Demonstrating the Value of a Standardized Cognitive Assessment Tool Through the Use of Interprofessional Rapid Safety Rounds

NCPD 2.0 Contact Hours

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ABSTRACT

Background: Understanding patients' cognitive functional status is critical to prevent adverse outcomes, such as falls and injuries. However, there is variation in nurses' proficiency in assessing patients' cognitive status, and cognitive screening tools often do not provide guidance on safety interventions to keep patients safe.

Problem: Lack of appropriate cognitive screening and interventions may have contributed to increased fall rates on an acute care trauma unit.

Approach: A comprehensive 6-level Cognitive Pyramid, including guidance on safety interventions for each level, was developed and used during interprofessional Rapid Safety Rounds to assess patients' cognitive status.

Outcomes: The Cognitive Pyramid demonstrated appropriate face validity from 12 subject matter experts. After implementing the Cognitive Pyramid during interdisciplinary rounds, the fall rate decreased to 0 per 1000 admissions.

Conclusions: Assessment of patients' cognition using the Cognitive Pyramid, and implementing appropriate interventions, may help improve patient safety.

Keywords: acute care, cognitive assessment, falls, screening tools

Health care professionals exhibit variable proficiency in assessing patients' cognitive status, and in considering cognition when developing individualized and evidence-based treatment plans.[1] Specifically, the nurse's ability to assess and understand patients' functional cognitive status has broad implications in patient care planning for several reasons. First, the patient's overall physiologic stability often impacts functional cognition and can be a symptom of physiologic change.[2-4] Second, changes in functional cognitive status may impact the patient's ability to retain and understand information, from how to use the call light to discharge health teaching.[5] Understanding functional cognitive status allows nurses to assess the patient's ability not only to learn, but also to maintain their own safety within the hospital environment.[6,7]

For example, determining whether a patient has the current functional cognitive status to learn and retain new behaviors, such as asking for help by using the call bell before getting out of bed, would allow the nurse to individualize the level of nursing surveillance to prevent patient harm. Communicating assessment of cognitive status to care providers facilitates understanding of current risks, and can support individualized safety planning and care advancement.

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There are several evidenced-based tools that assess potential changes in cognition. Common tools used in critical and acute care settings to screen and assess a patient's mental status, cognitive deficits, and/or functional capabilities include the Confusion Assessment Method (CAM),[8] Glasgow Coma Scale (GCS),[9] Richmond Agitation-Sedation Scale (RASS),[10] and the Rancho De Los Amigos Brain Injury Scale (Rancho).[11] These tools are based, in part, on the idea that cognitive functions are hierarchically organized.[12] Factors assessed by these tools include the depth of sedation, the healing stage of a brain injury, the current level of consciousness, and delirium. Cognition is also impacted by medication interactions, infection, sleep deprivation, delirium, and premorbid conditions.[6] These assessments can help identify factors that may contribute to patients' functional cognitive status and their ability to maintain safety within their environment. These tools, however, do not track subtle changes of decline or improvement in functional status, nor make a direct connection between the assessment and the priority safety interventions to keep patients safe.

For example, the GCS, although a valid tool, "has some clear limitations, most notable the inability to asses a subscale due to a number of confounding variables."[13(p289)] The CAM assists nonpsychiatric care professionals in detecting possible delirium early, and is a widely used screening tool.[12] Delirium affects up to 60% of all acute care hospitalized patients in the United States; those affected are more likely to experience infections, falls, pressure injuries, longer hospital stays, and potential long-term functional disability.[5,14] However, a CAM-positive assessment may not provide a holistic picture of the patient's functional cognitive state, as delirium presents differently in individuals and is just one factor that influences cognitive changes. Transient cognitive deficit is quite notable in delirium, which is an acute fluctuating mental status change characterized by inattention, disorganized thinking, and altered level of consciousness.[13] One patient who is CAM positive could have a very different cognitive presentation from another CAM-positive patient. As such, bedside nurses may not find the CAM useful in daily practice. Likewise, the RASS is helpful to gauge levels of agitation and sedation, but provides no clear connection to the cause of the agitation nor how to mitigate the negative consequences of agitation.

Understanding an assessment tool's purpose and limitations can allow providers to select the appropriate tool(s). For example, incorporating the CAM assessment as a part of a more comprehensive cognitive assessment provides a fuller picture of overall cognitive function. If overall cognitive function is correctly assessed, health care providers can better apply appropriate interventions to meet the needs of the patient and reduce the patient's risk of adverse events. Despite spending a large majority of time at the bedside, nursing's understanding of cognitive changes, and how the wide variety of tools can be used to pull a cognitive assessment together, varies widely.[1] As a result, preventable adverse outcomes, such as falls, may occur more frequently.

LOCAL PROBLEM

The fall rate at an academic hospital's acute care trauma unit was higher than the national benchmark. The unit admits patients generally 18 years and older with conditions such as dementia, Alzheimer's disease, traumatic brain injury, brain neoplasm, stroke, intoxication, and delirium, which may impact a patient's functional cognitive status. Staff debriefs after a patient fall often revealed that missing or late identification of changes in the patient's functional cognitive status might have contributed to the fall, and that impairment of cognition was often minimized or not communicated between team members as a potential safety risk. Additionally, during interprofessional safety rounds on the unit, leadership identified that nurses often did not fully assess nor correctly use tools for cognitive and mental status variation, which caused them to misinterpret or ignore patient behavior that may have put them at higher risk for falls. Leadership involved in the unit's Rapid Safety Rounds (RSR), including occupational therapists (OT), psychiatric nurses, and direct care nurses, postulated that patients were at increased risk of falls and other injuries due to lack of assessment of functional cognitive status and lack of communication regarding cognitive changes.[15]

As such, a comprehensive cognitive assessment tool was developed. The purpose of this article is to describe the development of a cognitive assessment tool, the Cognitive Pyramid, which was used as a framework for the health

care team to screen, track, and monitor patients along the cognitive continuum and proactively advance the plan of care while also decreasing falls.

METHODS

Using several theoretical frameworks based on the concept that cognitive functions are organized hierarchically,[12,16-19] the Cognitive Pyramid groups commonly observed behaviors into 6 levels of cognition. Merging concepts of cognitive hierarchy, environmental safety interventions, and therapeutic communication techniques[20] with their clinical experience, the authors compiled a set of associated psychosocial and environmental interventions that realistically aligned with the assessed patient's cognitive status; nurses could implement these interventions to prevent patient harm.

The Cognitive Pyramid was designed to be used during the unit's interprofessional RSRs (see the Supplemental Digital Content Table, available at: http://links.lww.com/JNCQ/B23 for an overview of RSR roles).[21-23] The RSR created a forum for an integrated view of patient stability and identification of risks that placed the patient at increased exposure for harm. Rounds were conducted twice weekly, and could also be requested by staff who identified patients at high risk for falls, injury to themselves or others, had a long hospitalization, or conflicts in care goals.[20,24,25] During rounds, the team modeled assessment skills, and ensured alignment of goals between the patient and care providers. Use of the Cognitive Pyramid within RSRs highlighted the importance the role cognition plays in increasing safety, and provided guidance to nurses for interventions that could decrease the risk of adverse events, such as falls or injury.

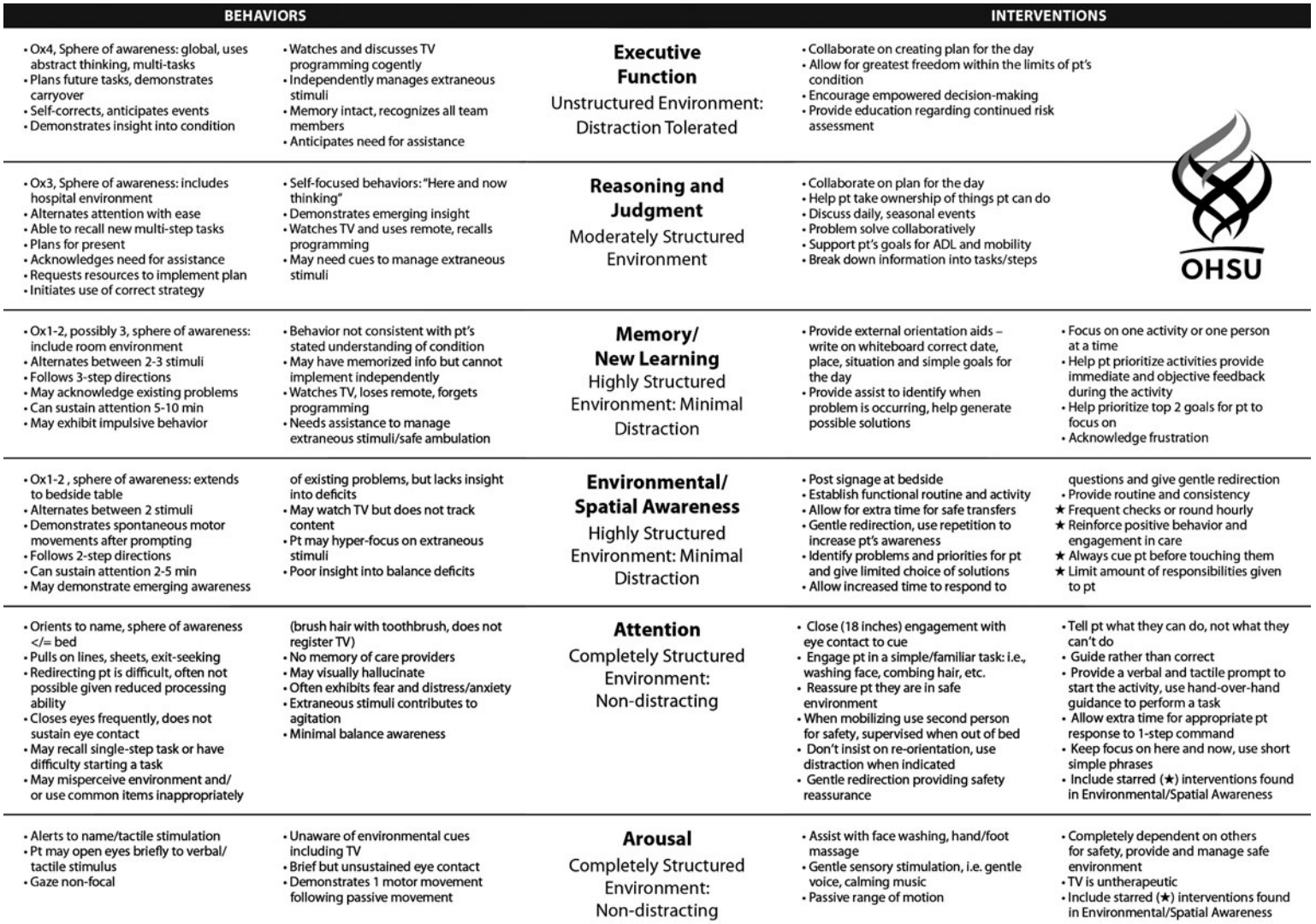
Levels of the cognitive pyramid

The Cognitive Pyramid can be found in Figure 1. The pyramid consists of 6 levels of varying cognitive functioning, including executive function, reasoning and judgment, memory/new learning, environmental/spatial awareness, attention, and arousal. In addition to using cognitive screening tools such as the CAM or the RASS as well as basic orientation and recall questions, the nurse can assess the level of cognitive function by observing and tracking discreet behaviors of the patient. Nurses determine which of the 6 levels the patient meets criteria for based on observed behavioral data and utilize the corresponding interventions to improve their care planning. Nurses are encouraged to observe for clusters of behaviors; patients do not have to exhibit all cited behaviors in 1 level, rather 2 or more behaviors signal level classification. If patient behavior straddles 2 levels, the nurse is advised to consider the lower-level interventions to enhance safety. Assuming the patient is at a higher cognitive level may contribute to increased risk of harm.

At the top of the pyramid is *Executive Function*; patients in this level are within the defined or normal limits, and can manage in an unstructured environment, tolerate distraction, and manage a degree of stress. The next level, *Reasoning and Judgment*, is how many "oriented and calm" hospital patients are assessed, depending on their acuity level and illness. Patients assessed at this level need a moderately structured environment. Under the stress of hospitalization, many patients are self-focused, and look to medical/nursing staff to cue and provide resources for them as they attempt to manage new stressors in the unfamiliar hospital environment. Insight is evolving as they take in new information on their condition.

In the middle of the pyramid, *Memory/New Learning,* are patients who have awareness of the stress or situation in their surroundings, but cannot consistently follow through on safety planning. This is because they have not retained the information taught to them and have difficulty applying the new knowledge to their situation. Patients at this level need a highly structured environment with minimal distraction. Awareness of their deficits, coupled with the inability to constructively adapt, often causes frustration, and care staff may assume that they are "noncompliant" or "resistive" to learning. Patients with mild delirium and/or dementia who wax and wane in their cognitive resilience are often at this level. Frustration can be reduced by use of external orientation aids, reassurance, and assistance with prioritization of activities.

One level below is the *Environmental/Spatial Awareness* level. Patients in this level are easily distractible, may be hyperfocused on something physical in the environment or on a particular topic, and cannot follow complex directions. Care providers often state that these patients are "not paying attention" or are "confused." They regularly screen positive for delirium with formal screening tools. Similar to patients in the



BEHAVIORS			INTERVENTIONS	
• Ox4, Sphere of awareness: global, uses abstract thinking, multi-tasks • Plans future tasks, demonstrates carryover • Self-corrects, anticipates events • Demonstrates insight into condition	• Watches and discusses TV programming cogently • Independently manages extraneous stimuli • Memory intact, recognizes all team members • Anticipates need for assistance	**Executive Function** Unstructured Environment: Distraction Tolerated	• Collaborate on creating plan for the day • Allow for greatest freedom within the limits of pt's condition • Encourage empowered decision-making • Provide education regarding continued risk assessment	
• Ox3, Sphere of awareness: includes hospital environment • Alternates attention with ease • Able to recall new multi-step tasks • Plans for present • Acknowledges need for assistance • Requests resources to implement plan • Initiates use of correct strategy	• Self-focused behaviors: "Here and now thinking" • Demonstrates emerging insight • Watches TV and uses remote, recalls programming • May need cues to manage extraneous stimuli	**Reasoning and Judgment** Moderately Structured Environment	• Collaborate on plan for the day • Help pt take ownership of things pt can do • Discuss daily, seasonal events • Problem solve collaboratively • Support pt's goals for ADL and mobility • Break down information into tasks/steps	
• Ox1-2, possibly 3, sphere of awareness: include room environment • Alternates between 2-3 stimuli • Follows 3-step directions • May acknowledge existing problems • Can sustain attention 5-10 min • May exhibit impulsive behavior	• Behavior not consistent with pt's stated understanding of condition • May have memorized info but cannot implement independently • Watches TV, loses remote, forgets programming • Needs assistance to manage extraneous stimuli/safe ambulation	**Memory/ New Learning** Highly Structured Environment: Minimal Distraction	• Provide external orientation aids – write on whiteboard correct date, place, situation and simple goals for the day • Provide assist to identify when problem is occurring, help generate possible solutions	• Focus on one activity or one person at a time • Help pt prioritize activities provide immediate and objective feedback during the activity • Help prioritize top 2 goals for pt to focus on • Acknowledge frustration
• Ox1-2 , sphere of awareness: extends to bedside table • Alternates between 2 stimuli • Demonstrates spontaneous motor movements after prompting • Follows 2-step directions • Can sustain attention 2-5 min • May demonstrate emerging awareness	of existing problems, but lacks insight into deficits • May watch TV but does not track content • Pt may hyper-focus on extraneous stimuli • Poor insight into balance deficits	**Environmental/ Spatial Awareness** Highly Structured Environment: Minimal Distraction	• Post signage at bedside • Establish functional routine and activity • Allow for extra time for safe transfers • Gentle redirection, use repetition to increase pt's awareness • Identify problems and priorities for pt and give limited choice of solutions • Allow increased time to respond to	questions and give gentle redirection • Provide routine and consistency ★ Frequent checks or round hourly ★ Reinforce positive behavior and engagement in care ★ Always cue pt before touching them ★ Limit amount of responsibilities given to pt
• Orients to name, sphere of awareness </= bed • Pulls on lines, sheets, exit-seeking • Redirecting pt is difficult, often not possible given reduced processing ability • Closes eyes frequently, does not sustain eye contact • May recall single-step task or have difficulty starting a task • May misperceive environment and/ or use common items inappropriately	(brush hair with toothbrush, does not register TV) • No memory of care providers • May visually hallucinate • Often exhibits fear and distress/anxiety • Extraneous stimuli contributes to agitation • Minimal balance awareness	**Attention** Completely Structured Environment: Non-distracting	• Close (18 inches) engagement with eye contact to cue • Engage pt in a simple/familiar task: i.e., washing face, combing hair, etc. • Reassure pt they are in safe environment • When mobilizing use second person for safety, supervised when out of bed • Don't insist on re-orientation, use distraction when indicated • Gentle redirection providing safety reassurance	• Tell pt what they can do, not what they can't do • Guide rather than correct • Provide a verbal and tactile prompt to start the activity, use hand-over-hand guidance to perform a task • Allow extra time for appropriate pt response to 1-step command • Keep focus on here and now, use short simple phrases • Include starred (★) interventions found in Environmental/Spatial Awareness
• Alerts to name/tactile stimulation • Pt may open eyes briefly to verbal/ tactile stimulus • Gaze non-focal	• Unaware of environmental cues including TV • Brief but unsustained eye contact • Demonstrates 1 motor movement following passive movement	**Arousal** Completely Structured Environment: Non-distracting	• Assist with face washing, hand/foot massage • Gentle sensory stimulation, i.e. gentle voice, calming music • Passive range of motion	• Completely dependent on others for safety, provide and manage safe environment • TV is untherapeutic • Include starred (★) interventions found in Environmental/Spatial Awareness

Figure 1. Cognitive pyramid.

Memory & New Learning level, these patients benefit from a highly structured, minimally distracting environment. Interventions include establishing a daily routine that is posted for the patient to reference frequently, allowing extra time for them to respond to questions, and giving gentle redirection including repetition to increase their awareness. Patients at this level and below do better with the television off, especially when interacting with them as they struggle to screen out extraneous stimuli.

The next level of the pyramid is the *Attention* level. Patients in this level are often described as "agitated" or having hyperdelirious behaviors, and require a completely structured, nondistracting environment for their safety. These patients can become frightened or anxious, and reassuring them they are in a safe environment with eye contact during all interactions may help alleviate some of their fears. However, common nursing interventions of distraction, reassurance, and guidance may or may not be successful. Often a personal safety attendant or sitter is required to maintain safety, and pharmacological interventions may be necessary to ensure safety and reduce psychic fear and distress. At this level, sleep can be severely impacted, which can negatively affect cognition, and monitoring is critical to maximize a normal circadian rhythm.[26]

At the bottom of the pyramid is the *Arousal* level. Patients are often assessed as hypodelirious and sometimes their nonengagement is misinterpreted as depression or failure to thrive. For their safety, they are reliant on a completely structured hospital environment and total care.

Assessment

To evaluate face validity of the Cognitive Pyramid, 15 subject matter experts (psychiatrists, geriatricians, advanced practice nurse practitioners, and advanced practice OTs) were asked via email letter to complete an electronic survey linked within the letter. Participants were asked to rate the appropriateness of interventions and assessment behaviors for each level of the Cognitive Pyramid using a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). In addition, participants could provide feedback by responding to the following questions: (1) How clear is each behavior/intervention? (2) Should anything be added/omitted? (3) What could increase accuracy of the assessment? (4) How impactful are appropriate interventions?

To evaluate inter-rater reliability of the Cognitive Pyramid, 75 patients were assessed independently by both the authors and a staff nurse or OT using the Cognitive Pyramid. The authors completed their independent assessment of the same patient within 30 minutes prior or following the staff assessment to limit possible changes in the patient's clinical condition, which would impact results of the assessment. The 2 independent assessments were then compared for alignment. Additionally, fall rates were tracked over time on a run chart to identify improvements after implementation of the Cognitive Pyramid during interprofessional rounds.

RESULTS

Of the 15 subject matter experts, 12 (80%) completed the face validity survey. A mean score of greater than 3.5 was considered an appropriate score for face validity. For the appropriateness of *assessment behaviors*, agreement from participants ranged from a mean of 3.68 to 3.9 (executive functioning, arousal = 3.9; reasoning and judgment, attention = 3.75; memory/new learning, environmental/spatial awareness = 3.68) (Figure 2). For the appropriateness of *interventions*, participants rated 5 of the 6 levels with a mean of 4 (executive function, reasoning and judgment, memory/new learning, environmental/spatial awareness, and arousal); the attention level received a mean of 3.9. All components had a mean score of greater than 3.5, indicating face validity for the Cognitive Pyramid.

In the 75-patient sample, when staff nurses had training and experience using the Cognitive Pyramid, they were in agreement with the expert assessment 80% of the time (18 of 22 patients assessed). Occupational therapists were congruent 100% of the time (12 of 12 patients assessed). Nurses with little or no experience with the Cognitive Pyramid tended to assess patients 1 level higher on the pyramid than the expert assessment and were only 50% in agreement (8 of 16 patients assessed).

The Cognitive Pyramid was integrated into the interprofessional RSRs in January 2012. Prior to integration, the fall rate per 1000 admissions was 4.9 in December of 2010; the fall rate per 1000 admissions reduced to 0 in December of 2020, a 100% reduction (see the Supplemental Digital Content Figure, available at: http://links.lww.com/JNCQ/B24).

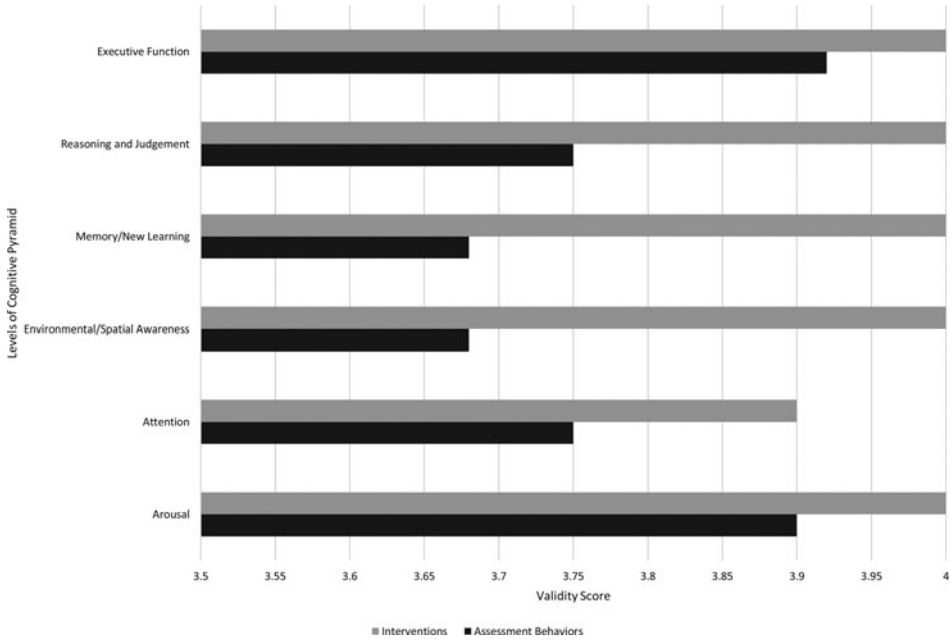


Figure 2. Content validity of assessment behaviors and interventions of the cognitive pyramid: greater than 3.5 is valid.

DISCUSSION

The purpose of this article was to describe the development and face validity of a comprehensive cognitive assessment tool that also provided interventions to promote patient safety. Literature supports the use of thorough cognitive assessments by the interprofessional team in preventing patient harm, such as from falls.[27,28] Many tools have been validated to screen for cognitive impairment in an acutely hospitalized patient[8-11,13]; however, few connect the fluctuation and variability of cognitive status with corresponding evidence-based safety interventions.[4] Additionally, studies have shown a reduction in falls after comprehensive cognitive assessments were integrated.[7,26,29] A reduction in patient falls occurred after the Cognitive Pyramid was integrated in interprofessional RSRs.

Nurses are in a unique position to observe and track behaviors in great detail, either through their interactions with the patient or by observing the patient in their environment. By utilizing a hierarchal cognition tool (Cognitive Pyramid), nurses can then use their assessments to guide environmental and psychosocial interventions regardless of a neurocognitive diagnosis or lack thereof. More research is needed to identify the effectiveness of these interventions.[30,31] Person-centered complex psychosocial interventions are difficult to research. Clinical experience validates effectiveness on a case-by-case basis and reinforces the complex nature of human interaction.

Limitations

There are several limitations to this article. First, face validity was established with only 12 participants; further psychometric testing is needed to understand the effectiveness of the Cognitive Pyramid. Additionally, only a small sample size (n = 75) was obtained to interpret interrater reliability. The education provided to staff nurses regarding cognition and the Cognitive Pyramid varied in timing and without standardization. Resources for RSR and cognitive assessment training were limited. Education was often provided "on the fly" during RSR or ad hoc; no formal investment in cognitive assessment training for all staff occurred. Interested nurses volunteered for RSR participation, others required persuasion, and night shift participation was intermittent. Additionally, falls were only assessed on 1 inpatient unit, which may limit generalizability. Even after fall rates declined, it was difficult to reinforce the connection between cognition and safety since 100% of the nurses were not trained. Nurses were not formally interviewed or surveyed regarding the perceived effectiveness or ineffectiveness of their use of the Cognitive Pyramid. Consequently, individual

statements of approval signifying usefulness may have a high degree of bias and are anecdotal.

CONCLUSIONS

We developed a comprehensive Cognitive Pyramid that demonstrated appropriate face validity for use in RSRs to role model, teach, and communicate assessment of cognitive functioning and intervention planning. Utilizing a cognitive tool that offers evidence-based interventions provides the nurse with actionable strategies that could keep high-risk patients safe. When addressing fall and harm prevention, cognitive assessment is a key component; aligning the appropriate functional cognitive assessment with strategies for intervening at the right cognitive level may improve safety. When team members were equipped to systematically use functional cognitive assessments paired with interventions, individualized evidence-based safety plans were developed and communicated and thus safer care was delivered. Other units may consider adopting this type of comprehensive Cognitive Pyramid.

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