

▪ **Basic Research**  
**Factors Associated with Delirium among Patients in the Intensive Care Unit**

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**Abstract:**

**Background:** Delirium is a clinical syndrome characterized by an acute change in attention, awareness and cognition. Identifying the possible risk factors of delirium may be helpful for its prevention, and early management. **Aim:** This study aimed to explore the risk factors associated with delirium among patients in the intensive care unit. **Study design:** A descriptive exploratory research design was utilized to achieve the aim of this study. **Setting:** This study was implemented in the intensive care unit at El-Demerdash hospital affiliated with Ain Shams University hospitals. **Subjects:** Purposeful sample of 325 adult patients admitted to the surgical intensive care unit were enrolled in this study based on inclusion and exclusion criteria. **Data collection Tools:** (1) patients' assessment tool. (2) Delirium risk factors assessment questionnaire. (3) Richmond agitation-sedation scale. (4) Intensive care delirium screening checklist. **Results:** The result showed that incidence of delirium was 23.4% among the studied patients. In addition, the results illustrated that the risk factors associated with delirium development among patients in the intensive care unit includes advanced age, sepsis, cognitive impairment, electrolyte imbalance, chronic diseases, sensory deprivation and sedation as p value <0.001. **Conclusion:** The present study concluded that incidence of delirium among patients under study was 23.4%, and the most associated risk factors for developing delirium in the intensive care unit were advanced age, presence of co morbidities, electrolyte imbalance, sepsis, using sedatives, having cognitive impairment and sensory deprivation. **Recommendations:** It was recommended to continuously assess patients in the intensive care units for delirium risk factors in order to develop delirium preventive measures, which could influence patients' outcomes.

**Keywords:** *Delirium, factors associated, intensive care unit, patients.*

## 1. Introduction

Delirium is an acute health problem that affects critically ill adult patients admitted in the intensive care unit (ICU). Delirium continues to be an increasing challenge for the healthcare team, especially nurses, who have the most person-to-person contact with the patients during their stay at the hospitals (*Thomas et al, 2021*). It has an effect on a patient's conscious and cognitive state, causing an acute alteration in attention, perception, and behavior, which has a significant impact on the health care system due to prolonged stay at hospitals, increased health care costs, readmission, falls, and adverse patient outcomes such as death, longer duration of mechanical ventilation, higher re-intubation rate (*Al-Hoodar et al., 2022*).

Delirium is often misdiagnosed, unrecognized and misunderstood condition in the intensive care unit that has been associated with increased mortality and morbidity. The prevalence of delirium is approximately 23,000 per 100,000 hospitalized patients worldwide (*Gibb et al, 2020*). High incidence of delirium up to 46.3% among patients admitted to intensive care unit had been reported. Delirium affects more than 20% of all hospitalized patients and 80% of mechanically ventilated intensive care unit patients (*Rosgen et al, 2020*).

Delirium is usually aggravated or caused by anything that disturbs the baseline homeostasis of a vulnerable patient. Previous research demonstrated that etiology of delirium is multi factorial and recognized several factors that negatively contribute to delirium development. These factors include predisposing risk factors (includes the characteristics of patients) and precipitating risk factors (acute insults, injury or drug use). Predisposing risk factors include advanced age, cognitive impairment, frailty, chronic conditions (such as cardiovascular, liver, and kidney disease), depression or other psychiatric disorders, alcohol use, mal nutritional status and visual and hearing problems (*Wilson et al, 2020*).

As regard to the precipitating factors for delirium, it includes history of acute illness (such as sepsis, hypoglycaemia, stroke and liver failure), trauma (such as fractures or head injury), surgery, dehydration and psychological stress. In addition, drug use and withdrawal and medication changes are associated with delirium. Antihistamines and opioids may convey the highest risk of delirium. Moreover, there are risk factors that are related to health care setting, such as mechanical ventilation that is considered a risk factor for hospital-acquired delirium (*Cirbus, et al, 2019*).

Clinically delirium can be classified into hyperactive, hypoactive, and mixed delirium. The hyperactive delirium is characterized by agitation of patients and increased psychomotor activity. Hypoactive delirium where lethargy is present and reduced psychomotor behavior, and the last category is the mixed delirium which characterized by

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being a mix of the two previous types (*Ramírez Echeverría, 2022*). Nurses provide the frontline care for patients and should assume an important active role in the prevention, early identification and detection, and treatment of delirium. Nurses should have a systematic approach in the physical assessment of patients, taking thorough medical history to determine pre-existing risk factors for delirium, carefully monitor patients in the intensive care unit for early recognition of delirium manifestations and take appropriate actions to achieve the optimal outcomes for patients (*Thomas et al, 2021*).

### **1.1 Significance of the study:**

Delirium is a serious health problem that is characterized by disturbances in attention and awareness. It is associated with a number of risk factors that can be avoided, prevented or detected early by health care professionals, particularly nurses. Because they stay with patients 24 hours/day and can observe timely changes in patients' behaviors, actions, and attention, bedside nurses play an important role in the early detection and identification of delirium symptoms and risk factors in the high risk patients. Early detection of delirium risk factors helps health care professionals coordinate and make the appropriate decision for early management and treatment of delirium in order to enhance patients' prognosis, improve patients' outcomes and prevent further complications and deterioration.

### **1.2 Aim of the study**

This study aimed to explore the risk factors associated with delirium among patients in the intensive care unit.

### **1.3 Research questions**

What are the risk factors associated with the development of delirium among patients in the intensive care unit?

## **2.Methods**

### **2.1 Research design**

A descriptive exploratory study design was used to achieve the aim of the current study. In exploratory study the researcher assess a problem that is not clearly defined or understood. This design provides researchers with a deeper comprehension of the problem before further research can be conducted. It is useful when dealing with the problems that have not been properly investigated in the past. It helps answer questions like “what”, “where”, and “how” (*Swedberg, 2020*).

The descriptive research design describes a phenomenon and its characteristics. It is related to the deeper understanding of what the phenomenon is rather than why or how it happens. It gives researchers a proper understanding of the problem before they begin investigating it. The observational study is used to observe and measure different variables and identify any changes and correlations depicted in the data collected (*Sharma, 2018*).

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## 2.2 Setting

This study was conducted in the surgical intensive care unit at El-Demerdash Hospital, affiliated with Ain Shams University Hospitals. It is located on the second floor and is divided into five partitions with 42 beds. The first two partitions contain 22 beds for patients with clean surgical incisions; the other two parts contain 14 beds for patients with septic surgical incisions; and the last part contains six (6) beds for patients with highly infectious diseases.

## 2.3 Subjects

Purposeful sample of 325 adult patients admitted to the surgical intensive care unit were enrolled in this study based on inclusion and exclusion criteria. The inclusion criteria involved the following: adult patients whose age was 18 years and more; postoperative patients, both genders; conscious patients with a Glasgow coma score of 15 upon admission to the ICU; and willing participants in the study. While the exclusion criteria included: patients with delirium symptoms upon admission to the ICU, unconscious patients upon admission or during their stay in the ICU, and aphasic patients.

According to the number of patients with surgical procedures who were admitted to the intensive care unit at El-Demerdash hospital during the year 2020–2021, it was 26,660. A sample of 325 patients was included in this study based on a power analysis with a margin of error adjusted to 5% and a confidence interval of 95%, and an estimation of a 30% incidence of delirium among the studied patients.

## 2.4 Tools for data collection

### 2.4.1 *Patients' assessment tool:*

This tool was used to assess patients' demographic characteristics such as age, gender, marital status, educational level, occupation, and residence. It was developed by the researcher in English after reviewing the related literatures (*Torres-Contreras et al, 2019*).

### 2.4.2 *Delirium risk factors assessment questionnaire:*

This tool was used to assess risk factors of delirium development among intensive care unit patients. It was developed by the researcher based on the following related literatures (*Abazid et al, 2021; Torres-Contreras et al, 2019*). It included data about:

- Present history: date of admission to the ICU, date of discharge/death, preoperative diagnosis, name and type of surgical procedure, date of delirium onset and date of relieved, duration of delirium symptoms, sedation during surgery, name of anesthetic drug, duration of surgery, Galsgow coma scale upon admission to the ICU, name of analgesia used in the ICU.

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- Past history: presence of chronic diseases, previous hospitalization, surgery, history of delirium, alcohol intake.

#### **2.4.3 The Richmond Agitation-sedation scale (RASS):**

This scale was used to assess the level of sedation/arousal or agitation among critically ill patients, who are receiving sedation, and/or showed fluctuating levels of consciousness. It was developed in English and was adopted from Ely et al, (2003). The RASS is a 10-point scale started from -5 to +4. Levels -1 to -5 include 5 levels of sedation, starting with “awakens to voice” and ending with “unarousable”. Levels from +1 to +4 describe increasing levels of agitation. The lowest level of agitation starts with apprehension and anxiety, and peaks at combative and violent. The level 0 is “alert and calm”. This scale was used to assess the first item in the intensive care delirium screening checklist.

- The more negative scores indicate deeper sedation.
- The more positive scores indicate increase agitation.
- Score zero indicate the appearance of calm and normal alertness.

#### **2.4.4 Intensive Care Delirium Screening Checklist (ICDS):**

The ICDS was used to assess if delirium is present or not. It evaluate a patient's consciousness level, inattention, disorientation, hallucinations or delusions, psychomotor activity, inappropriate speech or mood, sleep disturbance and fluctuation of symptoms. It consisted of 8-items for delirium screening (range from 0–8 points). It was developed in English and adopted from *Bergeron et al, (2001)*.

##### *Scoring system*

- One grade is given to each of the 8 items if the patient clearly meets the criteria defined in the scoring instructions.
- A score of “zero” was given if there is no manifestation or unable to score.
- If the patient scores is >4, was considered a positive delirium.
- If the patient scores <4, was considered a negative screen for delirium.

#### **2.5 Tools validity and reliability:**

The tools of data collection were evaluated in terms of face and content validity by five experts (two professors, one assistant professor, and two lecturers) from medical surgical nursing at Faculty of Nursing of Ain Shams University. They reviewed the tools for clarity, relevance, comprehensiveness, simplicity, and applicability. No changes were done. After verification of the validity of the tools by experts, the reliability of the tools was tested. The reliability was achieved via Cronbach’s alpha; it was 0.747 for the risk factors assessment questionnaire and 0.839 for the intensive care delirium screening checklist, and 0.922 for the Richmond agitation-sedation scale.

## 2.6 Pilot study

A pilot study was implemented on 10% (30) of patients who have the same selection criteria to test clarity and applicability of the study tools, as well as to determine the time needed for every tool. No modifications were carried out in any tool. Patients who participated in the pilot study were involved in the main study subjects.

## 2.7 Ethical considerations

The research approval was obtained from the committee of ethical research at faculty of nursing before starting the study. Permission to conduct the study was obtained also from the director of El-Demerdash hospital and of the intensive care unit before conducting the study. The researcher clarified the aim of the study in a letter issued to the hospital's director from the dean of faculty of nursing prior to data collection. Verbal consent was obtained from patients to ensure willingness to engage in the study. The researcher kept anonymity and confidentiality of subjects' data. The researcher informed patients that they are allowed to withdraw from the study at any time without penalty.

## 2.8 Field work

- Reviewing of the related literatures and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines was done to develop data collection tools.
- The aim of the study was explained by the researcher to the studied patients before to start data collection, also their verbal approval to participate in the study was obtained.
- Data collection done over about 6 months started from December 2021 until the end of May 2022. The data were collected by the researcher through 3 days/ week (Sunday, Tuesday, Thursday), in the morning and afternoon shifts.
- Patients who have the selection criteria were observed by the researcher.
- Demographic and medical data were collected from the patients' medical records, or from the patients.
- The data collection tools took about 30 minutes to be completed by the researcher.
- In order to assess patients with delirium at night shift, the researcher explained the tools to four bachelor nurses who are present at night shift. Each nurse was given a handout containing the tools and written instructions regarding the data collection tools.
- Each of the nurses participating in the study was allowed to practice on 2–3 patients in the presence of the researcher to assure accuracy of scoring.
- Nurses were asked to follow patients with the delirium symptoms and assess them at night shift and record the score in the scoring sheet for each patient.

## 2.9 Data analysis

The data were tabulated and analyzed using the statistical package for social science (SPSS) version 26. Quantitative data were described as mean and standard deviation (SD).

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Chi-square and Chocrane Q test was used to show relations between variables. Qualitative data were presented as frequencies (n) and percentages (%). Internal consistency and reliability (Cronbach's alpha) were measured for the tools. The significance of the observed difference was considered statistically significant if the P-value  $\leq 0.05$ .

### 3 Results

About the demographic data for patients under study, **table 1** shows that nearly three-quarters (73.2%) of patients were more than 40 years old, and the mean age was  $52.86 \pm 16.22$ . More than half (52%) of patients were females, and 36.9% of them have a primary school education. In relation to marital status, it was found that 60.9% of patients were married, and 73.2% of them didn't work.

As regard the screening of patients for symptoms of delirium, **table 2** illustrated that 23.4% showed positive symptoms for delirium, 20.9% of them had delirium for less than 10 days, and more than half (53.9%) of patients demonstrated hypoactive delirium.

**Table (1): Frequency and percentage distribution of studied patients' demographic characteristics (n=325)**

Patients' characteristics	No	%
<b>Age</b>		
– <30 years	30	9.2
– 30 < 40 years	57	17.6
– $\geq 40$ years	238	73.2
mean $\pm$ SD	52.86 $\pm$ 16.22	
<b>Gender</b>		
Male	156	48.0
Female	169	52.0
<b>Educational level</b>		
Can't Read and write.	56	17.2
Read and write.	93	28.6
Basic education	168	51.7
Higher education	8	2.5
<b>Marital status</b>		
Single	18	5.5
Married	198	60.9
Divorced/ Widow	109	33.6
<b>Occupations</b>		
Working	87	26.8
Not working	238	73.2

**Table (2) Frequency and percentage distribution of the studied patients for delirium symptoms, types and duration screening (n=325)**

Items	N	%
<b>Delirium symptoms</b>		
Yes	76	23.4
No	249	76.6
<b>Delirium duration (n=76)</b>		
<10 days	68	20.9
≥10 days	8	2.5
<b>Types of Delirium (n=76)</b>		
Hyperactive	18	23.7
Hypoactive	41	53.9
Mixed delirium	17	22.4

**Table 3. Frequency and percentage distribution of studied patients' past medical history (n= 325)**

Patients' characteristics	No	%
<b>Co-morbidities</b>		
Yes	250	76.9
Cerebrovascular	45	13.8
Diabetes mellitus	192	59.1
Hypertension	175	53.8
Renal disorders	13	4.0
Liver disorders	15	4.6
Respiratory	22	6.7
<b>Alcohol intake</b>		
Yes	2	0.6

Concerning pre-existing risk factors of delirium, the result of **table 3** demonstrated that more than three quarters of patients had history of chronic diseases, and more than half (59.1%, 53.8%) of them suffer diabetes and hypertension respectively, followed by cerebrovascular diseases that constitute 13.8% of the patients.

**Table 4** revealed that approximately one-third (31.1%) of patients admitted to the hospital had diabetic foot, one-fifth (21.5%) were hospitalized due to cerebrovascular diseases, and 15% of patients had colon cancer upon admission. The table also demonstrated that most (97.5%) of the patients undergoing open surgery with general anesthesia, and more than half (55.1%) of them, have operations lasting from 3 to 5 hours.



**Table 4. Frequency and percentage distribution of studied patients' present conditions history (n= 325)**

Patients' characteristics	No	%
<b>Diagnosis on hospital admission</b>		
Trauma	26	8
Cerebro vascular disorder	70	21.5
Diabetic foot	101	31.1
Intestinal obstruction	25	7.7
Peritonitis	20	6.2
Cancer colon	49	15.0
Hernia	20	6.2
<b>Current surgery</b>		
Open surgery	317	97.5
Endoscopy	8	2.5
<b>Duration of surgery</b>		
- < 3 hours	117	36.0
- 3-5 hours	179	55.1
- > 5 hours	29	8.9

**Table (5): Frequency and percentage distribution of the studied patients for delirium screening (N=325)**

Day	Post operative delirium screening	Delirium	No Delirium	P value	P value
First day	Morning shift	7(2.2)	318 (97.8)	0.001*	0.001*
	Afternoon shift	35(10.8)	290 (89.2)		
	Night shift	47(14.5)	278(85.5)		
Second day	Morning shift	56(17.2)	269(82.8)	0.390	
	Afternoon shift	51(15.7)	274(84.3)		
	Night shift	48(14.8)	277(85.2)		
Third day	Morning shift	49(15.1)	276(84.9)	0.004*	
	Afternoon shift	41(12.6)	284(87.4)		
	Night shift	29(8.9)	296(91.1)		

Cochrane Q test \* p value  $\leq 0.05$  = significant

**Table 6. Relation between delirium development and risk factors among the studied patients (n-325)**

Risk factors	Delirium		No delirium		P value
	N (76)	%	N (249)	%	
Age group					0.015*
• <30 years	7	9.2	23	9.2	
• 30<40 years	5	6.6	52	20.9	
• ≥40 years	64	84.2	174	69.9	
Gender					0.356
• Male	40	52.6	116	46.6	
• Female	36	47.4	133	53.4	
Sepsis					0.015*
• Yes	27	35.5	54	21.7	
• No	49	64.5	195	78.3	
Sedatives					0.014*
• Yes	23	30.3	43	17.3	
• No	53	69.7	206	82.7	
Electrolyte imbalance					0.007*
• Yes	30	39.5	59	23.7	
• No	46	60.5	190	76.3	
Respiratory failure					0.452
• Yes	12	15.8	31	12.4	
• No	64	84.2	218	87.6	
Sensory deficits:					0.001*
• Yes	6	7.9	1	0.4	
• No	70	92.1	248	99.6	
Cognitive impairment					0.039*
• Yes	23	30.3	43	17.3	
• No	53	69.7	206	82.7	
Lack of privacy					0.029*
• Yes	41	53.9	99	39.8	
• No	35	46.1	150	60.2	
Duration of operation					0.575
• < 3 hours	31	40.8	86	34.6	
• 3-<5 hours	38	50.0	141	56.6	
• ≥5 hours	7	9.2	22	8.8	

**Table (5)** demonstrated high incidence of delirium during the night shift of the first day of the operation and represented (14.5%) of patients under the study with statistically significant differences between the three shifts where p-value was 0.001. In the second day, there was no statically significant differences between the patients who had delirium in the three shifts as p-value = 0.390. Regarding the third day, it was found that 15.1% of patients had delirium symptoms in the morning shift with statistically significant differences between the three shifts as p-value = 0.004.

**Table (6)** illustrated that there was a relation between delirium development and age as p value 0.015, with majority (84.2%) of patients who had delirium was 40 years or more. While there was no relation between delirium and gender and respiratory failure as p value 0.356 and 0.452 respectively. In addition, there was relation between delirium and other risk factors shown in the table as p value was  $\leq 0.05$ .

**Table (7)** demonstrated that there was a relation between agitation sedation level and development of delirium with p value  $< 0.01$ .

**Table (7): Relation between agitation sedation level and occurrence of delirium (N=325).**

Agitation Sedation level	Delirium		No delirium		P value
	N (76)	%	N (249)	%	
• Moderate sedation	5	6.6	0	0.0	0.001*
• Light sedation	15	19.8	3	1.2	
• Drowsy	12	15.8	1	0.4	
• Alert and calm	8	10.5	233	93.6	
• Restless	13	17.1	10	4.0	
• Agitated	21	27.6	2	0.8	
• Very agitated	2	2.6	0	0.0	

#### 4 Discussion:

The admission to a critical care unit will often create a stressful environment for every patient. It is commonly that a patient admitted in critical care units is more subjected to stress intolerance and psychological instability and thus less able to cope with many stressors (*Jayaswal et al, 2019*). Delirium is one of the most common post-operative complications in the intensive care unit that is known as acute confusional state, characterized by a disturbed consciousness and reduced cognitive function, occurring in around 15% of patients following general surgery, yet is often still poorly identified and managed (*Kumar et al, 2022*).

This study, was trying to explore the risk factors contributing to delirium, and found that the more risks observed for developing delirium among patients in the intensive care unit were having co morbidities, electrolytes disturbances, sepsis, advanced age, using sedatives, cognitive impairment and sensory deprivation.

The current study revealed that mean age of patients under study was  $52.86 \pm 16.22$ . More than half of patients were females, incidence of delirium among patients under study was 23.4%, and half of these patients had hypoactive delirium that continued for less than 10 days. These results are supported by *Al-Hoodar et al, (2022)* who stated that the mean age was  $55.1 \pm 18$  years, and 45 (27.3%) were women in their study that assess incidence, factors, and outcome of delirium among patients admitted to ICUs in Oman.

As regard to the development of symptoms of delirium among patients under study, the results illustrated that about one quarter of patients showed positive symptoms for delirium, one fifth of them had delirium for less than 10 days, and more than half of them had hypoactive delirium. This may be due to the fact that patients who develop delirium had also more than co-morbidities and they were postoperatively and have a sedation during the operation and took morphine and fentanyl during their stay in the intensive care unit. This result is agree with *Lobo-Valbuena et al, (2021)* who stated that delirium was developed among 6.3% of patients under study and they are the older patients (more than 74 years old), and had a greater number of organ failures in their study that assess risk factors associated with development of delirium in the general ICU.

As regarding the previous history of patients under the study, the results of the present study illustrated that more than three quarters of patients had history of chronic diseases such as diabetes mellitus, hypertension, cerebrovasculr diseases, liver and kidney disorders which constitute a risk factors for developing delirium among patients because it create some degree of alterations in electrolytes and laboratory investigations and cause some deprivation of flow of oxygen to the brain. This result is supported by *Ibrahim et al, (2021)* who stated that all patients with significant co-morbidities through history were assessed using Charlson co morbidity index showing that most of them had diabetes mellitus, hypertension, ischemic heart diseases, and chronic liver disease, are associated with delirium.

One of the noticeable findings of this study is that only (0.6%) of patients consumed alcohol. This may be due to the fact that alcohol is prevented for Muslims based on the instructions of the Islamic religion. So, it may not be common risk factor for patients with delirium in Egypt. This result was agreed with *Abazid et al, (2021)* who reported that despite that alcoholism is a common cause of delirium, but alcohol consumption is prohibited in Saudi Arabia for religious reasons.

About the current diagnosis of patients upon admission to the hospital, the results revealed that nearly one third of patients presented with diabetic foot, one-fifth with cerebrovascular diseases, and few of patients were admitted due to colon cancer and peritonitis. This could explain the fact that delirium may be caused by infection that possibly produce some changes in the brain function.

Most of patients in the current study undergoing surgical procedures with general anesthesia and more than half of them their operations lasted from 3 to 5 hours with no relation found between duration of operation and development of delirium. This results is in accordance with *Kang et al, (2020)* who stated that operation time of patient who have disturbance in attention and awareness was longer than that of group B whose disturbance developed over a short period of time, and develop a change from baseline attention and awareness, and tends to fluctuate in severity during the day ( $185.8 \pm 106.8$  vs.  $147.7 \pm 83.3$  minutes,  $p = 0.052$ ), but the difference was not statistically significant.

The finding of the study showed that delirium increased in the night shift of the first day after the surgery. This result may be due to interruption of sleep hours of patients more frequently by nurses, who awaken patients at night to perform routine laboratory investigation and radiological test, or even to provide care or give medication to patients. This may be due to the lack of knowledge among nurses that sleep deprivation may triggers delirium development among ICU patients. While there was no relation was found in the second day of operation among patients which may due to the approximately number of patients in the three shifts. This result is agreed with *Pilkington, (2013)* who reported that not getting enough sleep is associated with difficulty concentrating and poorer memory.

The finding of this study reported that more than half of patients had hypoactive delirium and approximately one quarter had hyperactive delirium and the other quarter of patients demonstrated mixed type of delirium. This finding is in agreement with *Torres-Contreras et al, (2019)* who concluded that the incidence of delirium was 20.2%, the more common type of delirium was hypoactive at 66.7%, followed by the hyperactive type at 7.4% and mixed at 25.9%.

The current study found a relation between delirium development and several risk factors such as advanced age, sepsis, sedation, sensory deficit, cognitive impairment, lack of privacy, and electrolyte imbalance. This result was agree with *Falsini et al, (2018)* who reported that the length of stay, alcoholism, hypertension, advanced age, infection, urinary catheterization, electrolyte disturbance, and under nutrition are known predictors of delirium in a study conducted on 700 patients admitted in the CCU. In addition, *Roshdy and Sabri, (2016)* mentioned that advanced age is usually associated with neuro-

degeneration and formation of microglia to increasing the release of inflammatory cytokines within the brain in response to any mild systemic inflammatory process.

Moreover, the study found a relation between sepsis and the development of delirium; it was observed that patients who had sepsis had developed delirium manifestations that may be caused by neuropathy that result from inflammatory process due to infection in patients with diabetic foot or may be due to impaired blood flow to the brain and those patients show inattention, disorientation and agitation. This result is supported by *Atterton et al, (2020)* who stated that delirium associated with sepsis is a cerebral manifestation that occurs in patients with sepsis and is thought to occur due to a combination of neuro-inflammation and disturbances in cerebral perfusion.

Delirium is a disorder that must be recognized at the earliest possible stage to avoid complications and long-term cognitive dysfunctions. Nurses must possess knowledge and skills, to care for patients with delirium to improve clinical practice and patients' outcomes. In addition, patient's family members play a significance role in the care of the confused patient. Such positive strategies can be easily put into considerations to facilitate suitable and safe care of patients with delirium (*Thomas et al, 2021*).

### **5. Conclusion:**

The current study concluded that the incidence of delirium among patients under study was 23.4%, and the most associated factors for developing delirium in the intensive care unit were advanced age, presence of co morbidities, electrolyte imbalance, sepsis, using sedatives, having cognitive impairment and sensory deprivation.

### **6. Recommendations:**

- Based on the finding of the present study, it is recommended to continuously assess patients in the surgical intensive care units for delirium risk factors in order to develop delirium preventive guidelines, which could influence patients' outcomes.
- Early identification of the delirium symptoms by the health care professionals including nurses by using the appropriate assessment tool.

### **References:**

1. Al-Hoodar, R.K., Lazarus, E.R., Al Omari, O., and Al Zaabi, O. (2022). Incidence, associated factors, and outcome of delirium among patients admitted to ICUs in Oman. *Critical Care Research and Practice*. 8. <https://doi.org/10.1155/2022/4692483>.
2. Atterton, B., Paulino, M. C., Pova, P., & Martin-Loeches, I. (2020). Sepsis Associated Delirium. *Medicina (Kaunas, Lithuania)*, 56(5), 240. <https://doi.org/10.3390/medicina56050240>.

3. Bergeron, N., Dubois, M.J., Dumont, M., Dial, S., and Skrobik, Y. (2001). Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. *Intensive Care Med*; 27(5):859-864. doi:10.1007/s001340100909.
4. Cirbus, J. et al. (2019). Delirium etiology subtypes and their effect on six-month function and cognition in older emergency department patients. *Int. Psychogeriatr.* 31, 267–276.
5. Ely, E.W., Truman, B., Shintani, A., et al. (2003). Monitoring Sedation Status over Time in ICU Patients: Reliability and Validity of the Richmond Agitation-Sedation Scale (RASS). *JAMA*; 289(22):2983–2991. doi:10.1001/jama.289.22.2983.
6. Falsini, G., Grotti, S., Porto, I., Toccafondi, G., Fraticelli, A., Angioli, P., et al. (2018). Long-term prognostic value of delirium in elderly patients with acute cardiac diseases admitted to two cardiac intensive care units: a prospective study (DELIRIUM CORDIS). *Eur Heart J Acute Cardiovasc Care*; 7: 661-670.
7. Gibb, K., Seeley, A., Quinn, T., Siddiqi, N., Shenkin, S., Rockwood, K., and Davis, D. (April 2020). "The consistent burden in published estimates of delirium occurrence in medical inpatients over four decades: a systematic review and meta-analysis study". *Age Ageing.* 49 (3): 352-360. doi:10.1093/ageing/afaa040.
8. Ibrahim, M.H.ED., Elmasry, M., Nagy, F. et al. (2021). Prevalence and risk factors of delirium and subsyndromal delirium in older adults. *Egypt J Intern Med* 33, 14 (2021). <https://doi.org/10.1186/s43162-021-00042-3>
9. Jayaswal, A.K., Sampath, H., Soohinda, G., and Dutta, S. (2019). Delirium in medical intensive care units: Incidence, subtypes, risk factors, and outcome. *Indian J Psychiatry*; 61:352-8.
10. Kang, T., Park, S.Y., Lee, J.H. et al. Incidence & Risk Factors of Postoperative Delirium After Spinal Surgery in Older Patients. *Sci Rep* 10, 9232 (2020). <https://doi.org/10.1038/s41598-020-66276-3>.
11. Kumar, R., Haokip, H.R., Tamanna, Bairwa, M. (2022). Prevalence of delirium and predictors of longer intensive care unit stay: A prospective analysis of 207 mechanical ventilated patients. *J Mental Health Hum Behav*; 27:41-7.
12. Lobo-Valbuena, B., Gordo F, Abella A, Garcia-Manzanedo, S., Garcia-Arias, M-M., Torrejón, I., et al. (2021). Risk factors associated with the development of delirium in general ICU patients. A prospective observational study. *PLoS ONE* 16(9): e0255522. <https://doi.org/10.1371/journal.pone.0255522>.
13. Nieswiadomy, R.M. Foundations of Nursing Research. Pearson Education, Inc., 7<sup>th</sup> ed., (2017), London, pp. 124-125.
14. Pilkington, S. (2013). Causes and consequences of sleep deprivation in hospitalized patients. *Nursing Standard (Royal College Of Nursing (Great Britain))*: (1987), 27(49), 35-42.

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15. Ramírez Echeverría, M.d.L., Schoo, C., and Paul, M. Delirium. [Updated 2022 Nov 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK470399/>.
  16. Rosgen, B.K., Krewulak, K.D., Stelfox, H.T., Ely, E.W., Davidson, J.E., Fiest, K.M. (2020) The association of delirium severity with patient and health system outcomes in hospitalised patients: a systematic review. *Age Ageing*; 49(4):549-557. doi:10.1093/ageing/afaa053.
  17. Roshdy, H., and Sabri, Y. (2016). Predictors for postoperative delirium after vascular surgery. *Egypt J Psychiatr*; 37:1-6.
  18. Sharm,a S.K. Nursing research and statistics. 3<sup>rd</sup> ed., Elsevier, New York, (2018). P. 141.
  19. Swedberg, R. (2020). Exploratory Research. In C. Elman, J. Gerring, & J. Mahoney (Eds.), *The Production of Knowledge: Enhancing Progress in Social Science* (Strategies for Social Inquiry, pp. 17-41). Cambridge: Cambridge University Press. doi:10.1017/9781108762519.002.
  20. Thomas, N., Coleman, M., and Terry, D. (2021). Nurses' experience of caring for patients with delirium: systematic review and qualitative evidence synthesis. *NURSING REPORTS*; 11(1):164-174. <https://doi.org/10.3390/nursrep11010016>.
  21. Torres-Contreras, C.C., Páez-Esteban, AN., Hinestrosa-Díaz, del Castillo, A., Rincón-Romero, M.K., Amaris-Vega, A., Martínez-Patiño, J.P. (2019). Factors associated with delirium in critical patients in a health institution in Bucaramanga, Colombia. *Enferm Intensiva.*; 30 (1):13–20. DOI: 10.1016/j.enfie.2018.03.003.
  22. Wilson, J.E., Mart MF, Cunningham C. *et al.* Delirium. *Nat Rev Dis Primers* 6, 90 (2020). <https://doi.org/10.1038/s41572-020-00223-4>.



### الملخص العربي

#### العوامل المرتبطة بالهذيان لدى مرضى وحدات الرعاية المركزة

**الخلفية:** الهذيان هو متلازمة سريرية تتميز بتغير حاد في الانتباه والوعي والإدراك. **الهدف:** هدفت هذه الدراسة إلى استكشاف عوامل الخطر المرتبطة بالهذيان بين المرضى في وحدة العناية المركزة. **تصميم الدراسة:** تم استخدام تصميم بحث استكشافي وصفي لتحقيق هدف هذه الدراسة. **المكان:** أجريت هذه الدراسة في وحدة العناية المركزة بمستشفى الدمرداش التابعة لمستشفيات جامعة عين شمس. **الموضوعات:** تم تسجيل عينة غرضية من 325 مريضاً بالغاً تم قبولهم في وحدة العناية المركزة الجراحية في هذه الدراسة بناءً على معايير التضمين والاستبعاد. **أدوات جمع البيانات:** (1) أداة تقييم المرضى. (2) استبيان تقييم عوامل خطر الهذيان. (3) مقياس ريتشموند للتخدير والإثارة. (4) قائمة فحص الهذيان للعناية المركزة. **النتائج:** أظهرت النتائج أن نسبة الإصابة بالهذيان كانت 23.4% بين المرضى الخاضعين للدراسة. بالإضافة إلى ذلك ، أوضحت النتائج أن هناك علاقة بين تطور الهذيان والتقدم في العمر ، والإنتان ، والضعف الإدراكي ، وعدم توازن المعادن ، والأمراض المزمنة ، والحرمان الحسي والتخدير بقيمة  $p > 0.001$ . **الخلاصة:** خلصت الدراسة الحالية إلى أن نسبة الإصابة بالهذيان بين المرضى قيد الدراسة كانت 23.4% ، وأكثر العوامل المرتبطة بتطور الهذيان في وحدة العناية المركزة هي التقدم في السن ، وجود أمراض مصاحبة ، عدم توازن الكهارل ، تعفن الدم ، استخدام المهدئات ، تناول المهدئات. ضعف الإدراك والحرمان الحسي. **التوصيات:** تمت التوصية بإجراء تقييم مستمر للمرضى في وحدات العناية المركزة لمعرفة عوامل خطر الإصابة بالهذيان من أجل تطوير تدابير وقائية من الهذيان ، والتي يمكن أن تؤثر على نتائج المرضى.