is also strongly supported by other researches this might be due to it makes patients exposed to infections which might precede delirium.

## Conclusion

The prevalence of delirium was high among patients attending emergency department, jimma medical center. Current use of alcohol, visual impairment, frequent admission, bladder catheterization, and benzodiazepine exposure had significant association with delirium, in contrast to its high prevalence delirium pretend to have preventable causes. From the study finding the first recommendation goes to jimma medical center, emergency department to facilitate smooth interdepartmental communication and harmonized work efforts for the best sake of patient's good health outcome. Recommendation made to College of health science, department of psychiatry to pave a way for recognition of delirium through seminars, conferences and interdepartmental meetings.

## Abbreviations

**CAM:** Confusion Assessment Method scale

**CAM-ICU:** Confusion Assessment Method for the Intensive care unit

**DRS-R-98:** Delirium Rating Scale-Revised-98

**ED:** Emergency department

**ICUs:** Intensive care units

**IQCODE:** Informant Questionnaire on Cognitive Decline in the Elderly

**JMC:** Jimma Medical Center

<b>LOS:</b>	Hospital length of stay
<b>MMSE:</b>	Mini-Mental State Examination
<b>MIS:</b>	Memory Impairment Screen
<b>RASS:</b>	Richmond Agitation Sedation Scale
<b>REMS:</b>	Rapid Emergency Medicine Score
<b>WLM:</b>	Wechsler Logical Memory (WLM)
<b>USD:</b>	United States Dollar

## Declarations

**Authors' contributions:** B.S. designed the study and performed the analysis. Y.T. was involved in the analysis. H.A. prepared the manuscript. All authors reviewed the final manuscript.

**Funding:** No financial support was received for the study.

**Availability of data and materials:** The datasets generated and/or analysed during the current study are not publicly available due to confidentiality issues but are available from the corresponding author on reasonable request.

**Ethics approval and consent to participate:** The study was approved by Jimma University Ethical Review committee. Written informed consent was obtained from all the participants. All methods were carried out in accordance with relevant guidelines and regulations. Each respondent was informed about the objective of the study. Anyone who was not willing to participate in the study was not forced to participate. They were also informed that all data obtained from them would be kept confidential by using code instead of any personal identifier and is meant only for the purpose of the study. Those participants who were found to have delirium were immediately linked to mental health services for further evaluation and management.

**Consent for publication:** Not applicable

**Competing interests:** The authors declare that they have no competing interests.

**Acknowledgments:** The authors would like to thank all the participants of the study.

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