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# Impact of Interactive Education on Health Care Practitioners and Older Adults at Risk of Delirium: A Literature Review

**Abstract**

The current integrative literature review explored the impact of interactive delirium care education in facilitating knowledge transfer to health care practitioners and improving health outcomes for older adults. Academic databases, including MEDLINE, CINAHL, and Web of Science, were searched using the terms delirium and simulation or interactive education. Selected articles were analyzed using Critical Appraisals Skills Programme tools. Twenty studies were reviewed and three themes generated to explain the current understanding of the impact of interactive delirium care education on outcomes for: (a) individuals with delirium; (b) organizational health care; and (c) health care practitioners. The current review demonstrated that interactive education is a promising contemporary approach for raising awareness about best practice delirium care by health care practitioners. Due to gaps in the literature, future educational research in the area of delirium care education needs to adopt a more consistent method of reporting findings to ensure successful transferability across care settings.

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# TITLE

Evaluating the Impact of Interactive Education for Healthcare Practitioners and Older People at Risk of Delirium: A Literature Review

## ABSTRACT

This integrative literature review explored the impact of interactive delirium care education in facilitating knowledge transfer to healthcare practitioners and improving health outcomes for older people. Academic databases including MEDLINE, CINAHL and Web of Science were searched using the terms 'delirium' and 'simulation' or 'interactive education'. All the selected articles were analysed using the Critical Appraisal Skills Programme (CASP) tools. Twenty studies were reviewed and three themes generated to explain current understanding about the impact of interactive delirium care education on: i) health outcomes for individuals with a delirium; ii) organisational healthcare outcomes; and iii) outcomes for practitioners. This review demonstrated that interactive education is a promising contemporary approach for raising awareness about best practice delirium care by healthcare practitioners. Major gaps exist in the literature. Future educational research in this area needs to adopt a more consistent method of reporting findings to ensure successful transferability across care settings.

## INTRODUCTION

Delirium is not a new condition, yet it continues to be under-recognised and poorly managed (Brown et al., 2007; Moyle et al., 2008; Maclullich et al., 2013). Delirium occurs in up to 50% of older people admitted to hospital yet remains unrecognised in 32% to 66% of individuals, possibly due to uncertainty around the persons baseline cognition and differentiating with dementia (Cole et al., 2009; Australian Institue of Health and Welfare (AIHW), 2013). An episode of delirium

can cause adverse outcomes, including new onset dementia, worsening of existing dementia, falls, increased morbidity, re-location into residential accommodation and death (Witlox et al., 2010; Maclullich et al., 2013).

Complex issues abound in delirium care requiring innovations to challenge traditional cultures and models of care. Educational interventions are crucial to informing healthcare and promoting practice change. Clinical grand rounds have been the traditional intervention for professional development in healthcare, yet as with other didactic methods there have been questions as to whether this is the best means of effecting practice change (Van Hoof et al., 2009). A Cochrane Review of the effects of education on professional practice and healthcare outcomes found that interactive formats were more effective than didactic and multifaceted interventions better than single interventions. The combination of didactic and interactive formats was found to be more effective than either alone (Forsetlund et al., 2009).

Different from conventional education approaches , interactive interventions – including role play, interactive discussion, scenarios, learning games, short lectures incorporating discussion, and clinical simulation – are used to enhance learning in the clinical environment (Curran, 2014). Simulation techniques are gaining popularity, with hospitals now providing purpose-built clinical laboratories for interactive, experiential learning. The versatility of clinical laboratories allows simulation to be applied to technical and non-technical domains across disciplines, aiding practice change (Gaba, 2004).

Historically, healthcare practitioners have had a poor understanding of delirium due to its low educational emphasis in under-graduate studies. This review of the literature was undertaken for a Masters of Philosophy study (Coyle 2015). By reviewing the literature on the implementation of interactive delirium care learning interventions, an understanding of their use within health care is developed and their potential value for the continuing education of healthcare practitioners.

# AIMS

This literature review aimed to:

- critically analyse selected literature on interactive delirium care learning interventions within health care; and

- explore the effectiveness of interactive delirium care education in improving practitioner competence and older persons health outcomes.

# REVIEW METHODS

A systematic approach was used to search for and obtain peer-reviewed publications, including discussion papers and empirical studies (Aveyard, 2014). Studies were selected using the search terms: delirium AND education OR training; delirium AND practice development OR clinical practice; delirium AND simulation OR simulated learning environments OR simulated methods OR simulated models; ger* OR aged care; OSCE AND delirium. Databases including MEDLINE, CINAHL, and Web of Science were searched. Studies were limited to those published in English between 2004 and 2015, with full text available. The target participants were all healthcare practitioners: allied healthcare practitioners (AHPs) (dieticians, occupational therapists, pharmacists, physiotherapists and speech pathologists), registered nurses (RNs), enrolled nurses (ENs) or licensed practical nurses (LPNs), nursing assistants (NAs) and medical officers (MOs). Studies which did not have interactive delirium education initiatives were excluded, as were those focusing on paediatric or alcohol-induced delirium. Educational interventions could be multi-modal, for example, include didactic and interactive delivery. Papers focused on undergraduates and papers lacking outcome measures were excluded.

# RESULTS

The search located 97 articles; 12 articles were rejected due to irrelevant titles. Publication abstracts were then reviewed and 24 articles selected for further review. Analysis of the 24 articles was repeated using the original Critical Appraisal Skills Programme (CASP) framework (Public Health Resource Unit (PHRU), 2006). Articles focusing on student impacts were excluded (n=4). Twenty articles met the inclusion criteria – from 2004 to 2015, describing the use of interactive education impacting on healthcare practitioners, including AHPs, RNs, LPNs, NAs and MOs, and older persons health outcomes. Studies which were multifactorial due to a practice development type of approach were included where an interactive education intervention with outcome measures was described. Seven countries were represented, USA (n=9), Australia (n=3) and the UK (n=3), followed by Canada (n=2), Sweden (n=1), Ireland (n=1) and Japan (n=1).

## Quality review

Selected articles were analysed and critically appraised using the CASP tools (PHRU, 2006). Initially this was carried out by the first author, then by the co-authors to achieve a uniform approach in assessing the value and relevance of research papers. There was a paucity of articles and so regardless of the quality all articles meeting the inclusion criteria were included in this review. This should be viewed as a limitation. The 20 articles were classified as randomised controlled trials (n=1), cross-sectional studies and surveys (n=12), case-controlled studies (n=3), action research (n=2) and mixed-method studies (n=2).

## Generation of themes

This review was organised in themes based on described content. This was initially achieved using coloured post-it notes to locate commonalities and differences across sources. A concept map was generated from the post-it notes to explain findings (O'Leary, 2009). In the studies reviewed, diverse interactive delirium care educational interventions had been implemented with the aim of improving delirium care. Interventions used included face-to-face sessions, lectures and workshops,

observation of practice, simulation activities, mentoring and role modelling through the creation of a link worker/clinical champion, and online education. The implementation approaches varied, including participatory action research (PAR), change management projects and randomised controlled trials. Likewise, the measures used to determine the impact and benefits of education varied, including: health outcomes for individuals with a delirium, organisational aspects including length of stay (LOS), incidence and prevalence of delirium, and outcomes for practitioners including learner knowledge, attitude, skill and satisfaction. These measures were used to organise the themes. The three main themes were: health outcomes, organisational healthcare outcomes and outcomes for practitioners. Some papers were represented in more than one theme (Figure 1).
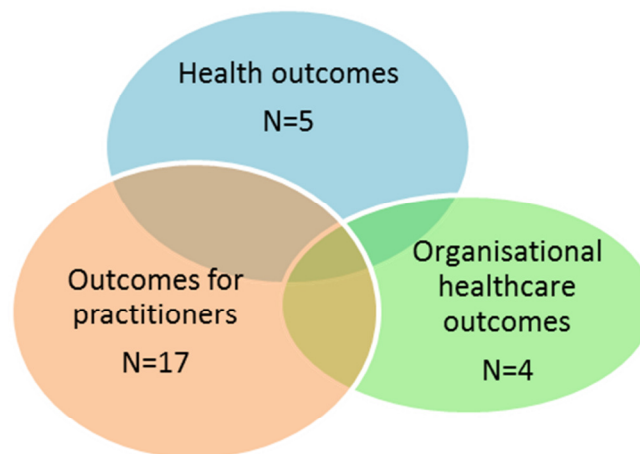


**Figure 1: 3 themes**

## Theme 1: Health outcomes for individuals with a delirium

Five studies were set in hospitals with the aim of improving care of people with delirium through a practice development intervention (Lundström et al., 2005; Naughton et al., 2005; Hunter and Cyr, 2007; Day et al., 2009; Marcantonio et al., 2010). Two sub-themes were identified: use of medication and restraints, and delirium persistence and mortality.

In two studies, practitioners' medication use was measured as an outcome of educational interventions (Naughton et al., 2005; Hunter and Cyr, 2007). A practice development intervention

effected change, as evidenced by less benzodiazepine use at nine months (p< 0.01) than at baseline (Naughton et al., 2005), a reduction in dimenhydrinate use from 21% pre-session to 11% post-session (p=0.011) after a one-hour interactive educational intervention on delirium (Hunter and Cyr, 2007) and an absence of physical and chemical restraint in the three months following 13 PAR sessions conducted over five months (Day et al., 2009).

Persistence of delirium and mortality were measured after multifactorial methods including interactive education and practice change in three studies (Lundström et al., 2005; Marcantonio et al., 2010; Naughton et al., 2005). No effect was found on delirium persistence based on two measurements (CAM, MMSE) at two weeks and one month at Delirium Abatement Program (DAP) sites (Marcantonio et al., 2010). However, a study of older people admitted to general internal medicine showed that a multidisciplinary intervention, including education, guidance and a changed caring organisation, reduced the duration of delirium on day 7 (p= .001). Mortality was significantly lower on the intervention ward, where two older people died compared to nine on the control ward (p=.03) (Lundström et al., 2005).

## **Theme 2: Organisational (healthcare outcomes)**

Four studies implemented a practice development intervention designed to reduce delirium in older adults in hospital and included healthcare practitioners. This was associated with improved LOS and prevalence of delirium (Lundström et al., 2005; Naughton et al., 2005; Tabet et al., 2005; Day et al., 2009). Two sub-themes were identified: LOS, and the incidence and prevalence of delirium.

Two studies provided evidence that a practice development intervention including interactive education is associated with a shorter LOS in a hospital setting (Lundström et al., 2005; Naughton et al., 2005). One study showed a reduced LOS in individuals who experienced a delirium on the intervention ward when compared to a control ward (9.4±8.2 versus 13.4±12.3 days, p<.001) (Lundström et al., 2005). Similarly, a practice development intervention that implemented guidelines

for the medical management of cognitive impairment and delirium among RNs and NAs was associated with a significant LOS reduction, from 11.5 to 8.2 days (Naughton et al., 2005).

In one study, a multimodal educational package for MOs and RNs, combined with the issuing of written guidelines reduced the delirium incidence within an acute medical ward (9.8% intervention ward versus 19.5% control ward, P < .05) (Tabet et al., 2005). Similarly, the prevalence of delirium was significantly reduced, from 40.9% at baseline to 22.7% at four months (P=.002) and 19.1% at nine months (P=.001), after a practice development intervention for RNs and NAs (Naughton et al., 2005). These results are consistent with those of another study (Day et al., 2009), where delirium incidence was reduced following 13 PAR sessions over five months.

## Theme 3: Outcomes for practitioners

In this theme, 17 studies were identified describing outcomes for health practitioners, the target discipline was not always specified. Four sub-themes emerged to explain intervention effectiveness: participant satisfaction, knowledge, skills and attitude (Figure 2).
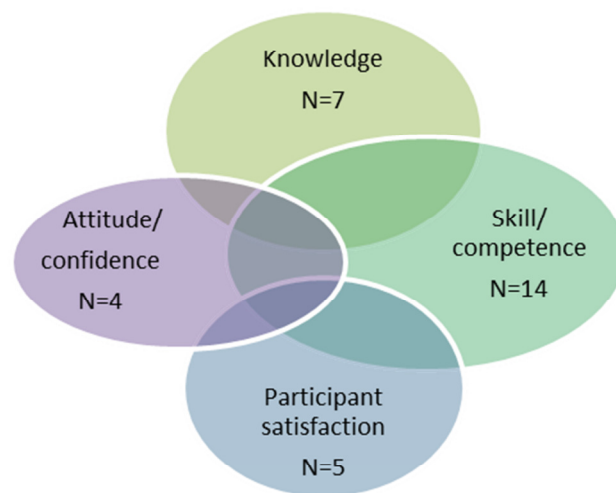


**Figure 2: Theme 3 sub-themes**

In relation to participant satisfaction, five studies demonstrated positive feedback on interactive delirium education, including improved knowledge and competence in delirium care

(Kowlowitz et al., 2009; Akechi et al., 2010; Featherstone et al., 2010; Foster et al., 2010; Page et al., 2010). Interventions consisted mainly of simulated learning activities, including online (n=1) and case simulation (n=2) and face-to-face workshops and feedback activities (n=2) for professional development of RNs and NAs. Ward audits, focus groups, interviews, a 'staff perception' survey and evaluation surveys were used to determine intervention effectiveness. Two studies found the education was rated as excellent or very good by more than 85% and 89% of participants respectively, and more than 80% in one study and 87% in the other rated simulation difficulty level as just right (Kowlowitz et al., 2009; Page et al., 2010). Nurses scored workshop usefulness as 'very satisfied' (Akechi et al., 2010) and an education package as relevant (99%) and time well spent (97%) (Featherstone et al., 2010). Similarly nurses gave positive responses to the education component of a quality improvement project, session objectives (95%), standard of presentation (100%) and quality of information (100%) were met or exceeded expectations (Foster et al., 2010).

Seven studies evaluated knowledge, adopting varied evaluation tools (Karani et al., 2004; Brajtman et al., 2008; McConnell et al., 2009; Foster et al., 2010; Duane et al., 2011; Ramaswamy et al., 2011; Siddiqi et al., 2011). The most effective study implemented an inter-professional education intervention (case scenarios, role playing) for a multidisciplinary team. This study showed that mean scores on the study generated Inter-professional Delirium Knowledge Test (IDKT) were significantly higher (p <0.05) on the post-test than pre-test (Brajtman et al., 2008). Concurrently, knowledge scores after the intervention increased by three points (p<.001) and increased by 3.8 points (p<.001) when participants attended two or more serial lectures and interactive sessions as opposed to one (1.3 points, p<.12 ) (Ramaswamy et al., 2011).

One study used a focus group, 'staff perception' survey and pre- and post-test covering three domains: job satisfaction, knowledge, and open comment (Foster et al 2010). This evaluated face-to-face and interactive discussion sessions among AHP, nurses and MOs. Knowledge improved with correct responses increasing 23% to 50%. Focus group discussion provided evidence that

knowledge was good but there was a need for further education in pharmacology and recognition. Participants felt that resources and support were limited (Foster et al., 2010).

Two studies with MOs revealed similar results to those with nurses (Duane et al., 2011; Karani et al., 2004). Surgical MOs' knowledge scores significantly improved from the pre- to post-intervention knowledge questionnaire for three different issues (polypharmacy, end-of life care, delirium) (p=.01). Correct responses to delirium questions increased from 53% to 56% after provision of reading materials and links to websites resources, but this did not correlate with simulation exams (Duane et al., 2011). A comparison of pre- and post-intervention self-reported knowledge showed significant improvements in all areas covered by the unfolding case in- four of the five question-and-answer stations of the OSCE (Karani et al., 2004).

Regarding competence, the effectiveness of interactive education interventions on improving delirium identification, recognition and detection was explored in 14 studies (Akechi et al., 2010; Bergmann et al., 2005; Karani et al., 2004; Naughton et al., 2005; Tabet et al., 2005; Day et al., 2009; McConnell et al., 2009; Featherstone et al., 2010; Foster et al., 2010; Li et al., 2010; Marcantonio et al., 2010; Siddiqi et al., 2011; Page et al., 2010; Ramaswamy et al., 2011).

The DAP improved delirium detection (41% DAP versus 12% usual care, p <.001) and (uncategorised) nurses completed delirium assessments 75% of the time (Marcantonino et al., 2010; Bergmann et al., 2005). MOs recognition of delirium significantly increased where the educational package had been delivered – eight out of 12 cases of delirium, compared to six out of 23 on the control ward (P < .01) – and a delirium diagnosis was more likely to be recorded (p=.156) (Tabet et al., 2005). A scripted unfolding case study using role play about delirium increased the ability of RNs, LPNs and NAs to identify strategies to improve cognitive function in acutely confused older people (96%, n=480) (Page et al., 2010). Siddiqi et al. (2011) reported an increase in recorded delirium episodes from 7% (8/113) to 11% (12/113) post-intervention in residential care settings. However, a study using a random audit for 34 older people at follow-up demonstrated that medical diagnosis of delirium remained similar (n=4; 44%) to the rate in the pre-intervention audit (Foster et al., 2010).

Self-assessed capacity to correctly administer assessment tools, including MMSE and CAM, increased by 36% (p<.001) in RNs and MOs (Ramaswamy et al., 2011) and 36% (p=.035) in MOs (Foster et al., 2010). The results were consistent with studies targeting MOs. More than 90% of MOs performed OSCE satisfactorily in three of the five procedure stations and four of the five question-and-answer stations. When self-reported knowledge results were compared with OSCE results inconsistencies became evident. For example, although 100% of participants reported the ability to administer and interpret a MMSE on the OSCE, only 78% administered the MMSE appropriately and 70% interpreted the results accurately (Karani et al., 2004).

Application of contextual learning was demonstrated (n=3). Two studies reported on the development of a bedside delirium alert protocol (Day et al., 2009; Li et al., 2010) and one (Naughton et al., 2005) adapted delirium screening tools to the emergency department. RNs reported that the face-to-face sessions and online modules enhanced their clinical skills (77%) (McConnell et al., 2009). In participating residential care facilities, the development of the delirium checklist and care pathways was facilitated using an interactive educational package (Featherstone et al., 2010).

With respect to attitude (confidence), four studies demonstrated that the interactive delirium education intervention was effective in improving practitioners' attitude and self-confidence towards delirium care. The results seem to be generalisable to hospital and residential care settings (Akechi et al., 2010; Meagher, 2010; Ramaswamy et al., 2011; Siddiqi et al., 2011).

A large-scale study using a study generated 15-item self-reporting measure to assess RN self-confidence in caring for people with delirium (96%) demonstrated a positive effect on 12 items, including improved confidence in delirium identification (p=.01) (Akechi et al., 2010). Also, there were significant increases in practitioner self-reported confidence in identifying delirium in older persons in hospital, which increased by 28% (p<.001) (Ramaswamy et al., 2011). In care homes RNs and NAs self-reported an increased confidence in delivering delirium care (34% to 68%; p=.000 [95%

CI -45.0, -20]), demonstrated by survey and supported by qualitative data describing empowerment of participants in the working groups (Siddiqi et al., 2011).

Using a television game show format for an educational workshop one study explored attitudes towards delirium pharmacotherapy. Evidence of change included the reduction of participant concerns regarding extrapyramidal effects and a more positive attitude towards pharmacological interventions, most notably in regard to hypoactive presentations (61%) and prophylactically in high-risk older people (56%) (Meagher, 2010).

# **DISCUSSION**

This review focused on developing an understanding about the effects of interactive education on delirium care by exploring how health, healthcare outcomes and practitioners changed after education was implemented. Consistent with all areas of delirium care more research is needed. Given the impact of delirium there is necessity to develop understandings from available evidence, while recognising limitations (Harwood and Teal 2017). Overall the findings infer positive benefits to health practitioner confidence and potential benefits in healthcare outcomes. The findings evidenced interactive delirium education of nurses and MOs decreased the use of anticholinergic agents and benzodiazepines and reduced the duration of delirium and mortality in older people with delirium after interventions (Hunter and Cyr, 2007; Lundström et al., 2005; Marcantonio et al., 2010; Naughton et al., 2005).

A multicomponent intervention shortened the LOS in two studies (Lundström et al., 2005; Naughton et al., 2005). Delirium is a complex condition and practice development type approaches provide opportunity to more broadly attend to the wide range of impacts on delirium care. Interactive educational interventions are suited to such approaches and can influence crucial domains in healthcare, such as cultural barriers shaped by practitioner attitudes and role delineations (Brown et al., 2007; Clarke and Wilson 2008).

A defining characteristic of delirium is the fluctuating nature of its course, complicating recognition (Maclullich et al., 2013). Unrecognised delirium rates continue to be as high as 60%, yet it is widely understood that delirium occurs in up to 56% of hospitalised older people (Marcantonio, 2017; Oh et al., 2017). Practitioners' recognition rate of confirmed delirium cases was significantly higher on the intervention site when compared with the control in our reviewed studies (Marcantonio et al., 2010; Tabet et al., 2005). Evidence suggests targeted interventions which include interactive education aimed at increasing knowledge and awareness helps improve delirium recognition.

Our review findings suggested that interactive delirium education positively affects knowledge, skills and attitudes of registered nurses and MOs, specifically when case scenarios, interactive discussion and role playing, or a combination of activities, are implemented. In addition, two studies reported a relatively high level of satisfaction with web-based clinical simulations among nurses (Kowlowitz et al., 2009; McConnell et al., 2009). Using interactive means to evaluate learning provides an authentic measure to understand how knowledge is translated to practice. Interestingly a reported increase in knowledge did not correlate with OSCE performance in two studies (Duane et al., 2011; Karani et al., 2004).

## Implications

Delirium is a complex condition demanding consideration of a wide range of influences likely to be best managed through practice development type of approaches which include education (Coyle et al., 2017; Marcantonio, 2017; Oh et al., 2017; Siddiqi et al., 2016). Education strategies need to involve managers to ensure their engagement and support, and to be continually repeated to enable full participation (Akechi et al., 2010; Featherstone et al., 2010). Interactive interventions such as simulation promote reflection and active learning in a non-threatening environment to develop essential clinical skills (Gaberson and Oermann, 1999).

## Limitations

The reviewed studies fail to elaborate on the factors that determine the effectiveness of education; therefore, explicability is impossible. It is not easy to determine the specific effects of educational interventions. In studies from this review, educational interventions were delivered as part of larger projects where other activities were simultaneously implemented to improve delirium care. An evaluation of multifaceted interventions is challenging because of the contextual complexities of documenting and replicating activities (Campbell et al., 2007). It can be argued that using a practitioner self-reported surveys on knowledge, attitude and delirium recognition are not appropriate measures. We acknowledge that practice change and the health outcomes for older people are important endpoints. Therefore, future research could consider evaluations of clinical practice and health outcomes as more substantial outcome measures in nursing education.

## CONCLUSION

This systematic literature review was conducted to examine the effectiveness of interactive delirium care education. The interactive education model, which is practice-based and mimics a clinical situation focusing on delirium in older adults, was rated highly by all levels of healthcare practitioners. Our review findings suggest that interactive education is feasible and has the potential to change the attitudes of healthcare practitioners, knowledge and practice relevant to delirium care. Fourteen of the review studies were conducted in hospital settings (n=14) and only two in residential care settings. However, older people in residential care homes are vulnerable to many risk factors for delirium. Studies estimate that rates of delirium in residential settings are between 7% and 60% (Siddiqi et al., 2011). Therefore, implementation of interactive delirium education has the potential to deliver real-life benefits in outcomes for older people living in residential care homes and reduce costs associated with delirium in tertiary healthcare services.

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# Appendix A: Summary of literature review findings

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Akechi et al. (2010) *Japan* | | | | | |
| To determine and report on the effectiveness of a novel delirium education intervention in improving self-confidence in delirium care. | Case controlled study: control group/intervention group before and after the program.<br><br>Two delirium workshops: to develop knowledge base for delirium link nurses (n=32); 8 x 1hour Q&A sessions; 2nd workshop included sharing of clinical experience. Link nurses educated others using workshop resources according to ward need. | General hospital. Participation by 20 of 23 wards. 95.6% nurses participated (n=390). 88% (n=359) completed a self-confidence survey, pre- and post-program. Control group (n=21) participated. | Theme 3: Outcomes for practitioners. Nurse unit manager support fundamental. May be a cost-effective and feasible education method in practice. Longitudinal study needed to assess any lasting impact. | Developed local tool to measure self-confidence in delirium nursing care. Significant effect shown in 12 of the 15 categories following education (p=0.001). Evidence of innovative nursing interventions. Link nurses completed a workshop usefulness survey, 10pt Likert scale. | Study participants were uncategorised nurses, but with different levels of education:<br>• vocational,<br>• college and<br>• university<br><br>The study engaged with the Staff Psychiatrist for training discussions and the NUMs for ward support. Use of case studies in second workshop and interactive discussions. Use of adult learning principles. A significant effect was observed for 12 of 15 items. The program can improve nurses' self-confidence in caring for older people with delirium. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Bergmann et al. (2005) *USA* | | | | | |
| Description of a multi-factorial Dementia Abatement Program (DAP). | Evaluated the program by RNs/NAs feedback. A four-module DAP: <br>• standardised screen of new admissions 65+yrs <br>• assess and treat causes <br>• prevent and manage complications <br>• restore cognition and function. <br><br>Delirium education facility wide. Medical directors included. The relationship between delirium and adaptive care strategies was emphasised. Responsive to staff and advisory panel feedback. | Eight post-acute hospital care facilities. (Not long term accommodation units). RNs/ NAs. | Theme 3: Outcomes for practitioners. Nurses uncomfortable with 'diagnosing' delirium. Detection of delirium superimposed on dementia challenging. Need for ongoing education and reinforcement. | No values of significance reported. DAP feedback from healthcare practitioners: Documentation: nurses uncomfortable with 'diagnosing' delirium. The assessment tool was thus retitled delirium symptom assessment. Enhancing mental status assessment: nurses' knowledge of and abilities to assess mental status were limited. Clinical presentation challenges: lack of reassessment of mental status for older people readmitted to the PAC unit. Delirium resource nurse: it was suggested that each advisory panel appoint a 'delirium resource nurse' to become an in-house expert for the program. | See also, Marcantonio et al. (2010) Study engaged with al levels of nurse including LPNs, NAs and nurse managers. Education methods included case discussion, demonstration of program, liaison activities, education sessions and feedback. Handouts included a summary of key program steps, worksheets, care planning tools, and the DAP brochure for families. Formal evaluation of the program is ongoing. |
| Brajtman et al. (2008) *Canada (short report)* | | | | | |
| To develop inter-professional delirium education to enhance team cohesiveness and effectiveness in managing delirium. | Innovative educational intervention. Interactive, case-based. Tool developed to evaluate knowledge pre- and post-intervention. Participants completed an interprofessional delirium knowledge test and an interprofessional team performance scale before and after the intervention. Concepts re teamwork, communication and conflict woven into activities. | Teaching Hospital. Palliative care unit, 10 AHPs in non-acute care teaching hospital in Canada. | Theme 3: Outcomes for practitioners. Inter-professional. Set within a palliative care team but principles possibly transferable. | No values of significance reported. Mean scores on knowledge were higher on the post- to pre-test. The mean scores for the leadership, communication, cohesion, coordination and conflict domains of team performance increased, no change in the mean score for team effectiveness. Findings suggest increased appreciation for emotional support in a team and increase in coping strategies. | Study engaged with physician, med student, nurse, dietician, pharmacist, chaplain and volunteer. 3 x 1hr sessions with case study, interactive discussion and activities (e.g. role play). Case scenarios. Facilitated discussions. The innovative inter-professional education provides an opportunity for learners to share and enhance professional knowledge while developing a focused collaborative approach to person-centered care. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Day, Jenny et al. (2009) *Australia* | | | | | |
| What are the constraints to best practice in acute care? (2008) The process of practice redesign in delirium care for hospitalised older people: a participatory action research study. To explore ways health practitioners might redesign their practice to include prevention, early detection and management of delirium in older people based on the best current practice. | Participatory Action Research (PAR) conducted a six-month acute care pilot study. Recorded weekly meetings x 13. Use of '*Claims, Concerns and Issues'*. 15-day older person profile audit. Self-assigned task of the research team to be familiar with the delirium literature and guidelines to contribute to the PAR process and provide the best possible evidence for group self-education and decision-making. Reflective practice. | Tertiary hospital. Medical ward. 7 nurses, 1 physiotherapist. 3 researchers. | Themes 1, 2 & 3: Health outcomes, Organisational outcomes, Outcomes for practitioners. Collaborative. Team building. Champions self-selected from PAR group. | No values of significance reported. Constraints to best practice were identified: delayed transfer of older people from the Emergency Department; routine ward activities were not conducive to provision of rest and sleep; assisting with the older person's orientation was not possible by relatives due to visiting restrictions. Underreporting of delirium and attributing confusion to dementia were viewed as an education deficit across disciplines. Physical and chemical restraints not used for 3 months following study completion. Nurse manager reported strategies had prevented episodes of acute hyperactive delirium. Older people continued to be admitted with delirium diagnosis, however, fewer incidences of delirium developing on the ward and less disruption to others, especially at night. | Study engaged with all staff across all shifts and management. PAR team comprised of 7 (uncategorised) nurses and one physiotherapist. Learning built into PAR meetings. Two significant actions were undertaken by PAR group: (i) development of a draft delirium alert prevention protocol and (ii) a separate section of the ward became a dedicated space for the care of older people with delirium. See also Li et al. (2010). Promotes diffusion, passive spread of innovative ideas and practices. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Duane et al. (2011) *USA* | | | | | |
| Evaluated a program designed to test and enhance aged care knowledge of surgical MOs. | 2-year prospective interventional trial. Resident MO's underwent pretesting in three areas: polypharmacy, delirium, and end of life. Test described as a validated tool. Education materials: 3 suggested readings, 4 websites to review in own time. Knowledge test repeated in one month. Simulation exam with an older person and carer. Graded by older person and MOs. | Acute care – Hospital, Level 1 Trauma Centre. 49 RMO's (51% interns, 55% general surgery residents). 70% had no aged care education in residency or medical school. | Theme 3: Outcomes for practitioners. Interns did as well (poorly) as more senior MOs, suggesting no improvement in knowledge base with years of education. . | Test scores showed significant improvement in delirium knowledge: pre test score 53.1% (p=0.0074), post test score 56.46% correct (p=0.0014). The pretest and posttest scores did not correlate with either the observer (R = -0.16, P = 0.27 pre, R = —0.08, P = 0.59 post) or subscores (R = -0.27, P = 0.11 pre, R = - 0.13, P = 0.45 post), although the observer and subscore correlated with each other (R = 0.35, P = 0.036). Improved test scores did not correlate with better care of the older person by simulation. | Study engaged with surgical residents, physicians and simulated patients. Simulation examination, combined with education website, suggested reading. Researchers following up with didactic sessions with aged care and clinical grand round. Noted orthopaedic MOs who had aged care rotation scored better. |
| Featherstone et al. (2010) *UK* | | | | | |
| This paper provides context for the 'Stop Delirium' study, discussing delirium and the enhanced educational package developed for residential care home healthcare practitioners to prevent delirium. | Provision of an enhanced educational package. Uses a variety of interactive teaching methods over a 10-month period. Identifies individuals to champion the change. Encourages ownership. Measurement: understanding and knowledge interview and questionnaires. | 6 residential care homes. 9 units RNs and NAs. | Theme 3 Outcomes for practitioners. Working groups put theory into practice, identifying barriers to care in their units and implementing strategies for local context. Identifies 'change champions'. | No values of significance reported. 91% of healthcare practitioners received education. 99.7% provided feedback stating education was relevant and 97% said it was time well spent. Interactive teaching methods engaged the healthcare practitioners. Collaboration occurred as the healthcare practitioners developed tools they then shared with others. | Study participants were trained nurses (uncategorised) and nurse assistants; and engaged with management for support and the community for interventions (GPs, Community nurses, family and friends). Education package including case studies, working group and empowerment to take action, recognising expertise resulted in development of interventions effective to local need. See also Siddiqi et al. (2011). |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Foster et al. (2010) *Australia* | | | | | |
| Implementation of a best practice approach to assessment, management and prevention of delirium. | Mixed method research. Full time project officer and a local champion, the ward Clinical Nurse Specialist, was identified.<br><br>Nurses the predominant target of interventions.<br><br>The Delirium Education Program was designed to respond learners' needs. Identification of delirium care practice limitations using focus groups, AHPs perception surveys and ward audit tool recording. Education consisted of 2 face to face sessions which included: i) background; ii) pre‑test; iii) inter‑active discussion; and iv) post‑test | Tertiary hospital - two acute medical wards. (n=30) older people in baseline audit, (n=34) in follow-up audit. (n=40) AHPs participated in workshop 1 (n=41) AHPs participated in workshop 2 (n=100) AHPs surveys distributed with (n=55) returned. (n=15) all healthcare practitioners in baseline focus group. | Theme 3: Outcomes for practitioners. Designed a model of delirium care for older people, local context, with key stakeholders. Included:<br>I. screening tools<br>II. local pathway<br>III. delirium care<br>IV. prevention strategies.<br><br>Delirium education:<br>I. AHPs (discussion)<br>II. older people and carers (leaflet). | Audit of practice: MMSE use increased (n=13, 36%, p=0.035). AHPs evaluation of education program positive: session objectives (95%), presentation standard (100%), information quality (100%). Knowledge improved, 23.3% to 50% correct answers. Focus group: AHPs felt resources and support were poor. Participants reported a need for delirium education in pharmacology and early recognition. AHPs perception survey given to (n=119), 21.8% returned. 63% unaware of the study tools referred to. Of respondents who had used the tools, the majority (81%) responded they were effective/very effective. | Study engaged with 'all major clinical disciplines' including nurses (uncategorised), MOs, physiotherapists, speech pathologists, dieticians and occupational therapists. Participants felt that resources and support were limited. Education package and resources seen as useful and acceptable to participants. However, substantial numbers of AHPs remained unaware of the project materials. Although an increase in knowledge, substantial room for improvement remained. |
| Hunter and Cyr (2007) *Canada* | | | | | |
| Did the administration of (target) medications change in an orthopaedic unit following education sessions on delirium? | Retrospective review of medication records for older people 65+yrs admitted 6 months pre- (n=158) and post- (n=199) intervention for hip surgery. One-hour didactic lecture with interactive Q and A throughout for orthopaedic nurses. Focus: use of PRN medications. | Hospital - Orthopaedic surgery unit. Records of 357 older people meeting the required criteria were included, with 158 in the pre-education group (Group 1) and 199 in the post-education group (Group 2) in a large hospital. | Theme 1: Health outcomes. Education of orthopaedic nurses on delirium management significantly decreased the use of a specific anticholinergic agent in older people following hip surgery during the 6 months after the education intervention. | Reduction in anti-cholinergic dimenhydrinate 20.9% pre-session to 11.1% post-session *(p=0.011)* and acetaminophen/codeine compounds *(non-significant)* in keeping with education. An increase in benzodiazapine and antipsychotic use was measurable, however not a large enough group for meaningful analysis, and demonstrated complexity in clinical decision-making processes. | Study engaged with uncategorised nurses able to administer medication.. Single education session with Q&A could support practice change. Multifaceted approaches more likely to translate knowledge to practice in delirium care and prevention. |

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| Karani et al. (2004) *USA* | | | | | |
| To identify relevant learning objectives for medical practitioners and develop a method to teach within adult learning principles, and within existing program. | Novel instructional method. Pre- and post-intervention Knowledge Questionnaire (5 point Likert). Case-based active learning for medical 'house staff'. The unfolding case is taught during attending rounds. Led by geriatrician, 3x1 hour sessions over the course of the 4-week rotation. Clinical competence measured by OSCE* using real older people in 4th week. Information is reliable and consistent through use of a manual given to teachers 4 weeks prior for reviewing the content. | Hospital Aged Care Unit. Medical practitioners on 4-week rotation to unit. Pilot over 7 months with (n=40) medical officers. Only 17% of participants had received case-based aged care education before the curricular intervention. 48% of respondents participated in an aged care rotation before this study, and 73% rotated on an inpatient aged care unit. | Theme 3: Outcomes for practitioners. Useful whatever the learner's future specialty in medicine. | No values of significance reported. A comparison of pre- and post-intervention self-reported. Knowledge showed significant improvements in all areas covered by the unfolding case. More than 90% of learners performed satisfactorily in three of the five procedure stations and four of the five question-and-answer stations of the OSCE. Although 100% of learners reported the ability to administer and interpret a MMSE, on the OSCE, only 78% administered the MMSE appropriately, and 70% interpreted the results accurately. | Study engaged with MOs: senior Geriatrician, hospital MOs and older people in hospital. Unfolding case presentation evolves over time in a manner that is unpredictable to the learner at the outset. OSCE Composed of five procedure and five question-and-answer stations, each 10 minutes in duration, the chosen assessments. Learners are given immediate feedback on performance. Satisfaction surveys indicated MOs enjoyed the OSCE and were motivated to learn by the interactive nature of this didactic intervention. |
| Kowlowitz et al. (2009) *USA* | | | | | |
| To describe the process of developing and disseminating a web-based library of aged care clinical simulations used in continuing education workshops. | Web-based unfolding case clinical simulations. Case development required a team including: aged care and education expertise, and Web design. 26 peer-reviewed simulations featuring delirium. Suitable for 3 levels of nurse (USA); RN, LPN and NA. Minimum of 2 RNs competencies per topic. | Educational institution John A Hartford Foundation Institute for RNs. Library used in over 45 continuing education workshops, 700+ RNs participated. Online demographic questionnaire for registrants (n=919) and evaluation survey (5-point Likert) for users (n=463). | Theme 3 Outcomes for practitioners. Overall few adequately prepared aged care educators, growing need for aged care competencies more broadly within healthcare due to ageing populations. | No values of significance reported. Potential to enhance care through improved nurse education. 80% of survey respondents identified difficulty level as *'just right'*. PD contact hours obtained to meet professional responsibilities. | Study engaged with nurse participants: RNs, LPNs and NAs; and in preparation of the intervention with clinical and administrative nurses who worked with older people. Simulation education using world wide web. Accessed by online learners, and teachers who integrated simulations in courses and workshops. Simulation costly and time-intensive resource but internet library allows wider use, increases accessibility and flexibility. |

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| Li et al. (2010) *Australia* | | | | | |
| The practitioner experience of participating in an action research study to improve delirium care in older people. | Participatory Action Research (PAR) conducted a six-month acute care pilot study. Weekly meetings generated collaborative discussion around older person profiles to develop actions (pseudonyms used). | Tertiary hospital, medical ward. 8 clinical nursing and AHPs and 3 academics from local university. | Theme 3: Outcomes for practitioners. Collaborative. Demystified research. | No values of significance reported. Developed Delirium Alert Protocol (DAP) and inserted DAP into all older people's charts. Increased awareness of delirium risk factors and intervention. | Study engaged with (uncategorised) nurses and one AHP (uncategorised). PAR. See also Day, Jenny et al. (2008/2009). Learned more about delirium in older people and continue to use the DAP to guide practice. Practitioners enjoyed the PAR experience citing reflection and learning which exceeded expectations. |
| Lundström et al. (2005) *Sweden* | | | | | |
| To investigate whether an educational program and a reorganisation of nursing and medical care improved outcomes for older people with delirium. | Prospective case-controlled study. All healthcare practitioners completed delirium education on: assessment, prevention, and treatment; and, caregiver-older person interaction. Education explained as describing and discussing concepts. Regular nursing guidance with 1:1 education comprised of observation of practice followed by feedback and discussion. Measured cognitive status using MMSE* and OBS Scale** at days 1, 3, 7 and post-admission. | Hospital, 2 medical wards One control ward, one intervention. Random consecutive older person allocation to wards. People 70+yrs (n=400). AHPs sample details not reported here or in another study. | Themes 1 & 2: Health outcomes, Organisational. A multi-component intervention can improve outcomes for older people with delirium. Nursing care crucial to success. | Mortality (2 died in intervention ward and 9 in control group) (p=.03). Shorter length of hospital stay on the intervention ward than on the control ward (9.4±8.2 vs13.4±12.3 days, p<.001). Shorter duration of delirium on Day 7 on the intervention word (n=19/63, 30.2% vs 37/62, 59.7%, p=.001). | Study engaged with 'all nursing and medical staff'', level and seniority uncategorized, and older people in hospital. A multidisciplinary intervention program including education, guidance, and a changed caring organisation reduces the duration of delirium, shortens the length of the hospital stay, and reduces the mortality rate during hospitalisation for delirious older people. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Marcantonio et al. (2010) *USA* | | | | | |
| To determine whether a delirium abatement program (DAP) can shorten duration of delirium. | Cluster randomised controlled trial. DAP launched with a mandatory education program for all three nursing shifts. A 50-minute comprehensive program was administered to all licensed nurses, along with a post- test and nursing Continuing Education units; a 30-minute program was given to certified nursing assistants, with certificates of attendance. In addition DAP facilities were provided with admission assessment for delirium, assessment for reversible causes of delirium, delirium nursing plan of care, and a family caregiver pamphlet, ''Guide to Understanding Delirium.'' Environmental modifications were also provided.<br><br>Delirium defined by the CAM*, reassessed at 2 weeks and 1mth. | Post-acute hospital care facilities. (Not long-term accommodation units). 8 of 12 facilities were chosen as meeting criteria then randomised to (n=4) DAP and (n=4) Usual Care. 7,794 admissions, 3,034 Usual Care and 3,318 DAP eligible for screening. In the trial: (n=457), 175 usual care sites and 282 in the DAP. 79% of nurses attended DAP education (n=426). | Themes 1 & 3: Health outcomes, Practice/Outcomes for practitioners.<br><br>Lack of adherence to intervention steps by DAP staff blamed for failure to shorten duration of delirium, researchers citing other studies and need for closer supervision. | Eighty-four licensed nursing and 58 certified nursing assistant education programs were performed at the DAP sites. Nurses detected delirium at DAP sites in 41% of participants vs. 12% in usual care sites (*p*<.001) and delirium assessments were completed 75% of the time at DAP sites. However, for other key management steps, such as notification of MO/NP documentation was lower at DAP than at usual care sites (13% vs. 21% respectively). DAP intervention had no effect on delirium persistence based on two measurements at 2 weeks (DAP 68% vs. UC 66%) and 1 month (DAP 60% vs. UC 51%), adjusted p values ≥ 0.20. There were no differences in death rates at DAP and usual care facilities at 2 weeks (2.1% vs. 2.3%, respectively, p=.89) or 1 month (8.5% vs. 9.1%, p=.78). | Study engaged with nurse participants, stated LPN and NAs, and for implementation of the study and interventions with physicians, nurse practitioners and older people in post-acute care. DAP. See also, Bergmann et al. (2005). Detection of delirium improved at the DAP sites; however, the DAP had no impact on the persistence of delirium. This effectiveness trial demonstrated that a nurse-led DAP intervention was not effective in typical PAC facilities. The DAP facilities received small incentive payments (up to $700 every 6 months) based on their performance. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| McConnell et al. (2009) *USA* | | | | | |
| The Geriatric Nursing Innovations through Education (GNIE) Institute is a 39-contact hour, hybrid distance learning continuing education model designed to build two core abilities among RNs: the ability to identify and apply the best scientific evidence to the care of older adults, and the ability to recognise and manage common clinical problems, using evidence-based nursing practices both for direct care and for nursing leadership of paraprofessional nursing staff. Describes design, questionnaire and impact. | Hybrid 6-9 month distance learning. Online modules complement the 3 face-to-face sessions. 1st face-to-face session, core concepts in evidence-based practice are introduced using common, realistic scenarios in which tradition-based clinical practice is associated with harm. Leadership and change management is introduced. 2nd face-to-face session: leadership and clinical content are elaborated on and reinforced through learner-centred interactive exercises. A comprehensive clinical case focused on delirium to expand participants' clinical knowledge and skills with a simulated older person. Unfolding case, 4 groups focus on pain, delirium, falls, incontinence, dehydration. Larger group follows with small group presentation and discussion to arrive at a clinical impression for a problem related to the syndrome. 3rd face to face: shared learning from clinical improvement projects. Faculty mentorship is provided to participants as they apply their new knowledge with a clinical practice improvement project in their work settings. | Educational institution 214 RNs who practise or teach in acute care, clinic, home care, and residential care homes have enrolled in the GNIE Institute. Of these, 128 have completed the Institute (5.5% men, 28.1% minorities, median age = 35 to 44). | Theme 3: Outcomes for practitioners, Sub-theme: knowledge and skill. Theoretical frameworks were taught and participants learnt varied teaching styles, consistent with adult learning theory, change management and leadership skills to enhance capacity for improved care in their work settings. Although GNIE Institute faculty provided guidance, consultation, and support, ultimately self-reflection leads participants to solve workplace problems. | Statistically significant improvements occurred on clinical knowledge for most modules (t tests, $p < 0.05$) and high self-efficacy for managing geriatric syndromes (mean = 4.6 of 5, *SD* = 0.5) by series end. Participant satisfaction with both the face-to-face and online instruction was high. Questionnaire data from 62 of the RNs who completed the program found the clinical practice projects to be very helpful in developing their clinical and management skills {n = 48, *77%).* Similarly, most (66%) found the projects very helpful in improving the quality of care in their organisation. No data collected to measure individual health outcomes for the older person receiving care. | Study engaged with RN participants. Completion of 2 to 7 online learning modules highlighting key concepts in assessment and management of each geriatric syndrome and the leadership skills needed to implement new care practice.. With the online modules the program incorporates, face to face, discussion groups, simulation and role play. Mentorship, reflective journals, shared activities and structured debriefing, and experiential learning enhance the participants own learning and capacity to teach others. The experiences of 128 RNs suggest that the GNIE Institute supports the implementation of a variety of best practices, including management of acute pain, dehydration, delirium, oral hygiene, urinary incontinence, and falls prevention. Participant feedback has shown low initial awareness of practice guidelines but high satisfaction with their use. |

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| Meagher (2010) *Ireland* | | | | | |
| Can educational interventions impact on attitude towards delirium pharmacotherapy? Attitudes towards delirium pharmacotherapy were investigated before and after an educational workshop using the format of a television game show. | Workshop aimed to challenge presumptions about delirium pharmacotherapy. Surveys pre- and post-workshop investigating attitudes to delirium, additional comments also analysed. A 2 hour interactive format. The 'quiz' was preceded by a brief presentation on the dilemmas of delirium pharmacotherapy. The 'quiz' consisted of 10 true/false statements for which the teams could volunteer to answer, followed by audience discussion and then brief PowerPoint presentation of research evidence. The session concluded with reflection and summarizing. Attendees were asked to complete an anonymously coded questionnaire at the beginning and conclusion of the workshop exploring practice and attitudes towards pharmacotherapy of delirium. | Educational setting – conference. Attendees included a heterogeneous mix of practitioners from a range of specialties and settings all with a common interest in improving delirium care. (n=66) surveys provided. 'University Challenge' quiz style b/w 2 teams of 3 people (sceptics v neuroleptics). Audience adjudicates. | Theme 3: Outcomes for practitioners. Sub-theme: Attitudes can be impacted by education interventions. | Sixty-six attendees responded to the questionnaire, which represented all participants at the three workshops. Of these, 65/66 indicated that they use psychotropic agents in the management of delirium (99%). In relation to potential adverse effects, 70% of respondents indicated one of four categories was a major deterrent to psychotropic drug use pre-workshop, reduced to 45% post-workshop. The specific adverse effect of greatest change was in relation to concerns regarding potential for extrapyramidal effects, reported as a major deterrent in 52% of respondents before the workshop and 21% after the workshop (p < 0.001). Post-workshop concerns regarding extrapyramidal effects were reduced with a more positive general attitude towards pharmacological interventions, especially in hypoactive presentations (61%) and prophylactically in high-risk patients (56%). | Study engaged with a heterogenous mix of healthcare workers attending conferences focussed on: <br>• the care of older people; and <br>• delirium. <br><br>'Quiz' statements were deliberately provocative and were not unequivocally true or false, ensuring that the workshop was highly active. The final decision on correct answers was according to the consensus vote of the audience and differed for some questions over the three workshops. A light-hearted atmosphere was encouraged to amuse the audience while keeping discussions focused. Creative interactive learning - educational workshop using the format of a television game show was successful in engaging participants and associated with a positive change in attitudes towards pharmacotherapy of delirium. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| **Naughton et al. (2005)** *USA* | | | | | |
| Intervention aimed at improving outcomes for cognitively impaired older people by reducing delirium. To improve delirium recognition and management. | The study compared outcomes of care before and after a practice development intervention directed toward the processes of care for older people (75+ years) admitted to the medical service of Buffalo General Hospital. Measurements: delirium prevalence, admission to Acute Geriatric Unit (AGU), psychotropic medication use, and length of stay. Audit and feedback of nurse cognitive assessments and review of medical practitioner compliance to medication guidelines 2-3 times per week. | University affiliated hospital. MOs and nurses in the Emergency Department (ED) and Acute Geriatric Unit (AGU). (n=374) total older people assessed, (n=110) baseline cohort, 4 month cohort AGU (n=84) and (n=70) other. 9 month cohort (n=37) AGU and (n=73) other. Excluded older persons from residential care. Staff sample details not reported here or in another study. | Themes 1, 2 & 3: Health outcomes, Organisational, Practice, Outcomes for Practitioners. Innovation to local context. Reduction in LOS likely to be cost saving to the organisation. Guidelines developed: <br> I. to cluster older adults with delirium or dementia <br> II. ED assessment and medication management guideline development <br> III. Empowerment of nurses to provide immediate feedback to prescribing MOs. | Length of stay: showed a saving of >3 days per case prevented, evidenced by shorter length of stay in the AGU for non-delirious older people at 4 and 9 month cohorts with baseline data. (i.e. 11.5 days vs 8.2 days). Delirium prevalence reduced from 40.9% to 22.7% at 4 months ($p<.002$), 19.1% at 9 months ($p<.001$). Reduced use of benzodiazepines ($p<.01$) and antihistamine ($p<.05$) at 9 months. Screening tools adapted to unit (ED) culture. | Study engaged with ED nurses and MOs; older people in hospital, NP and geriatrician for intervention. Didactic presentations standardised through DVD use. Education supported by interactive small group feedback twice weekly, post audit. A practice development program reduced the duration of delirium, length of hospital stay, and mortality in delirious older people. |
| **Page et al. (2010)** *USA* | | | | | |
| Describes the processes in developing and using a scripted unfolding case study about delirium for a continuing education workshop for nurses. | Innovative instructional strategy for nurses designed for small groups. Versions vary for level of nurse. Addressed competencies including: assessment, clinical reasoning, teamwork, evidence-based practice, as well as delirium knowledge. 5-point scale survey post-workshop. 35 workshops with the delirium case presented and data from surveys analysed. | Educational institution RN (N=230), LPN (N=112), NA (N=152). Flexible to setting and audience, facilitators need to identify most appropriate scenario to context. | Theme 3: Outcomes for practitioners. Gives outline for developing a simulation script. | Participants rated the delirium case very positively. More than 88.5% of participants rated each aspect of the case either excellent or very good and more than 86.5% rated the difficulty level just right. The participants strongly agreed or agreed (95.7%, n = 480) that they increased their ability to identify strategies to improve the cognitive function of acutely confused older people. | Study engaged with RN, LPN and NA. Scripted unfolding case study, low-fidelity case simulation focusing on delirium and older adults was rated highly by all levels of nurse who attended the continuing education workshops. The format allows interactive learning, and the use of dialogue and enactment can give participants an opportunity to practice effective or ineffective communication techniques. |

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| Ramaswamy et al. (2011) *USA* | | | | | |
| A comprehensive and sequential intervention (CSI) aiming to effect change in practitioner behavior by improving knowledge about delirium was tested. | 2-day program consisted of progressive 4-part didactic series, including evidence-based reviews of delirium recognition, prevention, and management, interspersed with interactive small group sessions and practical case conferences. Interdisciplinary education. Measured confidence and knowledge in delirium identification (n=71). Pre- and post-test surveys (n=50) matched by numeric coding. | 305-bed hospital, university affiliated. A total of 58 nurses, 18 MOs, 19 trainees, 24 AHPs and directors attended 2 or more education sessions. | Theme 3: Outcomes for practitioners. Use of multiple reinforcing modes might be more effective in behaviour change than traditional grand rounds. | An average of 71 people attended each didactic session. Mean pretest and posttest scores were 7.9 and 10.8 points, respectively (maximum: 17), showing a positive change in knowledge scores after the intervention (2.9 points, $p < .001$). Improvement in knowledge scores was higher in the cohort attending 2 or more lectures (3.8 points, $p < .001$) compared with those attending only 1 lecture (1.3 points, $p < .12$). Confidence in identifying older people with delirium increased by 28% ($p < .001$), and self-assessed capacity to correctly administer the Confusion Assessment Method increased by 36% ($p < .001$). Limitation: Behaviour change was not measured nor were clinical indicators to measure whether knowledge did change practice. There were no measures to extrapolate comparison with clinical grand rounds. | Study engaged with RNs, MOs, NA, pharmacists and support personnel. Interactive small groups promoted interdisciplinary dialogue and confidence. Practitioner s collected CNE points. A novel CSI increased practitioner knowledge about delirium identification and management and improved confidence and self-assessed capacity to identify delirium in the hospitalised elderly person. |

| Study aim/research question | Method (e.g. intervention) | Setting and sample | Themes | Outcomes (impact and specific details of study outcomes e.g. statistics and effect size) | What interactive educational methods are used in delirium education and how effective are they? |
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| Siddiqi et al. (2011) *UK* | | | | | |
| To test the feasibility of an intervention 'Stop Delirium' to prevent delirium in residential care homes for older people. | Mixed methods before and after study. Specialist delirium practitioner provided education and facilitated working groups. Data including pre- and post-intervention care home personnel interviews, post-intervention care home personnel focus group, delirium practitioner log, care home personnel confidence questionnaires, education feedback forms, primary care data, study documents. | Nine units from six residential care homes, with a total of 286 older people, were included in the study. Most care home personnel (164/216, 75.9%) did not have formal nursing training. Over the 10months there was a high staff turnover (32%), but there were also many staff who had been in the role for more than 5 years (55.9%). | Theme 3: Outcomes for practitioners. Data collection to reliably reflect practice needs ongoing consideration. Consider factoring hospital admission as measurable outcome in residential accommodation delirium intervention. The study was not powered to demonstrate effectiveness, hence not included in Theme 1 Health outcomes. | No values of significance reported. Interviews and survey showed increased awareness of delirium and examples of practice change. Evidence supporting positive changes in personnel attitudes and practice and increases in personnel confidence in delirium care after the intervention. Although qualitative data suggested it was too early to expect changes in older persons' health outcomes, preliminary evidence suggested potential improvements in a range of outcomes, including a reduction in the number of falls and prescribed medications. | Study engaged with 'care home staff', and uncategorised nurses. Interactive, flexible, relevant, multi-component education shows positive signs for potential improvements in delirium care. Training used staff expertise in knowing the older people they supported. Training should be repeated often due to high staff turnover and include managers to secure engagement. A systematic rolling programme rather than a stand-alone intervention is needed. Identified potential for 'delirium champions' to deliver training. See also Featherstone et al. (2010). |
| Tabet et al. (2005) *UK* | | | | | |
| Hypothesis: education package would decrease the point prevalence of delirium but paradoxically increase recognition rates and diagnosis recorded in clinical notes. | Prospective single blind case control study. Education: 1 hour formal presentation to MOs and RNs, group discussion, written management guidelines. Also follow-up sessions: one-to-one and group discussions to provide continuous staff support - emphasising learning and testing knowledge. Previous cases were included for learning. Tested knowledge. Measured incident cases of delirium and documentation audit. Both wards continued usual referral processes to Old Age Psych. | Teaching Hospital, 2 acute wards. (n=250) participants 70+ years from 2 wards. (n=122) from intervention ward and (n=128) from control ward. Allocation according to bed availability. Staff sample details not reported here or in another study. | Themes 2 & 3: Organisational, outcomes for Practitioners. Data supports the benefit of educational packages in improving outcomes for older people. | Both study hypotheses were supported by the data. The point prevalence of delirium was significantly reduced on the intervention compared to the control ward (9.8% versus 19.5%, P < 0.05) and clinical staff recognised significantly more delirium cases that had been detected by research staff on the ward where the educational package had been delivered (P < 0.01). | Study engaged with RNs and MOs. Formal presentation, group discussion, management guideline and follow-up sessions. Increasing delirium awareness among MOs and RNs is an effective strategy in prevention. Supportive, individually tailored feedback. Can be implemented within mandatory education and orientation day sessions. |

**Abbreviations**

Allied Healthcare Practitioner: AHP; Confusion Assessment Method: CAM; Licensed Practical Nurse: LPN; Mini Mental State Examination: MMSE; Medical Officer: MO; Nurse Practitioner: NP; Nurse Assistant: NA; Organic Brain Syndrome Scale: OBSS; Registered Nurse: RN.

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