

Jordanian Intensive Care Unit Nurses' Knowledge of Delirium Recognition

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Received: May 3, 2016 Accepted: August 1, 2016 Online Published: August 25, 2016

doi:10.5539/gjhs.v9n4p182

URL: <http://dx.doi.org/10.5539/gjhs.v9n4p182>

Abstract

Introduction: Delirium is a clinical syndrome that negatively affects the outcomes of the intensive care units patients if undetected early and treated well. However, this condition remains under recognized and poorly managed by health care providers including nurses. The objective of this study was to check nurses' knowledge level about delirium recognition.

Materials and Methods: This was a cross-sectional study on 176 intensive care units nurses working in four major hospitals in Amman, Jordan. Data were collected using a self-reported likert scale questionnaire.

Results: Nurses lack the basic knowledge about delirium recognition; the mean was (52.65 ± 4.99). Older nurses (aged 31 years and above) have significantly higher levels of knowledge regarding delirium recognition compared to younger nurses (mean ± SD, 56.02 ± 18.1 vs. 49.28 ± 12.65, $P < .005$). Moreover, nurses with longer experience in intensive care units were more knowledgeable about delirium recognition ($r=0.73$, $p < .001$). Graduate studies have a positive effect on the knowledge level. Nurses holding master degree have significantly higher levels of knowledge regarding delirium recognition compared to those with Baccalaureate degree; (mean ± SD, 60.28 ± 16.86 vs. 53.0 ± 12.18, $P < .005$).

Conclusion: Delirium is a widespread disorder in the intensive care units. Jordanian nurses lack the basic knowledge regarding essential characteristics of delirium and its recognition. Education of nurses in all care settings is vital and necessary.

Keywords: delirium, nurses, Intensive care units, Jordan, recognition

1. Introduction

Delirium, a clinical syndrome characterized by an acute disruption of consciousness and change in cognition, is mostly due to reversible multi-factorial medical rather than psychiatric causation (Nidsa, Anita, Taggart, & Paula, 2015). Delirium has over thirty synonyms, including brain syndrome, acute confusional state, intensive care unit (ICU) psychosis, ICU syndrome, acute brain failure, and metabolic encephalopathy (Inouye, 1994; Wells, 2012). The characteristics of delirium were first recognized 2500 years ago (Johnson et al., 1990; Rando, 1990).

According to the level of psychomotor activity and alertness, delirium can be classified as hypoactive, hyperactive and mixed (Holly, Cantwell, & Jadotte, 2012; Meagher & Trzepacz, 2000). Hypoactive "quiet" delirium is characterized by a lethargic level of consciousness, (Meagher, Hanlon, Mahony, Casey, & Trzepacz 2000; Milisen, Foreman, Godderis, Abraham, & Broos, 1998), while hyperactive delirium is associated with agitation, restlessness and pulling out tubes and lines in ICU (Meagher & Trzepacz, 2000; Meagher et al., 2000; Milisen et al., 1998). The mixed subtype is characterized by the two previous types.

Estimates indicate that a delirious episode may occur in 30-80% of hospitalized patients (Christensen, 2014; Ely et al., 2001a; Ely et al., 2001b). ICUs have the highest rate of delirium (up to 87%), (Arend & Christensen, 2009; Svenningsen & Tonnesen, 2011; Svenningsen et al., 2013) distributed as: a) mixed-subtype delirium, the most common (54.9%); b) hypoactive delirium (43.5%); and c) purely hyperactive delirium (1.6%) (Peterson et al., 2006). During hospitalization, 30% of hip fracture, 44% of medical, and 56% of surgical patients develop delirium (Arend & Christensen, 2009; Svenningsen et al., 2013). Incidence of postoperative delirium is high even in a population without known risk factors (Andrea Saporito, 2014). Among all admitted patients, those at highest risk of delirium (87%) are the elderly (aged over 65) (Han et al., 2010; Svenningsen & Tonnesen, 2011).

Delirium is associated with high mortality and morbidity rate and longer length of hospitalization (Christensen, 2014; Roberts, 2004; Salluh et al., 2010; Shehabet al., 2010; Svenningsen & Tonnesen, 2011). Patients admitted to ICU who developed delirium during their stay were at three times greater risk of mortality within the next six months compared to those without delirium, even after controlling for preexisting comorbidities. Each extra day of delirium was associated with a 20% increased risk of prolonged hospitalization and a 10% increased risk of death (Pun, 2007; Svenningsen et al., 2013). Interestingly, hypoactive delirium has the worst prognosis among all types of delirium (Arend & Christensen, 2009; Bergeron, Skrobik, & Dubois, 2002). Therefore, early routine structured assessment of delirium may facilitate delirium recognition in the ICU (Meagher, 2001).

Despite increased attention that delirium has received in the last two decades, the patient outcomes remain relatively unchanged (Devlin, Fraser, Joffe, Riker, & Skrobik, 2013). Even though, there is a consensus and universal agreement about the presenting behaviors of ICU delirium, (Arend & Christensen, 2009) and wide availability of extensively validated screening tools, (Christensen, 2014; Devlin, Fong, Fraser, & Riker, 2007a; Devlin et al., 2007b) the recognition of delirium by health care workers (HCWs) remains a persistent problem. HCWs (including both physicians and nurses) fail to recognize delirium in as many as 66-84% of their patients (Peter, Bea, Jose, & Johannes, 2009; Sanders, 2002).

The main issues contributing to this problem are: a) most clinical settings do not implement routine assessment of delirium; (Hamdan-Mansour, Farhan, Othman, & Yacoub, 2010; Wells, 2012), b) the fluctuating nature and varied manifestations of delirium (i.e. hypoactive, hyperactive or a mixture of both) (Arend & Christensen, 2009) may be mistaken as dementia or functional psychosis; and c) lack of knowledge on the part of the nurses about risk factors, signs and symptoms, causes, criteria and methods of detecting delirium (Boot, 2012; Steis, & Fick, 2008).

Because of the high incidence and the negative outcomes of delirium, prevention and early detection should have the highest priority among HCWs. This is particularly important for nurses, who have the most exposure to patients due to their front-line care position, making them the best professionals to observe and note changes in the behavior of patients. Delirium often occurs either as a prominent feature of a life-threatening physical illness or a serious complication of a disease. Therefore, it is vitally important that the nurses are skilled in its detection. However, many nurses lack not only the knowledge but also the competency to recognize and diagnose delirium effectively (Inouye, 1994; Sanders, 2002; Steis & Fick, 2008).

2. Methods

2.1 General Objective

The major goal of this study was to assess the level of knowledge in detecting delirium in Jordan among ICU Registered Nurses (RNs).

2.2 Research Questions

a) Is there a difference between nurses' knowledge of delirium recognition by age group? b) Is there a difference in knowledge regarding delirium recognition between nurses who work in teaching and private hospitals? c) Is there a relationship between years of experience and the level of knowledge of delirium recognition? d) Is there a relationship between nurses' educational level and knowledge of delirium recognition?

2.3 Design, Sample and Setting

A descriptive design was used to meet the objective of the study. The study was conducted in the ICUs of one teaching and three private hospitals in Amman, Jordan. A convenience sample of ICU nurses who accepted to participate in the study and signed the informed consent was included. Newly employed (with experience of one year or less) ICU nurses were excluded from the study, because this period is the preceptor-preceptee period for new nurses in Jordanian hospitals. Nurse managers were also excluded because they are not participating directly in patient care. The total number of nurses enrolled in the study was 176.

2.4 Ethical Considerations

Ethical approval for this study was granted by the IRB committee at the Applied Science Private University, Amman, Jordan (Faculty 002). This letter was submitted to the medical and nursing directors of the above mentioned hospitals. Permission to conduct the study within the different ICUs was issued to the principle investigators by the medical directors.

2.5 Data Collection

In psychiatry, there are various validated tests/ tools to assess if the patient is delirious, e.g. Confusion Assessment Method for ICU (CAM-ICU), Intensive Care Delirium Screening Checklist, Delirium Rating Scale, Delirium

Symptom Interview, Memorial Delirium Assessment Scale and others (Casarett & Inouye, 2001; Svenningsen & Tonnesen, 2011). However, instruments assessing the nurses' knowledge about delirium are lacking. Instruments used in studies to check the knowledge about delirium recognition by ICU staff were criticized for lacking the validity and reliability (Hare, Wynaden, McGowan, Landsborough, & Speed, 2008; Nidsaet al., 2015). Therefore, a new instrument to check nurses' knowledge was developed (Delirium Assessment Tool).

In order to identify the three subtypes of delirium (hypoactive, hyperactive and mixed), the new instrument was based on the Intensive Care Delirium Screening Checklist, (Bergeron et al., 2001) and CAM-ICU, published in 2001 (Neziraj et al., 2011). These two instruments were widely used by researchers and designed specifically to diagnose delirium in ICU.

CAM-ICU was developed and validated by Ely et al. (2001b) with a specificity of 89–100% and a sensitivity of 89–93%. It focuses on four main items: acute onset, inattention, altered level of consciousness, and disorganized thinking. The Intensive Care Delirium Screening Checklist is an eight-item checklist with a sensitivity of 99%, specificity of 64%, and inter-rater reliability of 0.94 (Bergeron, Dubois, Dumont, Dial, & Skrobik, 2001).

In the first item, the patient's altered level of consciousness is assessed based on five levels (1-5), after which it is decided whether the examination can be carried out or not. If the patient is at level 3, 4 or 5, the remaining seven items are analyzed: inattention, disorientation, hallucination– delusion – psychosis, psychomotor agitation or retardation, inappropriate speech or mood, sleep/wake cycle disturbance and symptom fluctuation (Bergeron et al., 2001; Neziraj, Sarac, & Samuelson, 2011). The new instrument was developed to reflect these eight items.

The first portion of the data collection instrument was about the demographic data of the participants (n=9). In this section nurses were also asked to determine if they read about the delirium. The second portion was a self-reported questionnaire containing 36 questions using a Likert scale from one (strongly disagree) to five (strongly agree). Negatively stated items were reversely coded when they were entered in the computer for data analysis. The minimum score the participant can get is 36, and the maximum score is 180. Higher scores indicate higher levels of knowledge.

To ensure sufficient reliability of the new instrument, the equivalence was checked by inter-rater reliability, and homogeneity was checked by split half method. For the construct validity, the instrument was shown to three experts (for face-expert validity), one with knowledge of instrument development, the second with clinical expertise in appropriate field of practice, and the third with expertise in another discipline relevant to the content area. They checked the instrument for readability, relevance, and accuracy. Moreover, a pilot study on 10% of the sample size was done to determine the adequacy, as well as the time needed to complete the questionnaire. The pilot study showed adequate questions and the time needed was 20-30 minutes. Some questions (10, 13 and 15) were modified due to language difficulties and according to expert advice. The reliability of the instrument was ensured, with a Cronbach's alpha of 0.78.

2.6 Data Analysis

All data were analyzed by using SPSS version 21 (SPSS Inc, Chicago, Illinois). All of the statistical tests were set at 5% alpha level of significance. *p*-values less than 0.05 ($p < 0.05$) were deemed to be statistically significant. Descriptive statistics with numbers and frequencies, means \pm SD, were used for the purpose of this study. To test research questions one, two and four an independent sample t-test was performed. To test research question number three, Pearson correlation coefficient was used.

3. Results

3.1 Descriptive Statistics

Sociodemographic variables of the sample are presented in table 1. The gender percentages were approximately equal (51%, n=90 and 49%, n=86 male and female, respectively). The mean age was 26.55 ± 4.73 , with a range of 23-50 years old. Approximately two-thirds of the sample was working in private hospitals. Their experience in nursing and critical settings ranged from 2-27 years, with means of 4.39 ± 4.28 and 3.48 ± 3.13 , respectively.

Table 1. Socio-demographic characteristics of the sample(N=176)

Character	N (%)	Mean ± SD
Age		
23-30 years	139 (79.0)	26.55± 4.73
31 years+	37 (21.0)	
Sex		
Male	86 (49.0)	
Female	90 (51.0)	
Type of hospital		
Private	118 (67.0)	
Academic	58 (33.0)	
Number of years of experience in nursing		
0-5 years	125 (71.0)	
6-10 years	27 (15.3)	4.39 ± 4.28
11 years+	24 (13.7)	
Number of years of experience in ICU		
0-5 years	140 (79.5)	
6-10 years	25 (14.2)	3.48 ± 3.13
11 years+	11 (6.3)	
Academic qualifications		
BSN	146 (83.0)	
MSN	30 (17.0)	
Read about delirium		
Yes	66 (37.5)	
No	110 (62.5)	

ICU: Intensive care unit, BSN: Baccalaureate Science of Nursing, MSN: Master Science of Nursing.

3.2 General Purpose

The mean of nurses' total knowledge regarding delirium recognition was (52.65 ± 4.99). The ability to recognize that the sign and symptoms of delirium are diagnostic features of delirium scored the highest percentage (70.45 ± 26.06), and the knowledge of psychomotor agitation criteria scored the lowest percentage (36.04 ± 17.28).

3.3 Age and Knowledge about Delirium Recognition

Older nurses (aged 31 years and above) have significantly higher levels of knowledge regarding delirium recognition compared to younger nurses (mean ± SD, 56.02 ± 18.1 vs. 49.28 ± 12.65, $P < .005$)

3.4 Nurses' Workplace and Knowledge about Delirium Recognition

Nurses working in academic hospitals have significantly higher levels of knowledge regarding delirium recognition compared to those working in private hospitals (mean ± SD, 62.22 ± 17.86 vs. 55.0 ± 13.12, $P < .005$).

3.5 Years of Experience and the Level of Knowledge about Delirium Recognition

There was a significant moderate positive correlation between years of experience in nursing and level of knowledge about delirium recognition ($r=0.57$, $p < .001$). There was a significant strong positive correlation between years of experience in ICU and level of knowledge about delirium recognition ($r=0.73$, $p < .001$).

3.6 Nurses' Educational Level and the Level of Knowledge about Delirium Recognition

Nurses holding MSN have significantly higher levels of knowledge regarding delirium recognition compared to those with BSN; (mean ± SD, 60.28 ± 16.86 vs. 53.0 ± 12.18, $P < .005$).

3.7 Reading and Level of Knowledge about Delirium Recognition

Nurses who read about delirium were more capable to recognize it than those who did not (mean \pm SD, 52.89 \pm 15.98 vs. 46.41 \pm 15.38, $P < .005$).

4. Discussion

Although most studies about delirium recognition were conducted in Western countries, the general features of delirium are universal in all cultures, regardless of the particular patient and HCWs. Nobody questions the essential role of nursing in diagnosing and treating delirium as the main front-line workers who spend most of their time with patients. Thus, nurses should be Knowledgeable and confident about delirium recognition.

Unfortunately, the results of this study showed that nurses lack sufficient basic knowledge to detect delirium in ICU. This result is consistent with previous studies about the same topic (Nidsaet al., 2015; Christensen, 2014; Varghese, Macaden, Premkumar, Mathews, & Kumar, 2014; Hamdan-Mansour et al., 2010). In Jordan, the reasons behind that might be: a) the fluctuating nature of delirium (hyperactive, hypoactive, and mixed); b) lack of education about delirium in the nursing undergraduate programs; c) lack of the application of delirium assessment tools in the ICUs; d) depending on experience as a basis to diagnose delirium; and e) the level of importance attached to delirium by the ICU nurses.

ICU nurses are usually busy focusing on the physiological status and hemodynamic stability of their patients. Thus, in terms of delirium they are more attuned to familiarity with hyperactive delirium, since they are acutely cautious about actions that might harm the patient (i.e. pulling arterial line, central line or NGT), which in addition increases their workload (Christensen, 2014). For this reason, while hyperactive delirium has a chance of detection in ICU, nearly all hypoactive delirium is unrecognized. Consequently, educational programs are highly recommended to enhance nurses' knowledge about different types of delirium. The results of this study showed three outcomes supporting this idea.

First: Nurses working in academic hospitals have significantly higher levels of knowledge regarding delirium recognition compared to those working at private hospitals. Frequently, ICUs in academic teaching hospitals in Jordan have continuous educational programs and didactic-multidisciplinary rounds. These programs sometimes have discussions about delirium and its recognition, as indicated by nurses. *Second: Nurses holding MSN have significantly higher levels of knowledge regarding delirium recognition compared to those with only BSN.* Most postgraduate nursing programs in Jordan are focusing on critical care or clinical nursing, and their curricula cover delirium. Undergraduate programs focus on core nursing activities and basic nursing skills, with little material about delirium. *Third: Nurses who read about delirium were more capable to recognize it than those who did not read.* Previous studies (Donahue, Kazer, Smith, & Fitzpatrick, 2011; Varghese et al., 2014; Yanamadala, Wieland, & Heflin, 2013) showed that educational programs and bedside coaching (El Hussein, Hirst, & Salyers, 2015) were effective in increasing knowledge, and producing positive changes in staff behaviors, practices and participant outcomes. These educational programs included information about the eight topics mentioned above regarding delirium and the screening instruments.

A number of nurses found that the use of delirium screening tools is difficult and confusing. (Christensen, 2014) Furthermore, there are no protocols implemented in the above mentioned ICUs or a standard method used to assess delirium (Hamdan-Mansour et al., 2010; Wells, 2012). As a result, ICU nurses depend on their experience to detect delirium. The results concerning the experience and knowledge regarding delirium recognition are still controversial. Hamdan-Mansour et al., (2010) reported that there is no significant relationship between knowledge and age or years of experience. Donahue et al., (2011) reported a significant *negative* relationship between knowledge and years of experience, which they attributed to resistance to change by experienced nurses.

In this study we found that there is a positive relationship between age, years of experience and knowledge scores. This might be explained because most of our participants (79%) were young (≤ 30 years) and do not have long experience (4.39 \pm 4.28), while only some of them (17%) hold master's degrees. These characteristics might make the sample less subjective to resistance. Consistent with our findings, Nidsaet al., (2015) found that nurses who had previously cared for patients with delirium scored higher in the general delirium knowledge than those who lacked such experience ($p = 0.028$). More studies are needed to check the relationship between socio-demographic variables and professional experience.

Nurses frequently find it difficult to identify the core signs and symptoms of delirium as acute onset and disorganized thinking (Christensen, 2014). In addition, previous studies (Devlin et al., 2008) about the perception of nurses on the importance of delirium found that only 3% of the nurses ranked delirium as the most important condition to evaluate. Accordingly, they rely on doctors' orders to perform this assessment (Eastwood, , Peck,

Bellomo, Baldwin, & Reade, 2012). This might explain why nurses lack knowledge about delirium assessment and recognition.

5. Conclusion

Delirium is a widespread disorder in the ICUs. If this syndrome is not managed appropriately or if preventive interventions are delayed, the patient might deteriorate and become functionally impaired. This could lead to long term complications and even death. The results of this study showed that Jordanian nurses, as other nurses, lack the basic knowledge regarding essential characteristics of delirium and its risk factors. Education of nurses in all care settings is vital and necessary. A special focus should be on the different types of delirium and patients who are at risk (i.e. elderly). Education can provide nurses the underpinning they need to become more practical in addressing this under-recognized condition and taking independent nursing actions to improve patient safety.

Acknowledgements

The author is grateful to the Applied Science Private University, Amman, Jordan, for the partial financial support granted to this research project (DRGS-2014-2015-178), and the financial support granted to cover the publication fees of this research article.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

References

- Andrea Saporito, E. S. (2014). Incidence of postoperative delirium is high even in a population without known risk factors. *Journal of Anesthesia*, 28(2) 198-201. <http://dx.doi.org/10.1007/s00540-013-1706-5>
- Arend, E., & Christensen, M. (2009). Delirium in the intensive care unit: A review. *Nursing in Critical Care*, 14(3), 145-54. <http://dx.doi.org/10.1111/j.1478-5153.2008.00324.x>
- Bergeron, N., Dubois, M. J., Dumont, M., Dial, S., & Skrobik, Y. (2001). Intensive Care Delirium Screening Checklist: Evaluation of a new screening tool. *Intensive Care Medicine*, 27(5), 859-864. <http://dx.doi.org/10.1007/s001340100909>
- Bergeron, N., Skrobik, Y., & Dubois, M. J. (2002). Delirium in critically ill patients. *Critical Care*, 6(3) 181-182. <http://dx.doi.org/10.1186/cc1482>
- Boot, R. (2012). Delirium: A review of the nurses role in the intensive care unit. *Intensive Critical Care Nurse*, 28(3), 185-189. <http://dx.doi.org/10.1016/j.iccn.2011.11.004>
- Casarett, D. J., & Inouye, S. K. (2001). Diagnosis and management of delirium near the end of life. *Annals of Internal Medicine*, 135(1), 32-40. <http://dx.doi.org/10.7326/0003-4819-135-1-200107030-00011>
- Christensen, M. (2014). An exploratory study of staff nurses' knowledge of delirium in the medical ICU: an Asian perspective. *Intensive and Critical Care Nursing*, 30(1), 54-60. <http://dx.doi.org/10.1016/j.iccn.2013.08.004>
- Devlin, J. W., Fong, J. J., Fraser, G. L., & Riker, R. R. (2007a). Delirium assessment in the critically ill. *Intensive Care Medicine*, 33(6), 929-940. <http://dx.doi.org/10.1007/s00134-007-0603-5>
- Devlin, J. W., Fong, J. J., Howard, E. P., Skrobik, Y., McCoy, N., Yasuda, C., & Marshall, J. (2008). Assessment of delirium in the intensive care unit: nursing practices and perceptions. *American Journal of Critical Care*, 17(6), 555-565.
- Devlin, J. W., Fong, J. J., Schumaker, G., O'Connor, H., Ruthazer, R., & Garpestad, E. (2007b). Use of a validated delirium assessment tool improves the ability of physicians to identify delirium in medical intensive care unit patients. *Critical Care Medicine*, 35(12), 2721-2724. <http://dx.doi.org/10.1097/01.CCM.0000292011.93074.82>
- Devlin, J. W., Fraser, G. L., Joffe, A. M., Riker, R. R., & Skrobik, Y. (2013). The accurate recognition of delirium in the ICU: the emperor's new clothes? *Intensive Care Medicine*, 39(12), 2196-2199. <http://dx.doi.org/10.1007/s00134-013-3105-7>
- Donahue, M., Kazer, M. W., Smith, L., & Fitzpatrick, J. J. (2011). Effect of a geriatric nurse education program on the knowledge, attitudes, and certification of hospital nurses. *Journal of Continuing Education in Nursing*, 42(8), 360-364. <http://dx.doi.org/10.3928/00220124-20110415-01>
- Eastwood, G. M., Peck, L., Bellomo, R., Baldwin, I., & Reade, M. C. (2012). A questionnaire survey of critical care nurses' attitudes to delirium assessment before and after introduction of the CAM-ICU. *Australian*

- Critical Care*, 25(3), 162-169. <http://dx.doi.org/10.1016/j.aucc.2012.01.005>
- El Hussein, M., Hirst, S., & Salyers, V. (2015). Factors that contribute to underrecognition of delirium by registered nurses in acute care settings: a scoping review of the literature to explain this phenomenon. *Journal of Clinical Nursing*, 24(7-8), 906-915. <http://dx.doi.org/10.1111/jocn.12693>
- Ely, E. W., Inouye, S. K., Bernard, G. R., Gordon, S., Francis, J., May L., ... Dittus, R. (2001b). Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU). *Journal of the American Medical Association*, 286(21), 2703-2710. <http://dx.doi.org/jce10051> [pii].
- Ely, E. W., Margolin, R., Francis, J., May, L., Truman, B., Dittus, R., ... Inouye, S. K. (2001a). Evaluation of delirium in critically ill patients: validation of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) *Critical Care Medicine*, 29(7), 1370-1379. <http://dx.doi.org/10.1097/00003246-200107000-00012>
- Hamdan-Mansour, A. M., Farhan, N. A., Othman, E. H., & Yacoub, M. I. (2010). Knowledge and nursing practice of critical care nurses caring for patients with delirium in intensive care units in Jordan. *Journal of Continuing Education in Nursing*, 41(12), 571-576. <http://dx.doi.org/10.3928/00220124-20100802-01>
- Han, J. H., Shintani, A., Eden, S., Morandi, A., Solberg, L. M., Schnelle, J., ... Ely, E. W. (2010). Delirium in the emergency department: an independent predictor of death within 6 months. *Annals of Emergency Medicine*, 56(3), 244-252. <http://dx.doi.org/10.1016/j.annemergmed.2010.03.003>.
- Hare, M., Wynaden, D., McGowan, S., Landsborough, I., & Speed, G. (2008). A questionnaire to determine nurses' knowledge of delirium and its risk factors. *Contemporary Nurse*, 29(1), 23-31. <http://dx.doi.org/10.5555/conu.673.29.1.23> [pii]
- Holly, C., Cantwell, E. R., & Jadotte Y. (2012). Acute delirium: differentiation and care. *Critical Care Nursing Clinics of North America*, 24(1), 131-147. <http://dx.doi.org/10.1016/j.ccell.2012.01.008>
- Inouye, S. K. (1994). The dilemma of delirium: clinical and research controversies regarding diagnosis and evaluation of delirium in hospitalized elderly medical patients. *American Journal of Medicine*, 97(3), 278-288. [http://dx.doi.org/10.1016/0002-9343\(94\)90011-6](http://dx.doi.org/10.1016/0002-9343(94)90011-6)
- Johnson, J. C., Gottlieb, G. L., Sullivan, E., Wanich, C., Kinoshian, B., Forciea, M. A., ... Hogue, C. (1990). Using DSM-III criteria to diagnose delirium in elderly general medical patients. *Journal of Gerontology*, 45(3), M113-19. <http://dx.doi.org/10.1093/geronj/45.3.m113>
- Meagher, D. J. (2001). Delirium: Optimising management. *British Medical Journal*, 322(7279), 144-149. <http://dx.doi.org/10.1136/bmj.322.7279.144>
- Meagher, D. J., & Trzepacz, P. T. (2000). Motoric subtypes of delirium. *Seminars in Clinical Neuropsychiatry*, 5(2), 75-85. <http://dx.doi.org/10.153/SCNP00500075>
- Meagher, D. J., O'Hanlon, D., O'Mahony, E., Casey, P. R., & Trzepacz, P. T. (2000). Relationship between symptoms and motoric subtype of delirium. *The Journal of Neuropsychiatry & Clinical Neurosciences*, 12(1), 51-56. <http://dx.doi.org/10.1176/jnp.12.1.51>
- Milisen, K., Foreman, M. D., Godderis, J., Abraham, I. L., & Broos, P. L. (1998). Delirium in the hospitalized elderly: nursing assessment and management. *Nursing Clinics of North America*, 33(3), 417-439.
- Neziraj, M., Sarac, N., & Samuelson, K. (2011). The intensive care delirium screening checklist: translation and reliability testing in a Swedish ICU. *Acta Anaesthesiologica Scandinavica*, 55(7), 819-826. <http://dx.doi.org/10.1111/j.1399-6576.2011.02459.x>
- Nidsa, D., Anita, N., Taggart, H., & Paula, T. (2015). Delirium: Why Are Nurses Confused? *Nursing*, 24(1), 15-22.
- Peter, E., Bea, R., Jose, H., & Johannes, H. (2009). Occurrence of delirium is severely underestimated in the ICU during daily care. *Intensive Care Medicine*, 35(7), 1276-1280. <http://dx.doi.org/10.1007/s00134-009-1466-8>
- Peterson, J. F., Pun, B. T., Dittus, R. S., Thomason, J. W., Jackson, J. C., Shintani, A. K., & Ely, E. W. (2006). Delirium and its motoric subtypes: a study of 614 critically ill patients. *Journal of American Geriatric Society*, 54(3), 479-484. <http://dx.doi.org/10.1111/j.1532-5415.2005.00621.x>
- Pun, B. T. (2007). Assessment and Treatment of Delirium in the ICU. *Critical Care Nurse SUPPLEMENT*, 10-16.
- Roberts, B. (2004). Screening for delirium in an adult intensive care unit. *Intensive and Critical Care Nursing*, 20(4), 206-213. <http://dx.doi.org/10.1016/j.iccn.2004.04.003>

- Salluh, J. I., Soares, M., Teles, J. M., Ceraso, D., Raimondi, N., Nava, V. S., ... Rocha, M. G. (2010). Delirium epidemiology in critical care (DECCA): an international study. *Critical Care*, 14(6), R210. <http://dx.doi.org/10.1186/cc9333>
- Sanders, A. B. (2002). Missed delirium in older emergency department patients: A quality-of-care problem. *Annals of Emergency Medicine*, 39(3), 338-341. <http://dx.doi.org/10.1067/mem.2002.122273>
- Shehabi, Y., Riker, R. R., Bokesch, P. M., Wisemandle, W., Shintani, A., & Ely, E. W. (2010). Delirium duration and mortality in lightly sedated, mechanically ventilated intensive care patients. *Critical Care Medicine*, 38(12), 2311-2318. <http://dx.doi.org/10.1097/CCM.0b013e3181f85759>
- Steis, M. R., & Fick, D. M. (2008). Are nurses recognizing delirium? A systematic review. *Journal of Gerontological Nursing*, 34(9), 40-48. <http://dx.doi.org/10.3928/00989134-20080901-12>
- Svenningsen, H., & Tonnesen, E. (2011). Delirium incidents in three Danish intensive care units. *Nursing in Critical Care*, 16(4), 186-192. <http://dx.doi.org/10.1111/j.1478-5153.2011.00421.x>
- Svenningsen, H., Egerod, I., Videbech, P., Christensen, D., Frydenberg, M., & Tonnesen, E. K. (2013). Fluctuations in sedation levels may contribute to delirium in ICU patients. *Acta Anaesthesiologica Scandinavica*, 57(3), 288-293. <http://dx.doi.org/10.1111/aas.12048>
- Varghese, N.C., Macaden, L., Premkumar, B., Mathews, P., & Kumar S. (2014). Delirium in older people in hospital: An education programme. *British Journal of Nursing*, 23(13), 704-709. <http://dx.doi.org/10.12968/bjon.2014.23.13.704>
- Wells, L. G. (2012). Why don't intensive care nurses perform routine delirium assessment? A discussion of the literature. *Australian Critical Care*, 25(3), 157-161. <http://dx.doi.org/10.1016/j.aucc.2012.03.002>
- Yanamadala, M., Wieland, D., & Heflin, M. T. (2013). Educational interventions to improve recognition of delirium: A systematic review. *Journal of the American Geriatrics Society*, 61(11), 1983-1993. <http://dx.doi.org/10.1111/jgs.12522>

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