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Original Research Report

Validation of a Nurse-Based Delirium-Screening Tool for Hospitalized Patients

Anita Hargrave, M.D., Jesse Bastiaens, M.D., James A. Bourgeois, O.D., M.D., John Neuhaus, Ph.D., S. Andrew Josephson, M.D., Julia Chinn, R.N., Melissa Lee, R.N., Jacqueline Leung, M.D., Vanja Douglas, M.D.

Background: *Guidelines recommend daily delirium monitoring of hospitalized patients. Available delirium-screening tools have not been validated for use by nurses among diverse inpatients.* **Objective:** *We sought to validate the Nursing Delirium-Screening Scale (Nu-DESC) under these circumstances.* **Methods:** *A blinded cross-sectional and quality-improvement study was conducted from August 2015–February 2016. Nurses' Nu-DESC scores were compared to delirium diagnosis according to Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) criteria. A total of 405 consecutive hospitalized patients were included. Nu-DESC-positive (threshold score ≥2) patients were matched with equal numbers of Nu-DESC-negative patients, by sex, age, and nursing unit. Nurses recorded a Nu-DESC score for each patient on every 12-hour shift. A Nu-DESC-blinded evaluator interviewed patients for 2 consecutive days. Delirium diagnosis was determined by physicians using DSM-5 criteria applied to collected research data. Sensitivity and specificity of the Nu-DESC were calculated. In an exploratory analysis, the performance of the Nu-DESC was analyzed with the addition of bedside measures of attention.* **Results:** *The sensitivity of the Nu-DESC at a threshold of ≥2 was 42% (95% CI: 33–53%). Specificity was 98% (97–98%). At a threshold of ≥1, sensitivity was 67% (52–80%) and specificity 93% (90–95%). Similar results were found with the addition of attention tasks.* **Conclusion:** *The Nu-DESC is a specific delirium detection tool, but it is not sensitive at the usually proposed cut point of ≥2. Using a threshold of ≥1 or adding a test of attention increase sensitivity with a minor decrease in specificity.*

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Key words: inpatient delirium screening, Nu-DESC, nursing delirium screen.

INTRODUCTION

Delirium surveillance is recommended for hospitalized patients due to the pervasive nature and deleterious effects of delirium, which may be mitigated by early identification, diagnosis, and treatment.[1–3] Delirium is characterized by disturbances in attention, awareness, and cognition that are acute or subacute in onset and fluctuating in nature. Often, there is evidence of a causative underlying general medical

Received March 31, 2017; revised May 30, 2017; accepted May 30, 2017. From the Department of Internal Medicine (A.H.); Department of Psychiatry (J.B., J.A.B.); Department of Epidemiology and Biostatistics (J.N.); Department of Neurology (S.A.J.); Department of Nursing (J.C., M.L.); Department of Anesthesia (J.L.); and Department of Neurology (V.D.),University of California San Francisco, San Francisco, CA. Send correspondence and reprint requests to Vanja Douglas, MD, UCSF Department of Neurology, 505 Parnassus Ave M798, San Francisco, CA 94143-0114; e-mail: vanja.douglas@ucsf.edu

condition.[4] Delirium affects 11–64% of hospitalized patients, depending on the cohort studied, and has been shown to independently lead to greater mortality and morbidity,[2,5–9] translating into increased costs for the health care system ranging from $38–$152 billion per year in the United States alone.[10] Studies have demonstrated that more than 50% of cases of delirium are missed, which is associated with further increased morbidity and mortality due to delay in diagnosis and management.[1,11–16]

Delirium screening may be an important means of decreasing the severity and duration of delirium episodes, thereby potentially lessening its consequences and costs.[17–19] Tools have been developed to assist with the diagnosis of delirium in a more time-efficient manner than the rigorous application of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria by formal clinical interview.[2] The Nursing Delirium-Screening Scale (Nu-DESC) was designed for nurses, who are more frequently at a patient's bedside and are thus in a position to witness the characteristic fluctuations of delirium. The Nu-DESC is a scale that rates the severity of 5 delirium characteristics from 0 (not present) to 2 (severe) based purely on the nurse's observations of their patient's behavior over the course of their shift and takes only 1–2 minutes to complete.[20]

Although the Nu-DESC has the advantage of being brief and simple, it has not been thoroughly validated in diverse inpatient populations. The original study introducing the tool reported a sensitivity of 85.7% and specificity of 86.8% among hematology-oncology/internal medicine patients when the threshold for delirium diagnosis was set at ≥ 2.[20] However, a subsequent study using the same threshold in postoperative patients demonstrated 29% sensitivity at a threshold of ≥ 2 and 72% sensitivity at a threshold of ≥ 1.[21]

Other delirium-screening tools exist, but either show low sensitivities when used by bedside nurses or take a longer time to administer than the Nu-DESC. The Confusion Assessment Method (CAM)[22] was designed for use by nonpsychiatry-trained physicians and has been widely validated for use by researchers or trained individuals, but when applied by nurses had a sensitivity of 66.7% and specificity of 90.7%.[23] The Clinical Assessment of Confusion also has a low sensitivity (36%).[24] The Delirium Observation Scale had good predictive validity against a DSM-IV-TR delirium diagnosis, but was only studied in a cohort with 22 delirious patients and is a 25-item scale that takes 5 minutes to administer.[25,26] Similarly, although the NEECHAM Confusion Scale has high sensitivity (95%) and specificity (78%), it takes 10 minutes to administer.[26]

Therefore, we sought to clarify the test characteristics of the Nu-DESC in a clinically diverse inpatient population at a large tertiary hospital to determine whether this brief and efficient screen could be used by nurses systematically to accurately identify patients with delirium.

MATERIAL AND METHODS

Study Design

This blinded cross-sectional study compared the Nu-DESC scores obtained by nurses to a diagnosis of delirium based on DSM-5 diagnostic criteria made by both a board-certified neurologist (V.D.) and a board-certified psychiatrist (J.A.B.) through interpretation of standardized patient vignettes recorded by a trained interviewer.

Participants and Setting

The study was conducted at a university hospital in San Francisco from August 2015 to February 2016. All patients on 3 nursing units, regardless of age, primary language, or comorbid neurologic or psychiatric conditions were screened with the Nu-DESC every 12 hours as part of routine clinical care and were eligible for inclusion. One nursing unit had a neuroscience focus (neurology and neurosurgery); 2 were surgical units that also included spine neurosurgery. Of patients included in our study, 103 participants (25%) were admitted to neurology, 84 (21%) to general medicine, 82 (20%) to general or orthopedic surgery, and 136 (34%) to neurosurgery. Every Monday through Friday morning, all patients with positive Nu-DESC scores (threshold $\geq$ 2) during the previous shift were matched with an equal number of Nu-DESC-negative (score: 0–1) patients according to age ($\pm$5 years), sex, and nursing unit and were approached for participation within 8 hours. Patients who were transferred to the intensive care unit before they could be approached were excluded. The Committee on Human Research at the University