Delirium current practice among Intensive Care Units Doctors, Khartoum

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Research Article

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Abstract

Delirium is a brain dysfunction that is characterized by attention and cognition disturbances in a fluctuating pattern. International guidelines recommend daily screening of delirium. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) were the most commonly used for delirium assessment. The reasons why this study was developed were to identify the barriers and gaps in knowledge and practice. Multi-center Hospital-based Cross-Sectional study was developed. Multistage sampling technique was used. 72 ICU doctors were randomly selected. Statistical analysis was performed through chi-square test to determine association among variables. It was considered significant when $p \leq 0.05$. More than 70% of doctors were ≤ 30 years and females. 69.4% had < 1 year experience. 94.4% worked in medical ICUs. Less than 20% of the doctors used delirium assessment tools with a statistically significant difference based on experience ($p=0.012$). 13.9% had not assessed delirium regularly. Non-pharmacological management was applied by 76.4% of the doctors, communication with patients was the most frequent (75%). Haloperidol was the most used agent (83.3%). 40.3% of doctors had not stopped delirium medications on ICU discharge. Regular assessment of delirium was applied. Yet, the use of validated assessment tools was not common. Non-pharmacological management of delirium is important which is mostly done. Our doctors prescribed anti-psychotics for treatment of both forms of delirium and almost half of them did not stop medications on ICU discharge. Medication reconciliation and contact with the next in-charge of patients is important.

Introduction

Delirium is a state of brain dysfunction that is characterized by attention and cognition disturbances in a fluctuating pattern [1-7], with an acute onset of a confusion state and decline in cognitive ability; often occurring in hospitalized patients [8]. Delirium is related to many factors, as pre-existing vulnerable state of patients, or medication-induced delirium that occurred during hospital stay [9]. Among intensive care unit (ICU) patients, delirium is a common disorder; because of many factors such as, old age, multiple medical interventions and critical illness severity [5, 10]. Critically ill patients who were complicated with delirium, in addition to their critical illness, have been associated with prolonged mechanical ventilation (MV), longer duration of hospital and ICU stay, as well as, increased mortality [3,4,6,8,11-13]. The severity of delirium adverse outcomes was associated with the duration of delirium; the longer the duration, the worse the outcomes [11]. Prolonged delirium at the ICU is considered a risk factor for developing post-intensive care syndrome; this syndrome is characterized by worsened or new impairments in cognitive, physical, and mental health [12]. Acute delirium can be lasting for few hours, however, it can be persisting; lasting for weeks to months after hospital discharge [14]. Clinically, delirium could be either hyperactive or hypoactive. In the hyperactive form, agitation state is prominent, with frequent aggression and risk of self-harm. In the hypoactive form, the patient presents with low level of consciousness, usually prostrate and uncommunicative. The mixed form may also occur, with alternation between the two poles [14].

The incidence varies widely, yet, it has high rate; as high as 70–87% [3, 6, 8, 11, 12, 16, 17]. Although, delirium is common, yet, it is preventable mostly. Prevention of delirium from its occurrence or early management is crucial in order to reverse delirium state and minimize the adverse clinical outcomes [7, 11].

The nature of underlying critical illness, as well as, lack of any verbal communication among ICU patients posed a difficulty in delirium assessment at the ICU [5]. Furthermore, delirium is associated with long-term cognitive impairments [8, 15]. Systematic assessment of delirium among ICU patients is considered a very important approach to deliver patient care and allowing clinicians and other healthcare staff an early detection and then initiate delirium treatment at an early stage [1,2].

From another perspective, patients with delirium were more likely to bare increased costs of healthcare than patients without delirium [12,15, 16].

Management of delirium might be challenging for ICU clinicians as an established plan of treatment is yet lacking [15]. International guidelines recommend daily screening of delirium, through a validated delirium assessment tools [19]. Several methods were developed and were validated to assess delirium among ICU patients. Of those tools, the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) were the most commonly used for delirium assessment [20]. In CAM-ICU, four features are screened at a single-point of time. While, the ICDSC has a screening checklist composed of eight features [17,19]. These two tools were the most frequently used tools for the purpose of delirium screening [20]. Furthermore, these instruments could also be used among patients with primary neurological injury, as growing evidence suggests this possibility [21].

In particular, screening is mandatory for patients at moderate to high risk for delirium [19].

Barriers and gaps in practice were addressed by assessing the current status in order to identify the areas that need focusing on [22]. Regarding delirium assessment, several studies focused on clinicians [3, 19, 23]. In Sudan, no many researches were done in the ICU field; especially about delirium. This study assessed the current status of knowledge and practice of ICU doctors about delirium. The reasons why this study was developed were to identify the barriers and gaps in knowledge and practice.

Materials And Methods

Multi-center Hospital- based Cross-Sectional study was conducted to assess the knowledge, attitude and practice of intensive care unit doctors at the Military Hospitals of Khartoum State, Sudan. Multistage sampling technique was used. The formula for known population was used to select the sample size at each stage. The equation of sample size estimation used was $n = \frac{N}{1 + Nd^2}$, where n is the estimated sample size, N, the total number of patients records, d the degree of accuracy set at 0.05. At first level, simple random sampling was applied to select the hospitals; three hospitals were selected randomly out of all Military hospitals in Khartoum State. At second level, stratified random sampling technique was

used to select 72 participants proportionally to the type of ICU, medical and surgical, after excluding all the administrative staff. The statistical package for social sciences (SPSS version-23) was used to describe and analyse the data. Statistical analysis was performed through Chi-square test to determine association among variables. All tests were considered statistically significant when $p \leq 0.05$. The proposal was reviewed and approved by Omdurman Islamic University Ethics Board. Ethical Approval was obtained from the Military Hospital. Authorisation to implement the research was granted by the administration of the ICUs. Participants were well-informed about the research objectives and signed written informed consent was obtained from each participant prior to data collection. They were ensured about their confidentiality through the use of an anonymous research tool and that the data collected from each of them were not to be used for any other purposes than those assigned to the research. Participants had the complete freewill to accept or reject the participation in this study.

Results

Characteristics of intensive care unit (ICU) doctors

Seventy-two intensive care unit (ICU) doctors were assessed for their current knowledge and practice towards delirium among critically ill patients. Most of the doctors (70.8%, 51/72) were aged 30 years or less, and 86.1% (62/72) of them were females. On assessing the experience, 69.4% (50/72) had less than 1 year of experience. Most of the doctors (94.4%, 68/72) had been working in medical ICUs. Table 1. below illustrated the details of the demographic characteristics of the study participants.

Table 1. Characteristics of ICU doctors (n=72)

Characteristics	n	%
Age		
≤30 Years	51	70.8
>30 Years	21	29.2
Total	72	100
Gender		
Male	10	13.9
Female	62	86.1
Total	72	100
Years of experience		
< 1 Year	50	69.4
1-2 Years	7	9.7
> 2 Years	15	20.8
Total	72	100
ICU type		
Medical ICU	68	94.4
Surgical ICU	2	2.8
Surgical and Medical ICUs	2	2.8
Total	72	100

Assessment of current knowledge and practice of ICU doctors toward delirium

Knowledge and practice of ICU doctors was assessed with regards to delirium. Doctors who were aware about delirium assessment tools were 38.9%, while 61.1% (44/72) had no knowledge about delirium assessment tools. 76.4% (55/72) of ICU doctors stated that non-pharmacological approach was their first-line management, while 22.2% (16/72) chose the pharmacological approach, table 2.

As for practice of ICU doctors, the delirium assessment tools used were CAM-ICU (18.1%, 13/72) and ICDSC used by only one doctor. Signs and Symptoms were used by (76.4%, 55/72) for delirium assessment, table 2. Frequency of delirium assessment varied among doctors, 40.3% (29/72) of the doctors assessed delirium every 8-12 hours, while, 45.8% (33/72) assessed delirium every 24 hours. In the other hand, 13.9% (10/72) of the doctors had not assessed delirium regularly for critically ill patients, table 2.

Moreover, the practice of doctors towards delirium management was assessed. More than half (69.4%) of the doctors used Anti-psychotics for managing delirium. Followed by sedatives, (20.8%, 15/72) of the doctors. Not to forget that, doctors were asked about their practice towards stopping delirium medications for the patients on ICU discharge, 56.9% (41/72) of them stopped medications on discharge, while 40.3% (29/72) had not stopped them from patients upon ICU discharge, table 2.

Table 2. Assessment of current practice of ICU doctors about delirium (n=72)

Knowledge and practice	n	%	Knowledge and practice	n	%
Knowledge about delirium assessment tools			Delirium treatment used		
Aware	28	38.9	Anti-psychotics	50	69.4
Unaware	44	61.1	Sedatives	15	20.8
Total	72	100	Opioids	1	1.4
Knowledge about first line management			Antipsychotics+ Sedatives	2	2.8
Non-pharmacological	55	76.4	Do not know	4	5.6
Pharmacological treatment	16	22.2	Total	72	100
Do not know	1	1.4	Stopping delirium medications on ICU discharge		
Total	72	100	Yes	41	56.9
Delirium assessment			No	29	40.3
CAM-ICU	13	18.1	Do not know	2	2.8
ICDSC	1	1.4	Total	72	100
Signs+ Symptoms	55	76.4			
None	3	4.2			
Total	72	100			
Frequency of delirium assessment					
Every 8-12 Hours	29	40.3			
Every 24 Hours	33	45.8			
Not regularly	10	13.9			
Total	72	100			

Reasons for irregular delirium assessment and not using non-pharmacological approach management among doctors

Ten doctors reported that delirium assessment might be irregularly for patients in the ICU. They were asked to report the reasons for not assessing delirium regularly. Only five doctors mentioned the reasons.

First reason was, only after the patient develops signs and symptoms, reported by 2 doctors, Difficult to assess was the reason for 1 doctor, High workload was reported by 1 doctor. As well as, Use family member support was the reason for 1 doctor.

Doctors were asked to report their reasons for not using the non-pharmacological approach in their delirium management. Lack of knowledge about non-pharmacological approach was the reason reported.

Non-pharmacological interventions applied by doctors to reduce delirium

The most frequent non-pharmacological intervention used by ICU doctors for delirium management was communication with the patients. This approach was used by 75% of the doctors. They speak to the patients every time they perform any medical intervention or follow up. The second common approach was early mobility of the ICU patients (22.2%). Reducing night time sleep disturbances was used by 18.1% of the doctors. While, reducing benzodiazepine use was applied by 6.9% of ICU doctors, figure 1.

Pharmacological agents used by ICU doctors to treat delirium

Doctors were asked to identify the pharmacological agents they use for delirium treatment. By far, the most commonly used agent was haloperidol, prescribed by 83.3% of ICU doctors to treat delirium. The second agent used was olanzapine (5.6%), followed by a combination of olanzapine and haloperidol (4.2%). In the other hand, risperidone and quetiapine were the least prescribed agents; each by only 1.4% of the doctors, figure 2.

Association between knowledge of doctors and their experience

With regards to the experience of doctors, their knowledge was assessed in order to determine if there was any difference in knowledge about delirium among the experienced and the non-experienced doctors. Doctors were grouped into two groups based on their years of experience, ≤ 2 years of experience and > 2 years of experience. Interestingly, there was no statistically significant difference in knowledge of ICU

doctors about delirium tools and first-line treatment between experienced and non-experienced doctors ($p= 0.059$, $p=0.797$ respectively).

Practice of doctors was assessed with regards to their experience. Among the 13 doctors who used CAM-ICU as their assessment tool for delirium, 53.8% had experience of > 2 years. While, among the 55 doctors who assessed delirium using no tool and just by signs and symptoms, 85.5% were less experiences (≤ 2 years). This difference in practice was statistically significant between experienced and less experienced doctors ($p=0.012$).

With regards to frequency of delirium assessment, no statistically significant difference was found between doctors based on their years of experience ($p=0.636$). As well as, no difference in practice towards delirium treatment was found among doctors based on their experience ($p=0.246$). Also, stopping delirium treatment on ICU discharge did not differ between doctors of different years of experience ($p=0.121$). Table 3 below details all the percentages of doctors of different experience and their practice towards delirium.

Table 3. Association between knowledge and practice and years of experience among doctors

Years of experience								
Knowledge and Practice	≤ 2 Years	%	> 2 Years	%	Total	%	Chi ²	p-value
Knowledge about delirium tools								
Aware	19	67.9	9	32.1	28	38.9	3.55	0.059
Unaware	38	86.4	6	13.6	44	61.1		
Total	57	79.2	15	20.8	72	100.0		
First-line management								
Non-pharmacological	44	80.0	11	20.0	55	76.4	0.455	0.797
Pharmacological treatment	12	75.0	4	25.0	16	22.2		
Do not know	1	100.0	0	0.0	1	1.4		
Total	57	79.2	15	20.8	72	100.0		
Delirium assessment							10.961	0.012*
CAM-ICU	6	46.2	7	53.8	13	18.1		
ICDSC	1	100.0	0	0.0	1	1.4		
By signs and symptoms	47	85.5	8	14.5	55	76.4		
None	3	100.0	0	0.0	3	4.2		
Total	57	79.2	15	20.8	72	100.0		
Frequency of delirium assessment								
Every 8-12 Hours	22	75.9	7	24.1	29	40.3	0.906	0.636
Every 24 Hours	26	78.8	7	21.2	33	45.8		
Not regularly	9	90.0	1	10.0	10	13.9		
Total	57	79.2	15	20.8	72	100.0		
Delirium treatment								
Anti-psychotics	41	82.0	9	18.0	50	69.4	5.427	0.246
Sedatives	9	60.0	6	40.0	15	20.8		
Opioids	1	100.0	0	0.0	1	1.4		
Antipsychotics+ Sedatives	2	100.0	0	0.0	2	2.8		

Do not know	4	100.0	0	0.0	4	5.6	
Total	57	79.2	15	20.8	72	100.0	
Stopping delirium medications on ICU discharge							4.229 0.121
Yes	29	70.7	12	29.3	41	56.9	
No	26	89.7	3	10.3	29	40.3	
Do not know	2	100.0	0	0.0	2	2.8	
Total	57	79.2	15	20.8	72	100.0	

*Statistically significant

Discussion

Delirium is common disorder among ICU patients [3, 6, 8, 11, 12, 16, 17]. Doctors and nurses were the direct healthcare providers for critically ill patients. In addition to nurses, doctors were involved in delirium assessment and reporting as mentioned by Pisani MA et al. [5]. Lack of knowledge among staff was reported as one of the individual barriers [3], hence, our study tackled the knowledge of doctors about delirium and delirium management.

Society of Critical Care Medicine recommended delirium assessment for all patients in the ICU through the use of a validated assessment instrument [4, 5]. However, in our study, most doctors (76.4%) had not used any specific tool for delirium assessment and relied on signs and symptoms alone. As in the study of Depetris et al. 57% of the doctors did not use any specific tool for delirium assessment [19]. Delirium was usually assessed using either the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) or the Intensive Care Delirium Screening Checklist (ICDSC) [7, 18]. Although usefulness of the Confusion Assessment Method for the ICU (CAM-ICU) for delirium detection was documented in recent studies [5, 17], only 18.1% of our participants used CAM-ICU for delirium assessment. Nevertheless, ICDSC was used by only 1.4% of the doctors. Furthermore, in a systematic review, CAM-ICU was the tool used for assessing delirium in 65% of delirium clinical trials, while, ICDSC was used in only 6% of the trials [6]. In a meta-analysis study, both CAM-ICU and ICDSC could be used to screen for delirium and diagnose it. Yet, the study favored CAM-ICU as ICDSC showed lower specificity and sensitivity compared to CAM-ICU [20]. Comparatively, in a national multicenter study in china, 34% of the doctors used delirium tools; of which, CAM-ICU was the most commonly used (83%) tool [23]. Nevertheless, in another study, CAM-ICU was used by 27.5% of the doctors, while ICDSC was used by 5% [19].

Delirium among ICU patients must be assessed every 8 hours or at least every 12 hours [7, 18]. Less than half of ICU doctors (40.3%) in our study assessed delirium every 8-12 hours, this was the practice in 60% of the clinical trials of delirium as reported by Colantuoni E et al. Moreover, 45.8% of our doctors assessed delirium daily, that was higher than what was reported (35%) by Colantuoni E et al. [6]. Only 13.9% of our doctors had non-regular assessments for delirium, this was the case for 30% of the physicians in a multi-

national study [19]. Among our study participants, one of the reasons for irregular delirium assessment was the increased workload. Such issue was interpreted as an environmental barrier; especially among ICU staff [3]. This issue was addressed in a study that recommended, in such case of limited resources, delirium management strategies may be prioritized for patients with high risk of delirium [7]. In our study, association between practice of ICU doctors and their years of experience was studied. Regarding delirium assessment, a statistically significant difference ($p=0.012$) was found. Contrary to the study of Wang et al. showing no statistically significant difference ($p=0.074$) between experienced and less experienced clinicians [23].

Delirium preventive measures are important for all ICU patients [7]. This was the case for most of our doctors, however, two doctors reported that they had not conducted such measures unless the patient develops signs and symptoms of delirium.

Non-pharmacological approach for delirium management (treatment and/or prevention) was the preferred approach [18]. This approach was the first-line choice for 76.4% of the doctors in our study, higher than percentage reported (22.5%) by Depetris et al. [19]. Communication with ICU patients to prevent delirium was the most frequent non-pharmacological approach applied by the ICU doctors of our study (75%). This approach was discussed in a systematic review by Deemer K et al. assessing the early cognitive interventions for delirium among ICU patients [12]. Moreover, participation of family members in delirium preventive strategies could be complimentary to the communication interventions done by doctors and nurses [12]. This approach of using family member support was practiced by one doctor in our study. Sleep and circadian rhythm regulation among ICU patients was a target therapy approach for these patients [24]; however, it was applied by only 18.1% of our doctors. Another important risk factor for delirium was the use of benzodiazepines [16, 18]. Midazolam is the most commonly used sedative for ICU patients prescribed as high as 72%- 90.5% of the sedatives [16, 19, 25]. Hence, reduction in their use was considered an important non-pharmacological approach for prevention of delirium among critically ill patients [18]. However, among our ICU doctors, reduction of benzodiazepines was adopted by only 6.9% of the doctors. Surprisingly, sedatives were used by 20% of our doctors to manage delirium, similarly, midazolam was one of the agents used by clinicians in China (31%) for treating delirium [23]. This issue needed to be addressed because use of sedatives for patients with delirium worsens the case and their use should be reduced [17, 18].

Based on the systematic review of Barbateskovic M, et al., evidence for using pharmacological interventions in the management and prevention of delirium was poor [26]. Nonetheless, this approach was not superior in delirium management [9]. Pharmacological approach for delirium treatment was used as first-line management by 22.2% of our study participants. This was higher than reported (2.5%) in a multi-national study [19]. Anti-psychotics were the most commonly used agents (69.4%) among our study doctors. Haloperidol was, by far, the most commonly used agent among ICU doctors (83.3%) for delirium treatment. This was consistent with a cohort study using haloperidol alone or in combination with clonidine [15]. Furthermore, studies reported that haloperidol use was the highest for patients with delirium (30%, 43.3%) [4, 23, 26]. The second commonly used agent in our study was olanzapine (5.6%),

similarly to that reported (5.9%) by Swan et al [4]. In the other hand, quetiapine and risperidone were used by only 1.4% of our study participants, this was much lower than the frequencies reported by Swan et al. (12.7% and 5% respectively) [4].

Continuation of delirium medication after ICU discharge was common (50.2%) as per study [27]. Of our doctors, 40.3% had not stopped delirium medications on discharge, this was lower than what reported above [27]. But, continuation of such medications beyond hospital stay could lead to harmful and deleterious events, hence, medication reconciliation is crucial in such cases [18].

The limitations of our study were the lack of comparison of doctors practice to nurses practice. Furthermore, the data collection tool was not validated through Cronbach test of reliability. Although this study was a multi-center study, selection bias might be a risk as we focused on the Hospitals of the Military section as they were bigger and more populated hospitals.

Conclusions

Less than half of the ICU doctors assessed delirium every 8-12 hours. Non-pharmacological preventive measures were applied by majority of our participants (76.4%). Communication with patients is important for delirium prevention which is done by most of our study participants. However, involvement of family members for communicating to ICU patients is an important approach, yet, is only applied by one doctor. Delirium assessment tools were used by less than 20% of ICU doctors. Medication reconciliation and contact with the next in-charge of patients must be conducted in order to reduce the use of these medications after hospital discharge.

Recommendations

Advocate for safe staffing levels as this was one of the reasons cited for non-assessment of delirium at high risk patients. Urging medical schools to include more content on delirium and delirium management in their curriculum. Moreover, suggesting routine in-service training opportunities and case presentations at grand rounds to further educate doctors about the importance of delirium assessment using validated tools and non-pharmacologic management techniques. The discharge of patients on antipsychotics which more inappropriately prescribed for delirium management should be immediately addressed as a quality improvement issue.

Declarations

Consent for publication

All authors have read the final draft of the manuscript and gave their approval for publication.

Availability of supporting data

All supporting data are available within the manuscript.

Competing interests

All authors declare that they have no any competing interest.

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Authors' contributions

Sheema Hamid Seidna Hamid¹ Elaborated the research proposal, implemented the field data collection.

Ghada Omer Hamad Abd El-Raheem² Conducted the statistical analysis and drafted the initial and the final manuscript.

Mudawi Mohammed Ahmed Abdallah³ Facilitated the administrative arrangements at the Military Hospitals, assisted in the data collection, reviewed the final manuscript prior to submission.

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Figures

Figure 1

Non-pharmacological interventions applied by doctors to reduce delirium

Figure 2

Pharmacological agents used by doctors to reduce delirium