Models for Predicting Incident Delirium in Hospitalized Older Adults: A Systematic Review.

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BACKGROUND

• Delirium is common in the hospitalized older adults and ranges from 15 to 50%.
• It is associated with higher mortality and functional decline.
• Prevention is the most effective strategy and 40% of cases may be preventable.
• Hospital Elder Life Program (HELP) is an evidence-based program to reduce incidence of delirium.
• Identification of patients at highest risk of developing delirium using the electronic health record (EHR) may be an effective targeted strategy for HELP program

OBJECTIVE

To systematically review and summarize the medical literature regarding the risk prediction models for delirium in older inpatient populations above age 65 years of age

METHODS

TABLE 1. PICO question

| Population | Older adult patients admitted to a medical service.
| Intervention | Risk prediction models derived and validated in a cohort of medical inpatients.
| Comparator | Models comparing 2 or more risk prediction models in a population will be included.
| Outcome | Incidence of delirium
| Setting | Any time during hospital stay.

Inclusion Criteria: Non–disease specific delirium prediction models in older patients admitted to the medical ward. Inclusion criteria included original research, human patients, age 65 and older, and acute medical inpatient population.

Exclusion Criteria: We excluded studies that were disease specific, were performed in intensive care unit or included surgical cases. We also excluded review articles, case reports, commentary, abstracts, and presentations

Criteria for review of full-text articles:
1. Is the full text of the article in English?
   Yes Proceed to #2
   No Code X1 STOP

2. Does the study population include older adult patients admitted to a medical service?
   Yes Proceed to #3
   No Code X2 STOP

3. Is the article a primary study that develops or tests prediction models for risk of delirium?
   Yes Proceed to #4
   No Code X3 Proceed to #5

4. Is this model tested in both a derivation and validation cohort, or is it a validation of a previously developed model?
   Yes Code X4 Proceed to #6
   No Proceed to #6

5. Is the article a systematic review or a meta-analysis of prediction models for delirium?
   Yes Code X5 Proceed to #6
   No Proceed to #6

6. If the article meets none of the above criteria but may be useful for a background/discussion, add code 8

PRISMA 2009 Flow Diagram

The electronic databases included Ovid MEDLINE, CINAHL, Cochrane Database of Systematic Reviews, EMBASE, and PsycINFO. Controlled vocabulary terms specific to database as well as relevant keywords were used, including variants of delirium, altered mental status, acute confusion state, acute brain syndrome, acute brain failure, metabolic encephalopathy, predict, predictive, prediction, and models, modeling, scores, scoring, tests, testing, rules, index, and indices. The bibliographies of included studies were examined, and no additional articles were referenced.

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Data Extraction: 12 studies were included in the final systematic review. To appropriately extract data from the 12 studies, the following parameters were used: study description, study population, delirium assessment method, incidence of delirium and risk factors for delirium. Quality of the study was assessed using "Newcastle-Ottawa Quality Assessment Scale" for cohort studies using a scale of 1 to 9 (1:poor quality and 9:high quality).

RESULTS

• The overall incidence of delirium in the studies ranged from 4% to 26%.
• Most common risk factors for delirium were dementia, decreased functional status, blood urea nitrogen to creatinine ratio, infection and severe illness. Other variables less common were alcohol, malnourishment, history of delirium, older age, medications, physical restraints, malnutrition, admitted from other than home and an iatrogenic event. The quality of studies ranged from 4 to 8.

CONCLUSIONS

This systematic review summarizes the medical literature for risk prediction models for delirium in hospitalized older patients. We will use this information to develop an EHR-generated delirium risk prediction model to be used by the "Hospital Elder Life Program" to reduce incidence of delirium.