

# ASSESSMENT OF DELIRIUM IN CRITICALLY ILL PATIENTS: UTILIZING THE CONFUSION ASSESSMENT METHOD FOR THE INTENSIVE CARE UNIT (CAM-ICU)

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## Abstract

Delirium is a widespread neurological confusion detected in intensive care units (ICU). Patients in ICU are at very high risk for the development of delirium due to numerous elements. Routine examining of all patients in the ICU for the presence of delirium is extremely important to its successful management. Nurses are at the forefront to identify, control, and even prevent ICU delirium. The main aim of the study was to assess the delirium in ICU patients. The study involved 52 patients were recruited from 80 consecutive admissions to the General ICU, Mansoura International Hospital during a period of 6 months (February to July 2017). Patient assessment sheet was used for data collection including Demographic characteristic and health relevant data, The Richmond Agitation-Sedation Scale (RASS), for delirium recognition in acute care setting, the confusion estimation method can be utilized as it is a legitimized tool with excessive level of sensitivity and specificity. The results of the study revealed that the delirium detected in largest percentage (65.3%) of patients, and there were numerous threat factors for delirium were recognized together with, long duration of ICU stay, respiratory diseases, heart diseases, renal diseases, infection, and hypertension. The findings of the study highlighted the need for more interest ought to be paid to the implementation of a tested delirium screening instrument which includes the Confusion Assessment Method for the ICU (CAM-ICU) and should be a part of habitual every day vital care.

*Keywords:* Delirium, intensive care units (ICU), assessment, risk factors.

## 1. Introduction

Delirium is a widespread neurological confusion detected in intensive care units (ICU) (Dial & Payne, 2002). Delirium has been associated with bad hospital consequences, consisting of accelerated morbidity and mortality, delayed length of stay, institutionalization, and helpful decay (Harroche, Louis & Gagnon, 2014; Devlin, et al., 2008). There are many factors affect critically ill patients and make them at quite high chance for the development of delirium such as for example multiple- system ill-

nesses and co-morbidities, the utilization of psychoactive medicine, and age (Gesin, et al., 2012). Intensive care syndrome” and “ICU psychosis” are the most commonly used for delirium (Allen & Alexander, 2012; Ely, et al., 2004). The actual occurrence for delirium in the ICU is unknown (Harroche, Louis & Gagnon, 2014).

Brummel, et al., (2013) define delirium as a unexpected, fluctuating, and generally reversible disturbance of intellectual characteristic. Also, Van, et al., (2009) describe delirium as incapacity to pay interest, disorientation, lack ability to think clearly, and fluctuations within the level of alertness. There are three subtypes of delirium in line with psychomotor be-

havior: hyperactive, hypoactive and mixed. Agitation and tries to get rid of strains and tubes are the most common feature of hyperactive delirium (Peterson, et al., 2006 & Devlin, et al., 2008). Hypoactive delirium distinguish by withdrawal, sluggishness, and decreased responsiveness and it is the most commonplace kind within the essential care units. Mixed delirium shows characteristics of both types and are regularly undiagnosed if recurring monitoring is not carried out (Devlin, Frong, & Fraser, 2007; Ryan, et al., 2013).

Heeder, Azocar & Tsai, (2015) stated that one of the greatest common problems in the ICU is delirium, and this is leading to prolonged length of stay in the hospitals. Also, may have neurocognitive deficits after hospital discharge.

Moreover, patients in the ICUs are at a higher chance of growing delirium (Ely, et al., 2001). Therefore, successful management of delirium depends on routine examining of patients in the intensive care unit for the current existence of delirium. So, critical care nurses (CCNs) play an essential function to assess the perception of their patients because they spent a lot of time beside their patients. Moreover, they had the chance to promote their knowledge and skills to evaluate their patients carefully, to prevent further deterioration in the mental state of their patients (Gesin, et al., 2012; Neto, et al., 2012; Tobar E, et al., 2010; Van, et al., 2011).

Van, (2011) documented that regarding delirium, in addition to, being a main neurological disorder. Particularly, in mechanical ventilated patients, it is underdiagnosed. Founded on this study, certain tools have been established to enable the identification of delirium in critically ill patients.

Founded on the DSM III-R (Third Edition, Revised), the CAM is a consistent, sensitive, and specific algorithm for identifying delirium when compared to professional clinician examination (Vasilevskis, et al., 2011). The CAM algorithm comprises inattention, and either disordered thinking or alteration in consciousness. In the verbal and nonverbal ICU patients, the delirium can be diagnosed through Applying the CAM-

ICU tool because of its validity. As well as, involving objective assessments for attention, consciousness, besides thought (Gusmao, et al., 2012). The CAM-ICU main advantages are that trained health care providers can demonstrate easily, and can be repeated over time to detect variation and changes (Spronk, et al., 2009 & Swan, 2014).

## 2. Significant of study

Delirium in ICU was inadequately monitored, underdiagnosed and lacked standardized treatment (Hessler & Josephson, 2011; Han, et al., 2013). Through our empirical observation, and reviewing the medical records in ICUs at General ICU, Mansoura International Hospital in relation to the incidence of delirium among ICU patients showed that there are no recorded data and the health care providers are facing major problems related to early detection and management of patients suffering from ICU delirium, some of these problems are absence of assessment tool subsequently. This situation boosts the potential for substantial increases in morbidity and mortality. So, it is extremely important that nurses are perceptible of these risks and have the ability to practice based on current research recommendation; therefore, there is a need for such research to evaluate the delirium in critically ill patients.

## 3. Aim of the study

This study aimed to assess the delirium in critically ill patients, utilizing the confusion assessment method for the intensive care unit.

## 4. Subject & Methods

**Design:** prospective cohort study

**Settings:** The study was implemented at the General ICU, Mansoura International Hospital. The intensive care unit has 18 beds with continuous non-invasive monitoring and ventilators. There aren't windows in the bed regions of the ICU.

**Sample:** Study partner was set from 80 sequential admissions to the previously mentioned

setting during a period of 6 months ( February to July 2017) Only patients having an ICU stay more than 24 hours were incorporated, the patient with excessive sedation or basic cerebral harm bringing about failure to verbally or nonverbally speak with the interviewer were excluded. From a sum of 80 adult patients, 52 were qualified for the investigation, and all assented to take part.

**Tools:** The tool of data collection used in this study was interview questionnaire included three parts:

**First part:** patients demographic & data of relevant health designed by the researchers to collect data related to age, sex, marital status, educational level, job, reasons for ICU admission, current drugs intake, length of ICU stay, and associated problems.

**Second part:** the Richmond Agitation-Sedation Scale (RASS) (Sessler, et al., 2002 Adamis, et al., 2012), is just a 10-point scale reaching out from +4 to -5, with a RASS score of 0 demonstrating a quiet & aware patient.. via the agreement,, RASS rankings of -4 and -5 recognize coma; a comatose patient can't be evaluated for delirium. Every other patients, regardless whether respectably quieted (RASS score -3) or more alert, ought to be assessed for delirium.

**Third part:** in acute care setting, the confusion estimation method can be utilized because it is really a legitimized tool with a higher level of sensitivity and specificity for the acknowledgment of delirium in the patients of ICU (Vasilevskis, et al., 2011; Mitasova, et al., 2012) and in addition high inter-rater reliability ( $\kappa = 0.96$ , 95% CI = 0.92 to 0.99). The CAM-ICU joins 4 key highlights to assess the delirium: 1) change in mental condition from standard or a condition that varies, 2) lack of attention, 3) disorganized thinking, and 4) changed level of awareness. The identification of a delirium demands the presence of intense beginning of changes or variations over the span of mental condition (highlight 1) and lack of attention (highlight 2) and either disorganized thinking (highlight 3) or an changed level of awareness (highlight 4).

**Pilot study:**

Data collection were started after a pilot sample

was performed on five patients for testing the tool applicability as well as feasibility. Those patients were excluded from the study.

### Data collection

The data collection was carried out between February and July 2017. Baseline information about the studied subjects was collected concerning the beds number, techniques used to evaluate the delirium and the actuality of guideline for prevention of delirium before starting the data collection process. Richmond Agitation-Sedation Scale (RASS) and CAM-ICU were used for data collection. At the beginning, all patients are interviewed at admission by the researcher to recognize the demographic data and his related health status, to gain the baseline information about the patient, after that each patient interviewed for about 30 minutes twice a daily morning and night until discharge from ICU using RASS, as a sedation assessment tool, and the CAM-ICU, as a screening tool for delirium.

### Human Rights Protection

An Ethical Committee official agreement was gained to implement the proposed study from Nursing Faculty, Mansoura University as well as the hospital director. Participants (first kin) were notified that their involvement in the research is elective and they have the privilege to acknowledge or decline to partake; each probable subject was informed about the rationale, process, benefits, and nature of the study. Moreover, participants were assured to seek to withdraw at any time with no rationale and exclusive of any effect on the health care that they received then written consents were obtained. Furthermore, protection of obtained data and information through coding was assured to achieve each participant confidentiality and anonymity.

### Data analysis

After the data was collected and converted into special design formats to be computerized. Statistical Package for Social Sciences (SPSS) program version 20 was applied to test the collected information. A significant level of 0.05 was used through-out all statistical tests, p-value <0.05 showed significant results.

## 5. Results

### Demographic features of participants

**Table 1:** offerings the demographic data of members. The major ratio (46.2%) had more than 50 years of age, and (38.5%) had between 40 to 50 years of age. The largest percentage (61.5%) were males while (38.5) were females. The largest percentage 30.8% held a university education, and also 30.8% were writing and read, while 26.9% were uneducated. The largest percentages (73.1%) were not working and, 26.9% were working. The largest percentages (38.5%) were single, and also (38.5) were married.

### Health-relevant data of participant patients

**Table 2:** illustrates the health relevant data of participants. The largest percentage 40.4% of patients admitted to ICU with respiratory diseases, 17.4% had cardiac diseases and renal problem, 9.6% admitted with multiple injuries and head injury. Regarding duration of ICU stay, (38.5%) of patients stayed in between 5 to 6 days, and (46.2%) of patients stay in ICU more than 6 days. As regarding the associated health problems noted that (57.6%) of patients had hypertension, (42.3%) had an infection, and (50%) had diabetes.

### Occurrence of delirium in participant patients

**Figure 1** shows the occurrence of delirium in the participated patients. It can be noted that the delirium detected in largest percentage (65.4%) of patients.

### Delirium and participants demographic characteristics

**Table (3):** demonstrates the relation between delirium occurrence and participants demographic characteristics. It can be noted that delirium occurred in 32.7% of patients who had more than 50 years age, and 26.9% of patients in age between 40 to 50 years age compared to 5.8% of patients in age between 30 to 40 years, there was a significant relationship between the age and occurrence of delirium. As regarding the gender, 38.5% of male patients had delirium in compared to 26.9% in female patients. According to edu-

cation, 23.1% of uneducated patients had delirium, while 15.4% only from university patients had delirium. In relation to the job, the delirium occurred in 42.3% of not working patients, while 23.1% of working patients had delirium.

### Delirium patients and reasons of ICU admission

**Figure 2** shows percentage distribution of delirium patients according to reasons of ICU admission. The largest percentage of delirium patients 47.1% admitted to ICU with respiratory diseases, and 23.5% of them admitted with a renal problem. While the lowest percentage 2.9% of delirium patients admitted for GIT problem, and 5.8% of them admitted for a head injury.

### Delirium and relevant health data

**Table 4:** illustrates the relation between delirium occurrence and participants relevant health data. According to the duration of ICU stay, most of the patients with delirium 32.6% stayed in the ICU more than 6 days, and 30.8% stayed between 5 to 6 days, here was a important relation among the length of stay and incidence. Also, the table shows that the delirium detected in 36.5% of patients constituted with the sedative, and 30.8% of patients with antibiotic medications.

### Associated risk factors of delirium

**Figure 3:** portrays percentage distribution of delirium patients according to associated risk factors. The largest percentage of risk factors presented in delirium patients was diabetes mellitus, hypertension, smoking, infection, and hypoxemia by (58.8%, 52.9%, 47.1%, 44.1%, and 38.2% respectively).

## 6. Discussion

Delirium may have terrible and destructive results that load patients, family members, and the healthcare system (Cerejeira et al., 2014). According to Ely, et al., (2004) survey, a majority of healthcare researchs believed delirium was a prevalent problem, but there were a few had protocols for detecting and managing delirium.

The total sample of the current study 52 patients; most of them had more than 50 years of age. The study finding was consistent with

Table 1: **bio socio-demographic**

Representative		Numeral	%
Age	Less than 30 Yrs	2	3.8
	30 - 40 Yrs	6	11.5
	40 – 50 Yrs	20	38.5
	More than 50 Yrs	24	46.2
Sex	Male	32	61.5
	Female	20	38.5
Marital status	Single	20	38.5
	Married	20	38.5
	Widow	2	3.8
	Divorced	10	19.2
Educational level	Illiterate	14	26.9
	Read and write	16	3.8
	Middle education	6	11.5
Occupation	University	16	30.8
	Yes	14	26.9
	No	38	73.1

Table 2: **Relevant health data of the studied patients (n = 52).**

Medical history		Number	%
Reason for ICU admission	Respiratory failure	21	40.4
	Renal problem	9	17.4
Current intake of drugs	Head injury	5	9.6
	Multiple injury	5	9.6
	Cardiac disease	9	17.4
	GIT problem	3	5.7
	Sedative	20	38.5
	Antibiotic	35	67.3
	Antihistamines	12	23.1
Duration of ICU stay	Diuretics	8	15.4
	Ant seizure	4	7.7
	Antihypertensive	10	19.9
	Muscle Relaxant	4	7.7
	Insulin	12	23.1
Types of Co morbid diseases	1-2 days	2	3.8
	3-4 days	6	11.5
	5-6 days	20	38.5
	more than 6 days	24	46.2
Types of Co morbid diseases	Diabetes Mellitus	26	50
	Hypertension	30	57.6
	Smoking	21	40.4
	Infection	22	42.3
	Other chronic illness	7	13.5
	Hypoxemia	18	34.6

Table 3: **Relation between delirium occurrence and participants demographic characteristics**

Demographic Characteristics	Delirium		Yes ( n= 34)		p-value	
	No ( n= 18)		%			%
Age						
Less than 30 years	2	3.8	0	0		
30 - 40 years	3	5.8	3	5.8		
40 - 50 years	6	11.5	14	26.9	6.25	0.05
More than 50 years	7	13.5	17	32.7		
Sex						
Female	6	11.5	14	26.9	0.31	0.58
Male	12	23.1	20	38.5		
Marital status						
Single	8		15.4		12	23.1
Married	6		11.5		6.25	0.05
Divorced	4		7.7		6	11.5
Widow	0		0		2	3.8
Education						
Illiterate	2	3.8	12	23.1		
Read and write	7	13.5	9	17.3		
Middle education	1	1.9	5	9.6	7.10	0.05
University	8	15.4	8	15.4		
Occupation						
Work	2		3.8		3.84	0.05
Did not work	16		30.8		22	42.3

**Cavallazzi, Saad, & Marik (2012).** Who carried out research about delirium in the ICU and revealed that delirium is very common in the ICU particularly among hospitalized older patients. The findings of patients gender discovered that the quantity of delirious male patients was more than female patients. Similarly, **Elie, et al., (2000)** study found the rate of delirium includes a predominance in males, in spite of the fact that sex was not a prescient factor for delirium.

In this study, we observed that delirium was detected in about two-third of the patients. Additionally, our evidence appear that data was too related with lengthier extent of stay and was an exposed sign of hospital decease. As a growing rates connected with the critical ill and the certainty that delirium is commonly un known, our result have an increasing consequence. Therefore, data from the present study offer other endorse-

ment for apply of a accepted delirium- examining tool including the CAM.

Therefore, our results have important clinical and inquire about suggestions. To begin with, they affirm the past results viewing that between ICU patients, restlessness accompanying by opposing consequences, and is an free indicator of extended short term mortality (**Girard, Pandharipande, and Ely 2008**). Hence, delirium postures a vital address with regard to the security of the critical patient. The deterioration of the degree of delirium in the ICU must be cautious an opinion of worth and a mark to be required after, demonstrating to an alteration in the handle of giving care to the patients.

Finally, distinctive designs of training may show an imperative part in outcomes. Right now, scarcity information occurs with respect to worldwide predominance and practice with respect to delirium (**Beale et al., 2009**).

Table 4: **Relation between delirium occurrence and participants relevant health data**

Health data	Delirium				p-value	
	No ( n= 18)		Yes ( n= 34)			
		%		%		
Current drug intake						
Sedative	4	7.7	19	36.5		
Antibiotics	16	30.8	16	30.8		
Antihistamines	7	13.5	5	9.6		
Diuretics	4	7.7	4	7.7		
Ant seizure	4	7.7	0	0	24.1	0.01
Antihypertensive	7	13.5	3	5.8		
Muscle Relaxant	0	0	4	7.7		
Insulin	4	7.7	8	15.4		
Duration of ICU stay						
1-2 days	2	3.8	0	0		
3-4 days	5	9.7	1	1.9	6.85	0.05
5-6 days	4	7.6	16	30.8		
more than 6 days	7	13.5	17	32.6		
Reason for ICU admission						
Respiratory failure	5		9.6	16	30.8	
Renal problem	1		1.9	8	15.4	
Head injury	3		5.8	2.5	0.87	
Multiple injury	2		3.8	3	5.8	
Cardiac disease	5		9.6	4	7.7	
GIT problem	2		3.8	1	1.9	
Types of Co morbid diseases						
Diabetes Mellitus	6	17.6	20	58.8		
Hypertension	12	35.2	18	52.9		
Smoking	5	14.7	16	47.1	0.31	0.58
Infection	7	13.5	15	44.1		
Other chronic illness	4	11.8	3	8.8		
Hypoxemia	5	14.7	13	38.2		

Regarding the risk factors, due to the delirium is a typical difficulty in the ICU. The consideration of researchers has moved from the treatment to the avoidance, which required the investigation of related hazard factors. So, it is huge to perceive the hazard factors, especially managing hazard factors, and additionally the groups of patients at bigger risk of delirium. The present examination demonstrated that the largest percentage of hazard factors introduced in patients who diagnosed with delirium was diabetes mellitus, hypertension, smoking, and infection. The previous finding was contraindicated by **Flaigle,**

**Ascenzi, & Kudchadkar (2015)** who revealed that risk factor of delirium was poor nutrition and use of greater number of medication. But, **Hare et al., (2008)** revealed that 81.9% of the studied subject gave correct answers about diabetes as a high-risk factor for delirium. Also, according to **Burkhart et al., (2010)** study highlighted that the most common factors statistically related with delirium were increase blood pressure; smoking, irregular bilirubin level, usage of morphine, and the existence of an epidural line.

Moreover, the study finding revealed that the largest percentage of patients diagnosed with

delirium detected in patients who admitted to ICU was with respiratory diseases, renal problem, heart diseases, multiple injuries and long duration of ICU stay more than 6 days. These findings were consistent with **Cerejeira, Lagarto, & Mukaetova-Ladinska (2014)**. Most common associated factors with delirium in the ICU include older age, baseline cognitive impairment, respiratory disease, metabolic disturbances, and acute infection.

Thus, according to the findings of this study and similar ones, numerous risk factors for delirium have been identified such as, long duration of ICU stay, respiratory diseases, heart diseases, renal diseases, infection, hypertension, smoking, diabetes mellitus, and use of greater number of medication especially sedatives and antibiotics.

Therefore, delirium poses a significant burden on our healthcare, patients in the ICU at an increased risk for developing this disorder due to the increased number of risk factors present in these patients compared with non-ICU patients. Also, the ICU environment poses unique challenges in the assessment of delirium. So, the use of a well-validated and reliable screening tool in adult ICUs (i.e., CAM-ICU) should be an important feature in ICU care.

## 7. Conclusion

The finding of the present study revealed that about two third of the patients were at high risk for the increase of confusion. Delirium is really a common problem for patients admitted to the ICU. It may have serious results with regards to morbidity, mortality, increased medical care costs, and decreased standard of living. Therefore, the Confusion Assessment Method for the ICU (CAM-ICU) should be a part of routine daily care. Also, the largest percentage of risk factors presented in delirium patients was the infection, smoking, hypertension, diabetes mellitus, and hypoxemia.

## 8. Recommendations

In light of the discoveries of the present investigation, the accompanying proposals are recom-

mended:

### Clinical practice

1- Involving all ICUs nurses in the delirium assessments training program and using the Confusion Assessment Method for the ICU (CAM-ICU).

2- For newly employed staff, we recommend integrating delirium assessments program as a part of training program.

3- The need for ICU nurses to complete, and communicate delirium assessments.

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