Using language descriptors to recognise delirium: a survey of clinicians and medical coders to identify delirium-suggestive words

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Delirium is common in patients admitted to hospital, including intensive care unit (ICU) patients, and is associated with significant adverse outcomes such as mortality, institutionalisation, and long term cognitive impairment. However, delirium is also frequently unrecognised and its incidence varies widely across different settings. These discrepancies are partly explained by the lack of a robust gold standard for its diagnosis and variable clinical manifestations. Tools such as the Confusion Assessment Method (CAM) test have been developed to aid recognition of delirium, but underdiagnosis is common and it is not a specific diagnostic test for delirium. Moreover, the fluctuating nature of delirium makes assessment once or twice a day unlikely to reliably capture its development or presence. In contrast, the summary assessment of medical, nursing or allied health staff, as reported in their progress notes each shift, may logically provide a more comprehensive assessment of the patient’s mental state and risk of delirium over an entire period of observation. Identifying these delirium-suggestive words in the patient’s medical record may aid in earlier recognition or correct diagnosis of delirium.

Methods
We conducted an anonymous survey of medical, nursing and allied health staff as well as medical coders at our institution to develop a repertoire of delirium-suggestive words. A range of 54 words were selected by study investigators and clinicians experienced in working with patients with delirium as well as literature review and Medical Subject Headings (MeSH) terms. A number of distractor words were also included in the survey. Respondents were asked to rate the likelihood that they would use a particular word to describe a patient with possible delirium on a 5-point Likert scale (1, very unlikely; 2, unlikely; 3, neutral; 4, likely; 5, very likely), and they were permitted to suggest alternative words not contained in the survey questions. Demographic data of the respondents included occupational category (medical, nursing, allied health, medical coder), level of knowledge about delirium (none at all, a little, a moderate amount, a lot, a great deal), and previous experience in managing patients in ICU (yes, no). The study was approved as a quality improvement study by the Austin Health Human Research Ethics Committee (Victorian Health Incident Management
System Riskman Q 35880). Descriptive statistics and $\chi^2$ tests were performed using Stata release 16 (StataCorp).

**Results**

There were 227 survey respondents, with 203 fully completed responses. There was similar representation from medical and nursing staff (86/203 [42.4%] and 89/203 [43.8%] respectively), allied health staff were less frequent (21/203, 10.3%) and medical coders accounted for 7/203 (3.4%). Most respondents self-rated their knowledge of delirium as “a moderate amount” (105/203, 51.7%); however, there were clinicians who reported “a lot” (55/203, 27.1%) and “a great deal” (12/203, 5.9%) of knowledge. Only 31/203 respondents (15.3%) had “a little” knowledge, and no respondents reported “none at all”. Over half of the respondents had experience in managing patients in the ICU (122/203, 60.1%).

Table 1 shows the frequency of modal response for delirium-suggestive words as well as the mean response based on the 5-point Likert scale. Words or expression with a modal response rated as “very likely” to be strongly associated with delirium were “confused/confusion”, “delirious”, “disoriented/disorientation” and “fluctuating conscious state”. In addition to these, other commonly used words or expressions with a mean score of 4 or more included “agitated/agitation”, “combative”, “disorganised thinking”, “fluctuating behaviour” and “hallucinating/hallucination”. Words that had a mean score of 2 or below included intended distractors on the survey, such as “fatigued”, “hopeless”, “indecisive/indecision”, “interactive/interaction”, “laughing”, “obtunded” and “overdose”.

In addition, 35 respondents suggested multiple alternative words or phrases that they would use to describe patients with...
possible delirium. Words already included in the survey (hallucination, inappropriate, uncooperative, suspicious, confused, inattention) or variations of words included on the survey (fluctuating mental state, acute confusional state, poor attention span) were excluded. Novel words included “change of usual behaviour”, “wandering”, “undressing”, “altered sleep/wake cycle”, “odd”, “unsettled”, “impaired cognition”, “hypoactive/hyperactive” and “perplexed”.

Differences in word frequency and strength of association were noted according to occupation, experience in managing ICU patients, and knowledge of delirium. For example, medical and allied staff selected “fluctuating conscious state” as “very likely” in 50/86 (58.1%) and 11/21 responses (52.4%) respectively, compared with 19/89 nursing staff (21.3%) and 0/7 medical coders (0%). Clinicians working in ICU environments reported “combative” more frequently (likely or very likely) than clinicians working in other environments (109/122 [89.3%] vs 58/81 [71.6%]; P = 0.001). Clinicians who had “a great deal” of experience in working with patients with delirium rated “agitated/agitation” as “highly likely” in 91.7% of responses (11/12) compared with clinicians who only had “a little experience” (10/31, 32.3%; P = 0.001).

**Discussion**

This survey has generated a comprehensive repertoire of delirium-suggestive words based on knowledge from treating clinicians and literature review, by validating preexisting words selected by study investigators and adding new words submitted by survey respondents. Our approach, in seeking expertise of clinicians from different backgrounds, adds to the authenticity and reproducibility of delirium-suggestive words contained in our library, particularly as different terminologies may be used depending on occupational background and clinical experience.

Creating a broadly inclusive list of words is crucial as there is no gold standard for the diagnosis of delirium, and language descriptors are often used in the identification of patients with delirium. Previous studies have shown that International Classification of Diseases (ICD) diagnoses for delirium underdiagnose the condition in comparison with chart-based reviews or combination with additional data sources. Existing chart-based reviews have used only a limited repertoire of delirium-suggestive keywords.

**Conclusion**

With the advent of natural language processing techniques, it is possible to screen for delirium by analysis of medical progress notes. Identifying the presence of any of our repertoire of words may aid in earlier real-time recognition of delirium and could be implemented for contemporaneous clinical decision making and patient management.

**Competing interests**

None declared.
### References