Delirium has a substantial impact on health care. This complication is associated with a 15-day increase in hospital length of stay (LOS),¹ a financial impact of $4 billion to $16 billion annually,² and a 19% increase in 6-month mortality.³ Delirium is common across all patient settings; the prevalence, however, varies according to acuity of illness. Delirium develops in general medicine patients at rates ranging from 11% to 42%.⁴ The highest prevalence of delirium, as high as 87%, occurs in critically ill patients.⁵ Understanding the impact of delirium on hospitalized patients makes prevention and optimal treatment of this complication a priority. Two approaches are used to manage delirium: use of pharmacological agents and application of nonpharmacological therapies.

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Nonpharmacological Interventions to Prevent Delirium: An Evidence-Based Systematic Review

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Development of delirium in critical care patients is associated with increased length of stay, hospital costs, and mortality. Delirium occurs across all inpatient settings, although critically ill patients who require mechanical ventilation are at the highest risk. Overall, evidence to support the use of antipsychotics to either prevent or treat delirium is lacking, and these medications can have adverse effects. The pain, agitation, and delirium guidelines of the American College of Critical Care Medicine provide the strongest level of recommendation for the use of nonpharmacological approaches to prevent delirium, but questions remain about which non-pharmacological interventions are beneficial. (Critical Care Nurse. 2015;35[1]:39-51)

This article has been designated for CNE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

1. Describe the nursing literature on nonpharmacological interventions to prevent delirium
2. Discuss nonpharmacological interventions that have been shown to be effective in preventing delirium
3. Explain the tools developed for the measurement of delirium in intensive care unit patients

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The 2013 pain, agitation, and delirium guidelines of the American College of Critical Care Medicine provide recommendations for the use of pharmacological agents in the prevention and treatment of delirium. Because of a lack of compelling data, the guidelines do not provide a recommendation for a pharmacological protocol or for a combined nonpharmacological and pharmacological protocol for prevention of delirium. Furthermore, the guidelines give a -2C recommendation for pharmacological prevention with either haloperidol or atypical antipsychotics. The lack of evidence supporting the use of pharmacological agents creates a void in the effective management of delirium.

The guidelines give the highest grade within the delirium section (1B) to a nonpharmacological prevention strategy, meaning the recommendation is a strong one backed by a moderate level of evidence. Unfortunately, most of the literature is on nonpharmacological interventions used in either general medicine, geriatric, or perioperative patients. Although critically ill patients certainly differ from most of the populations of patients studied, one can reasonably assume that critically ill patients, who are at the highest risk for delirium, would also benefit from nonpharmacological interventions. Large randomized controlled trials with a multi-interventional approach that includes pharmacological and nonpharmacological approaches to prevent delirium are needed. Any appropriate attempt at such a study requires a strong understanding of nonpharmacological approaches. The purpose of this systematic review is to summarize the available literature on nonpharmacological management of delirium among all populations of patients. The ultimate goal is to identify which strategies are beneficial to facilitate the development of a nonpharmacological protocol that could be implemented for critically ill patients.

Methods

A literature search was completed by using MEDLINE and EMBASE. With PubMed, the following terms were used to search MEDLINE for material from 1946 to October 15, 2013: delirium AND (critically ill, intensive care, ICU, intensive care unit, OR critical illness), AND (treatment, prevention, prophylaxis, adjunctive therapy, OR adjunct therapy). Additional searches in MEDLINE were then performed with the terms (mobility, animation, exercise, rehabilitation, physical therapy, OR bicycle), (light, window, curtains, shades, OR blinds), (earplugs, ear, noise, OR hearing aid), (sleep, sleep hygiene, OR sleep deprivation), (eyeglasses, glasses, OR magnifying lens), orientation, and hydration, each combined with AND delirium, AND (critically ill, intensive care, ICU, intensive care unit, OR critical illness). EMBASE was searched by using the same strategy. The search was restricted to studies conducted in humans and reported in English. A second reviewer independently performed the same search for validation. The titles of all citations retrieved from the search were reviewed for relevance.

On the basis of the relevance of the title, articles were selected to be reviewed at the abstract level. Abstracts were considered for full-text review if delirium was measured as an outcome (incidence or severity), and the screening for delirium was completed by using a standardized screening tool. No further review of an abstract was done if the study covered was not original research, addressed exclusively pharmacological approaches, or used a combination of pharmacological and nonpharmacological approaches.

If, after review, the abstract was still deemed applicable, a full-text review was done in which the same inclusion

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and exclusion criteria were applied to the text of the article. No inclusion restrictions were placed on the study setting or population of patients (critically ill or not critically ill). Studies with mixed nonpharmacological interventions, including nonpharmacological protocols with many interventions, were included. The exclusion of any involvement of pharmaceuticals was necessary to evaluate the true benefit of a nonpharmacological protocol and minimize confounding variables. The references of the included articles were reviewed to ensure a comprehensive assessment.

Results
All Studies
A total of 17 articles7-24 met the inclusion criteria and were selected for review (see Figure and Tables 1 and 2). Seven studies18-24 were done in critically ill patients, 5 in geriatric general medicine patients,9-13 3 in postoperative patients,14-16 and 2 in patients who had a hip fracture.7,8 A total of 13 of the studies were prospective investigations,7,10,12,13,15,21-24 and 4 were randomized control trials.14-16 The Confusion Assessment Method or the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) was the most frequently used tool and was used in 10 studies.7,10,13,15-23 The Neelon and Champagne Confusion Scale was used in 4 evaluations,14-16,24 and the Intensive Care Delirium Screening Checklist,18 the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition; DSM-IV),12 and the Delirium Screening Scale15 were each used once. The frequency of delirium screening ranged from less than daily to 3 times per day.

The incidence of delirium was determined in 12 studies.7,10,12-15 Among these, 9 revealed a benefit of the nonpharmacological intervention.7,10,12,14-21 Table 3 gives the interventions used in the individual studies. Among the interventions that were beneficial, the mean reduction in the incidence of delirium was 24.7%, with a range of 9.7% to 31.8%. In 6 studies,7,10,11,12,22,23 the duration of delirium decreased after the addition of the nonpharmacological intervention. Additionally, among the 6 evaluations12,15,20 of the severity of delirium, all but 1 study indicated a reduction in severity. Patients’ LOS was examined in 6 studies7,11,16-20. Of the 6 studies, the results of 2 revealed a decrease in LOS.11,19 Among the 3 studies done in the ICU, only 1 indicated a reduction in LOS.19 When any outcome related to delirium (incidence, duration, severity) was examined, only 2 studies11,19 did not show any benefit from the addition of a nonpharmacological intervention.

A total of 28 unique nonpharmacological interventions were used in the clinical studies. The most common interventions associated with any clinical benefit were mobilization,8,10,20-23 reorientation,8,10,13,18,21 education of nurses,7,10,12,18,23 and music therapy.9,16,18,20,21 A single nonpharmacological intervention was examined in 5 studies,12,14,16,24 and multiple nonpharmacological interventions were examined in 12 investigations.7,10,11,13,18,21

Delirium is associated with multiple negative consequences, including increased length of stay, higher health care costs, and even increased mortality.
Table 1  Studies included that involved patients who were not critically ill

<table>
<thead>
<tr>
<th>Reference, year</th>
<th>Design</th>
<th>Screening tool used (frequency)</th>
<th>Population (N)</th>
<th>Notable exclusions</th>
<th>Nonpharmacological interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milisen et al,7 2001</td>
<td>Prospective</td>
<td>CAM, modified CAM</td>
<td>Hip fracture, emergency department/trauma, (26)</td>
<td></td>
<td>Nursing education Poster in units</td>
</tr>
<tr>
<td>Marcantonio et al,8 2001</td>
<td>Prospective, randomized, double-blind</td>
<td>CAM (daily)</td>
<td>Hip fracture, ≥65 years old (126)</td>
<td>Metastatic cancer, life expectancy &lt;8 months</td>
<td>Module: dehydration, dentures, nutrition supplements (physical/occupational therapy), glasses, hearing aids, clock, calendar, family presence</td>
</tr>
<tr>
<td>Inouye et al,9 1999</td>
<td>Prospective, individual matching</td>
<td>CAM (daily)</td>
<td>General medicine, &gt;70 years old (852)</td>
<td>Inability to complete interview, low risk for delirium</td>
<td>Protocol: orientation with care-team names and day’s schedule, cognitive stimulation activities, sleep protocol (warm drink, relaxing music, back massage, noise reduction, medication reschedule), mobilization, visual aids, adaptive equipment, hearing aids, hydration</td>
</tr>
<tr>
<td>Vidán et al,10 2009</td>
<td>Prospective, controlled</td>
<td>CAM (daily)</td>
<td>Geriatric unit, age &gt;70 years (542)</td>
<td>Expected hospital stay &lt;48 hours</td>
<td>Staff education Poster in units Orientation: clock, calendar, reason for admission, date, place, family letter Glasses, hearing aids Sleep: warm drink, reschedule medications and procedures Mobilization: out of bed, catheter removal, change positions, avoid restraints Hydration: schedule water if ratio of blood urea nitrogen to serum level of creatinine &gt;40 Nutrition</td>
</tr>
<tr>
<td>Lundström et al,11 2005</td>
<td>Prospective</td>
<td>DSM-IV criteria (days 1, 3, and 7)</td>
<td>Age &gt;70 years, geriatric unit (400)</td>
<td>None</td>
<td>Medical team education Reorganization of nursing staff</td>
</tr>
<tr>
<td>Tabet et al,12 2005</td>
<td>Case-control, single-blind</td>
<td>Delirium Rating Scale</td>
<td>Age &gt;70 years, geriatric unit (250)</td>
<td>Patient not present on unit during assessment</td>
<td>Medical team education</td>
</tr>
<tr>
<td>Caplan and Harper,13 2007</td>
<td>Prospective</td>
<td>CAM (every other day) MDAS for severity if CAM positive</td>
<td>Age &gt;70 years, geriatric unit (37)</td>
<td>Severe dementia Discharged within 48 hours</td>
<td>Reorientation Cognitive stimulation activities Feeding assistance Hydration Vision protocol Hearing protocol</td>
</tr>
<tr>
<td>Ono et al,14 2011</td>
<td>Randomized, randomized controlled trial</td>
<td>NEECHAM (no comment on how often)</td>
<td>Esophagectomy (22)</td>
<td></td>
<td>Bright light therapy</td>
</tr>
<tr>
<td>Taguchi et al,15 2007</td>
<td>Prospective, randomized controlled trial</td>
<td>NEECHAM (twice a day)</td>
<td>Esophagectomy (11)</td>
<td></td>
<td>Bright light therapy</td>
</tr>
<tr>
<td>McCaffrey,16 2009</td>
<td>Prospective, randomized controlled trial</td>
<td>NEECHAM (daily for 3 days)</td>
<td>Hip or knee surgery, &gt;75 years old (22)</td>
<td></td>
<td>Music therapy</td>
</tr>
</tbody>
</table>

Abbreviations: CAM, Confusion Assessment Method; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition); LOS, length of stay; MDAS, Memorial Delirium Assessment Scale; NEECHAM, Neelon and Champagne Confusion Scale.
<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Comments</th>
<th>Antipsychotic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>No difference in incidence</td>
<td>Used resource study nurses</td>
<td>Not reported</td>
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<tr>
<td>3-day reduction in duration</td>
<td>Screened only patients with CAM if NEECHAM identified them as high risk</td>
<td></td>
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<tr>
<td>Reduction in the severity (2.94 points)</td>
<td>Screened only on days 1, 3, 5, and 8</td>
<td></td>
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<tr>
<td>No difference in LOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18% reduction in incidence</td>
<td>Recommendations by geriatric consultant based on module</td>
<td>Yes</td>
</tr>
<tr>
<td>17% reduction in severity</td>
<td>Recommendations not made if team was already doing them</td>
<td></td>
</tr>
<tr>
<td>1.2-day reduction in duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No difference in LOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1% reduction in incidence</td>
<td>Less than 50% screened met inclusion criteria</td>
<td>Not reported</td>
</tr>
<tr>
<td>56 fewer days delirious</td>
<td>Used research nurses</td>
<td></td>
</tr>
<tr>
<td>28 fewer episodes</td>
<td>Geared intervention against risk factors</td>
<td></td>
</tr>
<tr>
<td>No difference in severity</td>
<td>Same medical team provided care to both groups</td>
<td></td>
</tr>
<tr>
<td>No difference in recurrence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.8% reduction in incidence</td>
<td>Must have risk factor for inclusion</td>
<td>Not reported</td>
</tr>
<tr>
<td>0.4 decrease in severity</td>
<td>Disposition to either geriatric or general medicine decided by emergency department physician</td>
<td></td>
</tr>
<tr>
<td>2.5-hour reduction in duration</td>
<td>Baseline characteristics not very similar</td>
<td></td>
</tr>
<tr>
<td>No difference in recurrence</td>
<td>Note intervention more helpful in intermediate risk</td>
<td></td>
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<tr>
<td>No difference in functional decline</td>
<td></td>
<td></td>
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<tr>
<td>No difference in death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No difference in prevalence at 24 and 72 hours</td>
<td>Extensive nursing training for the intervention</td>
<td>Not reported</td>
</tr>
<tr>
<td>4-day reduction in LOS</td>
<td></td>
<td></td>
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<tr>
<td>9.7% reduction in point prevalence of delirium</td>
<td>Investigators had no role in day-to-day management</td>
<td>Not reported</td>
</tr>
<tr>
<td>Use of daytime assessment and point prevalence could be underestimated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.8% reduction in incidence</td>
<td>Patient must have 1 risk factor for enrollment</td>
<td>Not reported</td>
</tr>
<tr>
<td>3.9-point reduction in MDAS score</td>
<td>Mean intervention time 14-19 h/wk</td>
<td></td>
</tr>
<tr>
<td>Very small sample size</td>
<td>Cost analysis</td>
<td></td>
</tr>
<tr>
<td>31.7% reduction in prevalence</td>
<td>Mean LOS 24.8 days</td>
<td>Not reported</td>
</tr>
<tr>
<td>Two dropped out because light was too bright</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All male population</td>
<td>Screening stopped on postoperative day 5</td>
<td></td>
</tr>
<tr>
<td>34% reduction in incidence at day 3</td>
<td>All male population</td>
<td>Not reported</td>
</tr>
<tr>
<td>Decrease in delirium each of the 3 days</td>
<td>All patients received standard pain, mobilization protocol</td>
<td>Not reported</td>
</tr>
<tr>
<td>Music set to play 4 times a day for 1 hour; patients could do more if they wished to</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In 6 of those studies,\textsuperscript{8-10,13,20,21} the interventions were incorporated into a protocol. The mean number of interventions used per study was 4.1.

**ICU Studies**

Of the 7 studies\textsuperscript{18-24} (Table 2) conducted in ICU patients, 6 investigations\textsuperscript{18,20-24} indicated a benefit in at least 1 delirium-related outcome, including incidence, duration, or severity. In the remaining study,\textsuperscript{22} a 0.6-day reduction in ICU LOS occurred. Only 1 study\textsuperscript{19} indicated a reduction in subsyndromal delirium. In all but 1 study,\textsuperscript{24} more than 1 nonpharmacological intervention was used; mobilization, a noise-reduction protocol, and a sleep protocol were used most often. All studies\textsuperscript{20-24} that included either mobilization or noise-reduction or sleep protocols indicated a statistically significant benefit in at least 1 delirium-related outcome.

**Discussion**

ICU delirium is associated with numerous adverse consequences, ranging from increased cost to mortality.\textsuperscript{3,5} As in a multitude of other ailments, prevention is the optimal strategy, especially when effective treatment options are unavailable. Haloperidol has been studied for prevention and treatment of ICU delirium, but the results have been inconclusive.\textsuperscript{25,26} Because of the unconvincing evidence

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**Table 2** Studies included that involved patients who were critically ill

<table>
<thead>
<tr>
<th>Reference, year</th>
<th>Design</th>
<th>Screening tool used (frequency)</th>
<th>Population (N)</th>
<th>Notable exclusions</th>
<th>Nonpharmacological interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skrobik et al,\textsuperscript{18} 2010</td>
<td>Prospective</td>
<td>ICDSC (3 times a day)</td>
<td>Medical-surgical ICU (1133)</td>
<td>Nursing education Radio or compact disc player, reorientation</td>
<td></td>
</tr>
<tr>
<td>Arenson et al,\textsuperscript{19} 2013</td>
<td>Randomized, cohort</td>
<td>CAM, CAM-ICU (3 times a day)</td>
<td>Cardiac surgery (ICU/medicine) (1010)</td>
<td>Inpatient death, preexisting structural brain disease Private room, no barriers Windows</td>
<td></td>
</tr>
<tr>
<td>Kamdar et al,\textsuperscript{20} 2013</td>
<td>Observational, pre-post design</td>
<td>CAM-ICU (2 times a day)</td>
<td>Medical ICU (300)</td>
<td>Visual or hearing impairment Sleep: minimize overhead page, turn off television, dim hallway, group care activities Open blinds Prevent napping Mobilization Minimize caffeine before bed Sleep: earplugs, eye mask, music</td>
<td></td>
</tr>
<tr>
<td>Colombo et al,\textsuperscript{21} 2012</td>
<td>Prospective, observational, 2 stage</td>
<td>CAM-ICU (2 times a day)</td>
<td>Medical-surgical ICU (314)</td>
<td>Reorientation: follow mnemonic—use first name, give information about location, LOS, and illness Clock Read paper or book, music, radio Reduction of night noise</td>
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<tr>
<td>Schweickert et al,\textsuperscript{22} 2009</td>
<td>Prospective, randomized</td>
<td>CAM-ICU (daily)</td>
<td>Medical ICU (104)</td>
<td>Absent limbs, 6-month mortality &lt;50%, cardiac arrest Mobilization, physical/occupational therapy Passive range-of-motion exercises</td>
<td></td>
</tr>
<tr>
<td>Needham et al,\textsuperscript{23} 2010</td>
<td>Prospective</td>
<td>CAM-ICU (daily)</td>
<td>Medical ICU (57)</td>
<td>No exclusions Mobilization, physical/occupational therapy Nursing education</td>
<td></td>
</tr>
<tr>
<td>Van Rompaey et al,\textsuperscript{24} 2012</td>
<td>Prospective, randomized controlled trial</td>
<td>NEECHAM (daily)</td>
<td>ICU (136)</td>
<td>Minimum score of 10 on Glasgow Coma Scale Hearing Impairment Sedation Ear plugs</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: CABG, coronary artery bypass graft; CAM, Confusion Assessment Method; ICDSC, Intensive Care Delirium Screening Checklist; ICU, intensive care unit; LOS, length of stay; NEECHAM, Neelon and Champagne Confusion Scale; RASS, Richmond Agitation-Sedation Scale.
for pharmacological management of delirium, nonpharmaceutical strategies need to be further evaluated.

The nonpharmacological intervention specifically discussed in the pain, agitation, and delirium guidelines of the American College of Critical Care Medicine is early mobilization. Our review fully supports this recommendation, and we think early mobilization should be included, when feasible, in any nonpharmacological prevention protocols implemented across all practice settings. Some type of mobilization was used in 6 studies and 4 of the types were included in protocols with many interventions. The 2 studies in which mobilization was not part of a protocol were conducted in medical ICU patients receiving mechanical ventilation, and the results showed benefits for all outcomes evaluated.

The onus then switches to the development of a nonpharmacological protocol to prevent delirium, but the ideal protocol has not yet been developed. One starting point would be to use the known risk factors for delirium and target interventions to patients who have these risk factors. This strategy was used by Inouye et al, who created a standardized protocol to combat 6 risk factors: cognitive impairment, sleep deprivation, immobility, visual impairment, auditory impairment, and dehydration. The observational PRE-DELIRIC (PREdiction of DELIRium in ICU patients) study was done in...
an ICU, and multivariate logistic regression analysis indicated that 10 of the 25 risk factors evaluated were predictive of delirium. Unfortunately, the majority of the predictors, such as age and scores on the Acute Physiology and Chronic Health Evaluation II, were characteristics that could not be altered by use of a nonpharmacological intervention. Although creation of a protocol based on risk factors is an excellent starting point, efforts must be directed toward modifiable health care–associated exposures and not nonmodifiable susceptibilities.

Protocols with many interventions would be needed in order to include the many risk factors for delirium identified through the literature and to combat each factor appropriately. Marcantonio et al8 attempted to devise such a protocol. They developed a geriatric consultation that encompassed 10 modules with at least 2 recommendations to be made for each module. Collectively, 31 recommendations potentially could have been used. Implementation of the appropriate recommendations for each patient resulted in one of the largest reductions in both incidence and severity of delirium. Vidán et al10 also used a multicomponent intervention and had results similar to those of Marcantonio et al. The inevitable follow-up question becomes, Is a certain aspect of these multicomponent interventions leading to the positive results, and, if so, what aspect?

The importance of a protocol that includes multiple interventions is evident when the outcomes of studies with 2 or fewer interventions7,9,11-13,15-18,22-24 are compared with the outcomes of studies with many interventions.8-10,13,20,21

Implementation of the appropriate recommendations for each patient resulted in one of the largest reductions in both incidence and severity of delirium.

Table 3 Interventions showing benefita

<table>
<thead>
<tr>
<th>Reference</th>
<th>Nursing education</th>
<th>Visual displays</th>
<th>Hydration</th>
<th>Dentures</th>
<th>Nutrition</th>
<th>Mobility</th>
<th>Eye protocol</th>
<th>Hearing protocol</th>
<th>Clock</th>
<th>Calendar</th>
<th>Family</th>
<th>Reorientation</th>
<th>Music</th>
<th>Daily schedule</th>
<th>Cognitive simulation</th>
<th>Warm drink</th>
<th>Back massage</th>
<th>Light therapy</th>
<th>Noise reduction</th>
<th>Medication/procedure reschedule</th>
<th>Adaptive equipment</th>
<th>Catheter removal</th>
<th>Avoidance of restraints</th>
<th>Open blinds</th>
<th>Minimization of caffeine before bed</th>
<th>Dim hallways at night</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
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a Key: X, trial in patients who were not critically ill; #, trial in critically ill patients.
indicate any difference in the incidence of delirium, whereas all 6 of the multi-interventional studies\textsuperscript{6,10,11,20,21} indicated a reduction in incidence of at least 5.1%.

Another strategy, included in 6 studies,\textsuperscript{7,10,12,18,21} was extensive education of nurses. The specifics of the education were typically not reported, but the material tended to focus on the effects of delirium, screening for delirium, and, at times, implementation of the investigators’ protocol. This strategy was used as the sole intervention in 2 studies.\textsuperscript{11,12} Milisen et al\textsuperscript{7} used education of nurses and prominent display of educational material, both of which resulted in no difference in the incidence of delirium or the LOS, but a positive reduction in both the duration and the severity of delirium. Tabet et al\textsuperscript{12} concentrated on an education-only strategy for both nurses and physicians and reported a 9.7% reduction in the point-prevalence of delirium. However, the investigators used the Delirium Rating Scale, a screening tool that is not recommended in the guidelines of the American College of Critical Care Medicine. Whether or not the results would be the same if either the Intensive Care Delirium Screening Checklist or the CAM-ICU were used is not clear. Last, Lundström et al\textsuperscript{11} used a similar strategy but also included a reorganization of the nursing staff. These investigators noted no difference in the prevalence of delirium at 24 or 72 hours. Patients in the study were tested for delirium by using the DSM-IV on hospital days 1, 3, and 7. Because the DSM-IV is a set of diagnostic criteria and not a delirium screening tool, whether or not these results can reliably be compared with the results of other studies in which screening for delirium was used is unclear.\textsuperscript{12}

We would be remiss if we did not address the notion that perhaps the best protocol simply involves high-level nursing care. Most of the unique interventions used in the studies reviewed could be easily incorporated into everyday nursing for every patient regardless of the patient’s risk factors for delirium. Notable exceptions would be early mobility, nutrition, and catheter removal. An inability to determine if certain aspects of a newly implemented protocol were already routine nursing practice before the protocols were implemented is a limitation of most published studies of nonpharmacological interventions. Unfortunately, a study that could indicate a true level of the benefit of each intervention would not be feasible, because such a study would require nurses to stop providing standard care. Additionally, any future studies must include use of a standardized screening tool, preferably either the CAM-ICU or the Intensive Care Delirium Screening Checklist, to allow accurate interpretation of the impact of any future interventions or protocol.

**Implications for Critical Care Nurses**

Although we reviewed studies of both critically ill and non–critically ill patients, we think that a variety of interventions that benefit patients who are not critically ill would still be useful in an ICU. The evidence shows that targeting interventions to prevent or treat known risk factors for delirium have the greatest benefit (eg, cognitive stimulation, reorientation), and a great deal of overlap exists between risk factors for both critically and non–critically ill patients. A wide variety of patients are treated in ICUs, and the variety of specialized ICUs can be as unique as the patients treated within the units. For these reasons, strong consideration should be given to having ICUs implement nonpharmacological interventions that have been beneficial for patients who were not critically ill.

Multicomponent intervention protocols to combat delirium have proved beneficial. On the basis of guideline recommendations and the strength of literature, these protocols should include early mobilization, education of nurses, and cognitive stimulation with reorientation. Depending on the severity of a patient’s illness, a variety of ways can be used to accomplish early mobilization.

All studies that included mobilization, noise-reduction, or sleep protocols displayed a benefit in the reduction of delirium. Mobilization can be as complete as full physical or occupational therapy treatments or merely passive range-of-motion exercises. Bedside nurses and other members of the medical team work together to decide the level of mobilization a patient can complete. Additionally, nurses can advocate for removal of tubes, catheters, or restraints that may prevent early mobilization.

Second, education of nurses is an essential component of the success of any new intervention or initiative. The literature describes a variety of strategies for educating nurses, including didactic lectures, visual displays, and one-on-one sessions. In order to include the potentially large number of nurses who need to be educated, education should be directed at all types of learners.\textsuperscript{18,21} Last,
cognitive stimulation and reorientation is a rather broad term that allows each nurse to develop a strategy that works for him or her. Still, each nurse’s intervention should incorporate a few key components, such as determining how the patient would like to be addressed, frequent reorientation to date and time, providing updates on the patient’s schedule and clinical status, and conversing with the patient in a manner that requires memory recall by the patient.

The implementation of a new intervention or initiative is often met with resistance to change. In order to minimize this resistance, obtaining nurses’ acceptance of and willingness to support the change becomes imperative. One strategy to eliminate high levels of resistance is to educate nurses about the dangers and implications of the development of delirium while stressing that patients become increasingly difficult to care for once delirium occurs. Another frequent reason for resistance is an overall lack of time during the nursing shift to add additional tasks to be completed; however, most interventions we have mentioned in this review could be worked into a nurse-implemented protocol that would require no more than 5 to 10 minutes per nursing shift to accomplish. Assembling a multidisciplinary team (physician, nurse, pharmacist, and respiratory therapist) to determine which nonpharmacological interventions are feasible within each specific unit is important. Ultimately the success of a nonpharmacological protocol to prevent delirium lies with the bedside nurses, who have the most frequent contact with patients.

**Conclusion**

Use of nonpharmacological interventions is essential for the prevention of delirium. These interventions can be a low-risk, low-cost strategy that has shown a benefit in most studies. Nonpharmacological therapy also has the potential to decrease the off-label use of antipsychotics for the treatment of delirium. The largest challenge in developing a nonpharmacological protocol is determining what interventions to include. Although a “one-size-fits-all” protocol may not be available, a strong body of evidence supports the inclusion of education of the medical team, reorientation with cognitive stimulation, and early mobility in any protocol created. ICU staff should assemble a multidisciplinary team to review interventions of known benefit to determine which ones can be implemented within the staff’s specific unit.

**References**


Nonpharmacological Interventions to Prevent Delirium: An Evidence-Based Systematic Review

Facts

Development of delirium in critical care patients is associated with increased length of stay, hospital costs, and mortality. The pain, agitation, and delirium guidelines of the American College of Critical Care Medicine provide the strongest level of recommendation for the use of nonpharmacological approaches to prevent delirium, but questions remain about which nonpharmacological interventions are beneficial.

- Prevention is the optimal strategy, especially when effective treatment options are unavailable. Haloperidol has been studied for prevention and treatment of intensive care unit (ICU) delirium, but the results have been inconclusive.
- A variety of interventions that benefit patients who are not critically ill would still be useful in an ICU. The evidence shows that targeting interventions to prevent or treat known risk factors for delirium have the greatest benefit (eg, cognitive stimulation, reorientation), and a great deal of overlap exists between risk factors for both critically and non–critically ill patients.
- Multicomponent intervention protocols to combat delirium have proved beneficial. These protocols should include early mobilization, education of nurses, and cognitive stimulation with reorientation.
- Mobilization can be as complete as full physical or occupational therapy treatments or merely passive range-of-motion exercises. Bedside nurses and other members of the medical team work together to decide the level of mobilization a patient can complete. Additionally, nurses can advocate for removal of tubes, catheters, or restraints that may prevent early mobilization.
- Education of nurses is an essential component of the success of any new intervention. In order to include the potentially large number of nurses who need to be educated, education should be directed at all types of learners.
- Cognitive stimulation and reorientation is a broad term that allows each nurse to develop an individual strategy. Still, each nurse’s intervention should incorporate a few key components, such as determining how the patient would like to be addressed, frequent reorientation to date and time, providing updates on the patient’s schedule and clinical status, and conversing with the patient in a manner that requires memory recall by the patient.
- Obtaining nurses’ acceptance of and willingness to support the new intervention is imperative.
- One reason for resistance is a lack of time during the nursing shift to add additional tasks. Assembling a multidisciplinary team (physician, nurse, pharmacist, respiratory therapist) to determine which nonpharmacological interventions are feasible within each specific unit is important.
- Ultimately the success of a nonpharmacological protocol to prevent delirium lies with the bedside nurses, who have the most frequent contact with patients.
1. The highest prevalence of delirium occurs in which of the following patient populations?
   a. Nursing home patients
e  b. Critically ill patients
c. General medicine patients
d. Perioperative patients

2. Exclusion criteria of the research described in this manuscript include which of the following?
   a. Not original research
e b. Delirium measured as an outcome
c. Screening for delirium using a standardized screening tool
d. Incidence or severity of delirium was an outcome measure

3. Excluding any manuscripts involved with pharmaceuticals was necessary to evaluate the true benefit of a nonpharmacological protocol and to minimize which of the following?
   a. Validity and reliability issues
e b. Hierarchies of evidence
c. Confounding variables
d. Cleaning and coding data

4. Which of the following tools was used most frequently in the delirium research?
   a. Delirium Screening Scale
e b. Neelon and Champagne Confusion Scale
c. Intensive Care Delirium Screening Checklist
d. Confusion Assessment Method for the Intensive Care Unit

5. In several studies, the duration of delirium decreased after the addition of which of the following?
   a. Nonpharmacological interventions
e b. Pharmacological interventions
c. Haloperidol
d. Lorazepam

6. Which of the following factors were examined in outcomes related to delirium?
   a. Incidence, duration, and severity
e b. Decreasing length of stay
c. Mobility
d. Reorientation

7. Which of the following is the nonpharmacological intervention specifically discussed in the pain, agitation, and delirium guidelines of the American College of Critical Care Medicine?
   a. Music therapy
e b. Reorientation
c. Nursing education
d. Early mobilization

8. Which of the following is used to allow accurate interpretation of the impact of future interventions to reduce delirium?
   a. Biostatistics
e b. Multiple regression analysis
c. Bonferroni multiple comparison test
d. Standardized screening tool

9. The evidence-based literature supports which of the following nonpharmacological interventions to combat delirium?
   a. Nursing education, mobility, and cognitive stimulation with reorientation
e b. Nursing education, mobility, and art therapy
c. Mobility, cognitive stimulation with reorientation, and art therapy
d. Mobility, exercise therapy, and cognitive stimulation with reorientation

10. Which of the following nonpharmacological interventions allows each nurse to develop a strategy that works for him or her?
    a. Mobilization
e b. Nursing education
c. Cognitive stimulation and reorientation
d. Music therapy

11. Which of the following is a strategy for educating nurses about nonpharmacological interventions that help reduce delirium?
    a. Visual displays
e b. Case study analysis
c. Excel spread sheet
d. PowerPoint self-learning modules

12. Which of the following is essential for the prevention of delirium?
    a. Pharmacological therapy
e b. Nonpharmacological interventions
c. Occupational therapy
d. Speech therapy

Test answers: Mark only one box for your answer to each question. You may photocopy this form.
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Ryan M. Rivosecchi, Pamela L. Smithburger, Susan Svec, Shauna Campbell and Sandra L. Kane-Gill

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