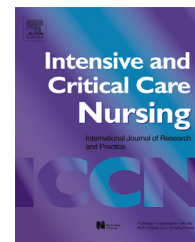




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ORIGINAL ARTICLE

# Early recognition of delirium in trauma patients



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## KEYWORDS

Delirium;  
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Knowledge;  
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## Summary

**Objective:** Evaluate change in practice and beliefs regarding delirium among nurses, pharmacists, respiratory therapists and physicians in a trauma intensive care unit.

**Methodology/design/setting:** Descriptive pre and post-design at a Level One Trauma Center. Education on causes of delirium, risk factors, strategies to prevent delirium and routine screening.

**Outcome measures:** Change in practice and beliefs regarding delirium.

**Results:** McNemars test measured the differences between pre- and post-questionnaires comparing the proportion of staff changed their responses in one direction to those who went in the opposite direction. Changes in "Delirium is largely preventable", were statistically significant ( $p=0.035$ ). Haldol was the medication of choice for treating delirium, with an increase in use ( $p=0.062$ ) post-intervention. The majority of participants believed a high percentage of patients experience delirium in a trauma intensive care. The two most frequent medical complications associated with delirium pre-questionnaire was over sedation 8 (22%) and falls 9 (24%) and in post-questionnaire, over sedation 12 (26%) and falls 13 (28%).

**Conclusions:** An educational intervention emphasising the importance of screening for delirium, risk factors for delirium and approaches to decrease the incidence of delirium can improve identifying and correctly treating delirium in a critical care setting. An educational program had concrete results in respondents' knowledge about delirium.

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### Implications for Clinical Practice

- Delirium often goes unnoticed due to its varying course, dementia related presentation, lack of formal cognitive assessment, and failure to consider this diagnosis important.
- There is a need to educate health care teams on delirium screening, risk factors for delirium and approaches to decrease the incidence of delirium.
- Assessing a health care team's beliefs and knowledge about delirium at baseline can provide concrete results in the respondent's knowledge about delirium.

## Introduction

Delirium is a neurobehavioral syndrome characterised by alteration in consciousness, attention, cognition, and perception (Kalaria and Mukaetova-Ladinska, 2012; Mattar et al., 2013). The highest rate of delirium occurs in hospitalised adults (Inouye et al., 2014; Nouwen et al., 2012; Witlox et al., 2010). Delirium often goes unnoticed by physicians and nurses due to its varying course, dementia related presentation, lack of formal cognitive assessment, and failure to consider this diagnosis important (Inouye et al., 2014). Identification of risk factors and assessing for delirium are strategies for early detection and prevention of delirium (Sendelbach and Guthrie, 2009). As primary care givers in an ICU setting it is imperative that nurses be educated on risk factors and signs of delirium among patients for delirium prevention. In the United States alone, the population of adults aged 65 years and older is projected to grow to 55 million in 2020, and 72.1 million by 2030 (Administration on Aging, 2008). The "oldest old" age group is projected to increase from 8.7 million in 2030 to 19 million in 2050, with adults aged 85 and older accounting for 4.3% of the U.S. population, compared to 2.3% in 2030 (Administration on Aging, 2008). Delirium prevention has recently been emphasised in national safety reports and as a health care quality indicator (Field and Wall, 2013; Inouye et al., 2014) and is clearly of significant importance when addressing the care of older adults.

## Literature review

The incidence of delirium in critically ill surgical or medical patients can be influenced by the patient's severity of illness and lack of a screening process for delirium (Skrobik, 2011). With delirium presenting as a multi-factorial disorder with varied clinical manifestations that differ based on patient population and hospital setting, early detection of delirium may not occur (Fong et al., 2009; Inouye et al., 2014). Without early detection, symptoms of delirium are not identified and treated, leading to further decline, resulting in persistent functional and cognitive loss (Fong et al., 2009). Ramaswamy et al. (2010) assessed knowledge and confidence of 58 registered nurses about delirium identification in a 32-bed acute care of elders (ACE) unit in a community hospital. They found a significant knowledge deficit in preventing, identifying, or managing delirium. An educational intervention was provided, including delirium prevention, recognition and management of delirium. Post-education surveys revealed a significant improvement in the identification of delirium ( $p < 0.001$ ) (Ramaswamy

et al., 2010). Devlin et al. (2008) conducted a survey of 601 ICU staff nurses employed in 16 intensive care units at five acute care hospitals to identify current practices and perceptions regarding sedation protocols that included a delirium assessment. Assessing for delirium was less common than assessing for sedation (47% vs 98%,  $p < 0.001$ ). Assessing for delirium was more common among nurses who were employed in medical intensive care units (55% vs 40%,  $p = 0.03$ ). The confusion assessment method was only used 36% of the time to assess for delirium. Nurses who failed to assess routinely for delirium were more likely to show gaps in knowledge about delirium, that delirium was under diagnosed, that hypoactive delirium was more prevalent in ICU settings, and that non-pharmacological modalities should be considered before antipsychotic therapy. Three major barriers identified by nurses in assessing for delirium included difficulty in evaluating delirium in patients who were intubated, inability to complete a delirium assessment in sedated patients, and use of delirium assessment tools that were too complex (Devlin et al., 2008). Patel et al. (2009) conducted a survey among 1384 intensive care unit healthcare providers, nurses, respiratory therapists, pharmacists, physicians and nurse practitioners in 41 acute care hospitals to assess behaviours and attitudes regarding delirium. A large percentage of respondents (86%) agreed with the statement that delirium was an underdiagnosed syndrome in ICU patients, delirium in the ICU prolonged hospital stay (96%), and 59% reported using a screening tool for delirium identification (Patel et al., 2009). Glynn and Corry (2015) conducted a descriptive quantitative survey design with registered nurses who were employed in an ICU setting. Their purpose was to explore ICU nurses' opinions about delirium in an ICU setting and evaluate current practices of delirium monitoring. They found that nurses understood that delirium was underdiagnosed in the ICU setting. The majority of nurses were not aware of a tool that could be used to assess for delirium. Barriers reported by the nurses in this study were similar to other international studies. They reported the reason why delirium monitoring was not occurring was due to lack of knowledge by the registered nurses on the importance of delirium assessments and how to conduct a delirium assessment (Glynn and Corry, 2015).

A screening assessment tool for delirium can be accomplished through the use of the confusion assessment method for the intensive care unit (CAM-ICU). The CAM-ICU is an adaptation of the CAM for use in ICU patients (Ely et al., 2001). The CAM defines delirium in terms of four diagnostic features; (1) acute change or fluctuating course of mental status during the past 24 hours, (2) inattention, (3) altered level of consciousness (current Richmond Agitation and Sedation Scale (RASS) level), and (4) disorganised

thinking. The diagnosis of delirium requires a score of features one plus two and either feature three and/or four to be present (Ely et al., 2001). The CAM-ICU was considered the instrument for use at the bedside due to five minutes needed for completion, ease of administration, and use in patients with hearing and visual disturbances.

## Aim

The aim of this study is to evaluate change in practice and beliefs regarding delirium among nursing staff, pharmacists, respiratory therapists and attending physicians working in the Trauma Intensive Care Unit (TICU) following an educational intervention.

## Methods

### Setting

Descriptive pre- and post-test designs were conducted in a TICU in a Level One Trauma Community Hospital with a convenience sample of a health care team including nursing, pharmacists, respiratory therapists and physicians. The hospital consists of 266 beds, with a 22 bed TICU. The hospital is one of eight trauma facilities in Arizona designated as Level One by the state, annually caring for more than 3000 of the region's most critically injured patients.

### Staff

A total of 57 trauma registered nurses (RNs) employed by the hospital that provide direct patient care in the TICU, six pharmacists, 14 respiratory therapists and eight physicians working in the TICU were asked to participate in this study.

### Instruments and measures

The paired pre- and post-questionnaires were similar except the pre-questionnaire did not include a definition of delirium where the post-questionnaire did. The definition of delirium was added to examine whether there was a change in the participants' responses (Ely et al., 2004). The 11-item questionnaire included free text responses consisting of listing the most serious medical complication(s) associated with delirium, medication of choice in treating delirium, and adverse reactions associated with treatment of delirium. A five-point Likert scale of strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree was used to assess practice and beliefs about delirium, and a five-point Likert scale of very important, important, moderately important, of little importance, and unimportant was used to assess importance of listed risk factors in the development of delirium in patients (Ely et al., 2004). Demographic information included type of health care professional, type of practice, main practice setting, age, years of critical care practice, original education degree, and shift worked.

### Procedure

A disclaimer letter accompanied the survey stating the purpose of the study, voluntary participation, the ability to

decline to answer any particular question and to discontinue participation without incurring any penalty. An index card was attached to the survey and participants were asked to write their name, position, and department on the index card with instructions to place the completed card in a questionnaire return box located in the TICU. A control number was assigned to each name and input on an excel spreadsheet by the unit secretary. The unit secretary placed the questionnaires in an envelope with the participants name on the front of the envelope. Participants were asked to open the envelope, complete the questionnaire with instructions to not write their name, and return the questionnaire in the return box. Completion of the questionnaire acted as consent of participation by the health care team. Upon completion of the questionnaire, the health care team received education including screening for delirium using the CAM-ICU, risk factors for delirium, and strategies to decrease the incidence of delirium. Education was provided by the TICU educator and included a module placed in "Net Learning" which is a Learning Management System that is accessed online. Laminated posters were displayed in the TICU displaying risk factors for delirium, and instructions for registered nurses in the use of the CAM-ICU. The health care team who were educated included registered nurses, attending physicians, pharmacists and respiratory therapists who work in the TICU and were employed by the hospital.

### Treatment fidelity

To maintain treatment fidelity and compliance with the CAM-ICU, education and training of nursing staff were provided by the TICU educator and was a standing agenda item at monthly staff meetings and shared leadership meetings. Protocol review and clarification were provided as needed, with observation of administration of the CAM-ICU by the TICU educator.

### Data collection

A pre-questionnaire was completed by the health care team prior to the educational intervention. A post-questionnaire was repeated at the end of the study with the same questionnaire including a definition of delirium (Ely et al., 2004).

### Data analysis

Data on the health care team's change in practice and beliefs were coded and analysed using a commercial software package (SPSS version 16.0; Chicago, IL). Descriptive statistics were used for the health care team's demographics including type of health care professional, type of practice, main practice setting and years practicing. Continuous variables were reported using means and standard deviations. Categorical variables were reported as percentages. McNemars test measured the differences between pre- and post-questionnaires comparing the proportion of staff who changed their response in one direction to those whose responses went in the opposite direction.

## Ethical considerations

Approval was received from an external Institutional Review Board review. Health care team questionnaires were anonymous and participation was voluntary. A disclaimer letter accompanied staff questionnaires stating the purpose of the study, voluntary participation, refusal to participate, the ability to decline to answer any particular question and discontinuing participation without incurring any penalty. Upon publication of any results of this study data would be reported in aggregate form only, so participants' identities would not be revealed. Patients were not consented for the study, as the CAM-ICU was low risk, standard practice in many hospitals and was being implemented for all patients as standard assessment. All questionnaires were kept confidential. Data were entered into a Microsoft Excel database. After data entry was completed, files were compared, with discrepancies identified and reconciled with raw data forms. Data confidentiality was maintained throughout the study.

## Results

### Sample demographics

Out of 85 paired surveys sent, 72 (85%) pairs of surveys were completed. Participants included registered nurses 46 (64%), respiratory therapists 14 (19%), physicians 6 (8%), and pharmacists 6 (8%). Mean years of critical care experience were 13 years, mean age 43 years, and mean years of practice 15 years.

### Health care team results

McNemars test measured differences between pre and post-questionnaire comparing proportion of staff that changed their response in one direction to those whose responses went in the opposite direction. Changes in staff responses to the statement, "Delirium is largely preventable", were statistically significant ( $p = 0.035$ ) (Table 1). When asked to rate using a five-point Likert scale from "unimportant" to "very important", "how important do you think the following risk factors are in the development of delirium in an ICU", the top three risk factors identified pre-questionnaire included baseline dementia 30 (54%), primary central nervous system disease 22 (35%) and age 20 (33%). Post-questionnaire the top three risk factors included baseline dementia 29 (47%), age 25 (42%) and hypoxaemia 24 (40%). When asked to write down the medication of choice in treating delirium, pre-questionnaire 28 (54%) of healthcare participants responded with Haldol, with an increase post-questionnaire 34 (81%). The two most frequent reasons cited for Haldol pre-survey included minimal adverse side effects compared to Ativan and less sedation. The two most frequent reasons cited for Haldol post-questionnaire included less sedation and more effective than Ativan with an increase in use of Haldol ( $p = 0.062$ ). When asked to list the most serious medical complication(s) associated with delirium, the two most frequent answered responses pre-questionnaire was over sedation 8 (22%) and falls 9 (24%). The two most frequent responses post-questionnaire were over sedation 12 (26%) and falls 13 (28%) (Graph 1). These statistically significant changes noted post-questionnaire can be attributed to the

**Table 1** Health care teams change in practice and beliefs regarding delirium.

Indicators	Percentage change in response	Exact Sig. (2-sided)
Delirium is under diagnosed	4.7% change to agree	0.625
Delirium is "normal" part of ICU hospitalisation	4.6% change to disagree	0.727
Delirium requires active intervention	2.3% change to agree	*
Delirium is largely preventable	22.6% change to agree	0.035
Delirium in ICU associated with long-term neuropsychological deficits	10% change to agree	0.549
We over sedate patients in ICU	17.9% change to agree	0.065
Delirium impairs weaning from ventilator	0% change	*

Binomial distribution used.

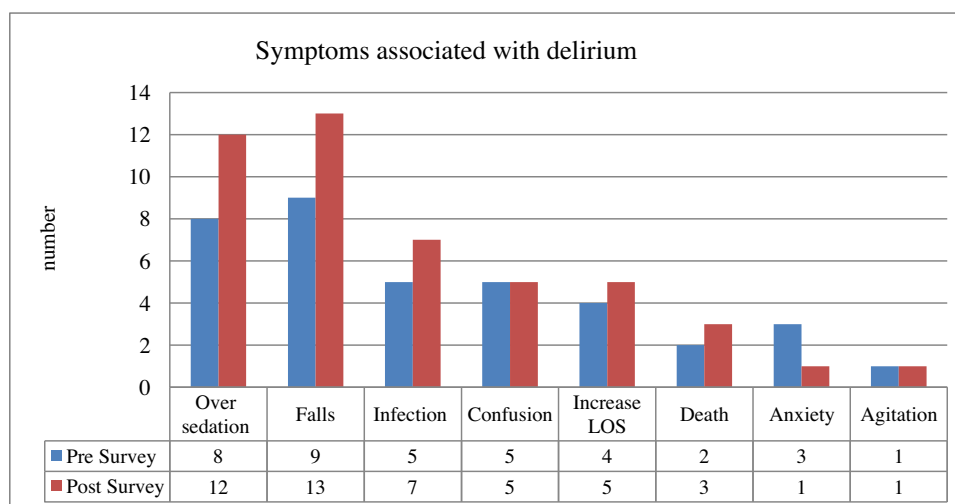
\* No measures of association are computed for this cross tabulation. At least one variable in each 2-way table upon which measures of association are computed is a constant.

educational intervention whose content included risk factors for delirium, delirium prevention, medications for use in delirium, and complications of delirium.

## Discussion

This study represents a health care team's change in practice and beliefs regarding delirium in the TICU. The questionnaire did reveal that the health care team believes that delirium is largely preventable. Early identification of delirium and risk factors associated with delirium can initiate the first step in preventing, identifying, and correctly treating delirium in the TICU. The success of this intervention was similar to Ramaswamy et al. (2010) who utilised a pre and a post-intervention to assess participants' knowledge and confidence with delirium identification among registered nurses, physicians and staff. They improved their patients' care in a hospital setting by increasing participant knowledge about delirium identification and management. Patel et al. (2009) found a significant difference between the perceived importance of delirium in the ICU and the practices of delirium monitoring and treatment. They provided an education intervention and improved specific practices in delirium and sedation management. Glynn and Corry (2015) surveyed nurses and found that the majority of nurses understood that delirium was a serious underdiagnosed syndrome and were not aware of a tool that could be used to assess for delirium. Glynn and Corry (2015) were successful in raising awareness on the importance of providing appropriate education and training on delirium for ICU nurses.





**Graph 1** Symptoms associated with delirium.

## Conclusion

Failure to detect delirium early can influence safe patient care. The presentation of delirium includes varied clinical manifestations that can be different based on the patient population and hospital setting, resulting in either a missed or delayed diagnosis of delirium (Fong et al., 2009; Maldonado, 2008). Lack of an education intervention and an assessment tool to monitor for delirium can increase the likelihood that delirium will go unrecognised. Surveying nurses can identify any deficits in knowledge regarding the prevention, identification or management of delirium. An educational intervention emphasising the importance of screening for delirium, risk factors for delirium and approaches to decrease the incidence of delirium can improve identifying and correctly treating delirium in a critical care setting. An educational program had concrete results in the respondent's knowledge about delirium.

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## Conflict of interest

The authors have no conflict of interest to declare.

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