Delirium Unveiled: Bridging the Gap in Knowledge and Accurate Detection for Enhanced Nursing Care

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Abstract

Objective: This evidence-based practice (EBP) project aimed to address the critical challenge of delirium detection, prevention, and treatment within a healthcare organization. The primary objective was to evaluate the impact of an educational program with the integration of a screening tool on the nurses' understanding of delirium.

Methods: *Design.* A repeated measure cross-sectional survey design with data collected at pre-intervention (T1), immediate post-intervention (T2), and 3 months post-intervention (T3) was employed. *Setting*. A suburban hospital within a multi-facility network on a 52-bed neuro-trauma-ortho unit. *Participants*. The target population was nurses working on the selected unit. *Measurements*. A nurse questionnaire for knowledge gained and retained. In addition, secondary measures of patient data on falls, restraints, length of stay, and discharge disposition. *Intervention*. A concise 10-minute in-person education session with the integration of the valid, reliable delirium screening tool into the electronic medical record (EMR).

Results: Sixty nurses participated in this EBP project. There was a statistically significant knowledge improvement between pre-DKQ (T1) and immediate post-DKQ (T2) scores (T1 M = 25.60 [71%], T2 M = 30.37 [84%], $p < .001$). Seventeen nurses completed the 3-month post-DKQ (T3) surveys, demonstrating an average score of 31.29 [87%]. Delirium-positive patients were 60% (pre)/78% (post) of individuals restrained, and 57% (pre)/32% (post) of the unit falls.

Conclusions: The concise, in-person education session was successful in improving and maintaining DKQ scores. This, paired with integrating a valid and reliable screening tool, is an effective and practical method for enhancing nurse delirium care.

Keywords: delirium, nurse, education knowledge, prevention, detection, treatment

Delirium Unveiled: Bridging the Gap in Knowledge and Accurate Detection for Enhanced Nursing Care

Delirium, an ongoing concern prevalent within the hospital environment, casts a long and foreboding shadow over countless patients. This condition is more than a passing inconvenience—it represents a formidable challenge for patients and healthcare providers. There is a strong correlation between patient deterioration and a potential cascade of adverse outcomes. The impact and prevalence of delirium have led national organizations like the American Delirium Society, the National Institute on Aging, and the Patient-Centered Outcomes Research Institute to commit to advancing our understanding of delirium over the past two decades. Nevertheless, this issue remains under-recognized and inadequately addressed at the bedside.

Background and Significance

Problem and Impact

Delirium represents an abrupt neurocognitive shift characterized by disruptions in attention, awareness, and cognitive processes (American Psychiatric Association [APA], 2022; World Health Organization [WHO], 2019). Disturbances in attention involve challenges in directing, sustaining, and shifting focus (APA, 2022). Altered consciousness includes disorientation, situational/environmental awareness changes, and shifts in alertness. Lastly, disruptions in cognitive processes affect memory, language, visuospatial abilities, motor coordination, and perception (APA, 2022). Delirium often presents as a combination of these features, making detection complex and difficult without ample familiarity.

Among general medical hospitalized adults, an estimated 20-40% experience delirium (Boettger et al., 2021; Ospina et al., 2018), up to 50% in postoperative patients (Boettger et al., 2021; Ho et al., 2021), and 23% in stroke patients (Shaw et al., 2019). In intensive care unit

(ICU) patients, the rate can be as high as 80% (Boettger et al., 2021; Krewulak et al., 2018; Ospina et al., 2018). Various predisposing factors or causes can contribute to the development of delirium, including those 65 and older, multiple comorbidities, anesthesia/surgery, infection, metabolic abnormalities, and neurological conditions (Fuchs et al., 2020; Hshieh et al., 2018; Jin et al., 2020; Mattison, 2020; Wilson et al., 2020). In a study by Guay et al. (2023), electroencephalogram studies on delirium-positive patients revealed that delirium stems from a combination of neurotransmitter dysregulation and network dysconnectivity. Additionally, the authors found a strong correlation between the severity of the condition and the patients' projected recovery (Guay et al., 2023).

Delirium-associated sequelae include increased morbidity and mortality due to adverse outcomes of falls, sedative use, restraints, longer length of hospital stay, and functional decline (Ospina et al., 2018; Thom et al., 2019; Wilson et al., 2020). Furthermore, delirium can have long-term consequences on cognitive, social, or physical functioning and potentially lead to the development of dementia (Atkins et al., 2021; Hayhurst et al., 2020; Nerdal et al., 2022). Moreover, the financial burden associated with delirium is substantial. From an estimated 700,000 cases of delirium in Medicare-enrolled patients, the overall cost was estimated to be approximately $32.9 billion (Gou et al., 2021). However, it is a preventable and reversible condition almost exclusively seen in hospitals (National Institute for Health and Care Excellence [NICE], 2023). These ramifications emphasize the need to address delirium without a financially taxing intervention that would mitigate the positive effect.

Purpose and Rationale

Delirium is not indicative of a failure by the organization or healthcare system. Rather, it represents a physiological condition that requires the contribution of these entities to promote its

betterment. Recognizing, preventing, and treating delirium are the crucial challenges faced by healthcare organizations. Without a reliable screening tool or evidence-based staff education, reactive safety-focused care is the only option available to bedside staff. This evidence-based practice (EBP) project aimed to bridge the gaps in delirium knowledge and detection by implementing staff education and integrating a delirium screening tool into the electronic medical record (EMR).

Population

Nursing staff play a pivotal role along the continuum of delirium care, acting as the primary drivers behind the successful implementation of EBP interventions for enhancing patient care. Delirium demands a multidisciplinary approach, and nurses are at the forefront of this endeavor. The American Nurses Association (2015) recognizes the fundamental role of nurses and has developed practice guidelines with EBP recommendations on the identification, prevention, and management of delirium. Nurse education is identified as an essential action for improving patient outcomes (American Nurses Association, 2015). A nurse's understanding of the condition and ability to apply evidence-based interventions significantly influences adverse events. Nurses are on the front lines of patient care, offering an irreplaceable perspective that facilitates the prevention and early detection of delirium.

In the hospital setting, nurses often serve as the first providers to recognize subtle shifts in patients' behavior or cognitive function. Recognizing early signs is crucial for timely intervention, as delirium is often reversible when detected and managed promptly (American Geriatrics Society, 2019). The tools for detecting delirium, the guidelines, and initial interventions heavily rely on the active participation of nursing staff (American Geriatrics Society, 2019). They serve as a central hub within the healthcare team, fostering collaboration

and effective communication among numerous providers. Grealish et al. (2019) proposed a comprehensive delirium care framework, stressing the importance of a multidisciplinary approach with nurses as a dominant component. The framework highlights the need for education and training to enhance nursing staff's knowledge and skills in delirium care (Grealish et al., 2019). The nurses' knowledge, vigilance, and active participation are indispensable. Empowering nursing staff with information will improve patients' quality of care and outcomes.

Intervention

Researched interventions for managing delirium fall into two categories: non-pharmacologic and pharmacologic. There is an ongoing emphasis on expanding preventative approaches, thus non-pharmacologic interventions are paramount. Nonpharmacologic strategies encompass sleep enhancement, mobility promotion, sensory management, reorientation, and cognitive support. Sleep promotion interventions have demonstrated reductions in both the duration and severity of delirium (Gode et al., 2021; Kukuck & Elertson, 2022; Mulkey et al., 2019). Mobility promotion interventions have been linked to decreased aggressive behaviors associated with hyperactive delirium and mitigate physical deterioration (Anada et al., 2022; Kresevic et al., 2020; Mulkey et al., 2019; Nydahl et al., 2023). Sensory interventions addressing patient hyperstimulation, hearing or vision deficits, and auditory environment enhancements have decreased the incidence and severity of delirium (Mulkey et al., 2019; Sangari et al., 2021). Reorientation and cognitive support interventions, such as interactive and memory-enhancing tools, have proven effective in reducing the severity, duration, and aggressive behaviors (Hwang et al., 2021; Mulkey et al., 2019). Multicomponent protocols that incorporate a combination of these interventions have demonstrated reductions in incidence, duration, severity, and instances of falls (Babine et al., 2018; Bannon et al., 2019; Burton et al., 2021; Chen et al., 2022;

Hasemann et al., 2016; Taylor et al., 2022; Zhang et al., 2020). Overall, interventions centered around direct patient care exhibit efficacy in preventing and managing delirium.

A third category of an arduously evaluated intervention that incorporates all of these potential measures is nursing education. Nurse education has been unequivocally established as the most effective, comprehensive approach for enhancing delirium care. Education-focused interventions are fundamental in translating the described non-pharmacologic strategies—such as sleep enhancement, mobility promotion, sensory management, reorientation, and cognitive support—into clinical practice. A multitude of studies support the profound impact of nurse education on improving delirium knowledge, enhancing screening tool performance, and yielding positive patient outcomes (Aldawood et al., 2021; Balková & Tomagová, 2018; Byrnes, 2021; Choi et al., 2020; Cyrus et al., 2021; Dormandy et al., 2019; Ewens et al., 2021; Francisco et al., 2022; Grealish et al., 2019; Johnson, 2021; Lieow et al., 2019; Mitchell et al., 2020; Sinvani et al., 2021; Van Velthuijsen et al., 2018). The evidence supports preparing bedside nurses with the necessary knowledge to provide effective delirium care to patients.

Comparison

An internal assessment of this organization and its approach to delirium care revealed a need for consistent staff education, evidence-based interventions, and practice protocols. While elective educational materials are available for delirium, all of the available courses are optional. None of the offerings provide a comprehensive overview or a complete list of potential interventions. Within the organization's ICUs, the CAM-ICU screening tool (Ely et al., 2001) is utilized along with a sedation-weaning protocol as the strategy to mitigate the occurrence and severity of delirium. However, delirium screening is not required outside of the ICUs. The nursing staff primarily provides reactive behavioral support. This includes safety-oriented

measures such as chair or bed alarms, restraints, and medications to manage aggressive behaviors. These treatment choices are either ineffectual or have a high risk of promoting adverse patient outcomes.

This analysis of current practices at the organization emphasized a clear issue. There is a notable gap in the use of guidelines being translated into clinical practice. This may be attributable to the existing guidelines having a narrow population scope or being outdated. Guidelines from organizations such as the APA, the American Nurses Association, the American Academy of Family Physicians, and the American Geriatrics Society are outdated. However, NICE (2023), an internationally recognized resource, has recently updated guidelines for preventing, diagnosing, and managing universal in-patient delirium. Similarly, the Society of Critical Care Medicine has issued current clinical practice guidelines for managing delirium in adult ICU patients (Devlin et al., 2018). The discrepancy between established practice guidelines and the subsequent failure to integrate that evidence into practice perpetuates suboptimal delirium care.

Outcomes

Primary

The primary focus of this EBP project was to achieve significant and lasting effects in delirium care through targeted efforts. The central objective focused on enhancing the nurses' knowledge of delirium, with an emphasis on ensuring long-term retention. Recognizing the indisputable effectiveness of nurse education in improving delirium care, knowledge acquisition stood as the fundamental and primary outcome measured in this initiative. The congruent aim was to translate the enhanced knowledge into practical skills and application at the bedside.

Follow-up assessments and reinforcement efforts were integrated into the project strategy to gauge the durability of knowledge gained among participating nurses.

Secondary

Indicators for short-term outcomes related to the morbidity of patients with delirium encompassed measures such as restraint utilization, falls with or without injury, discharge disposition, and the average length of stay (Babine et al., 2018). A meta-analysis by Ho et al. (2021) demonstrated that interventions aimed at preventing delirium led to a remarkable reduction of up to 43% in hospital-associated falls. Investigations into long-term outcomes remain limited due to the substantial time and resources required to monitor cognitive, social, and physical functioning. Nevertheless, a study conducted by Hayhurst et al. (2020) revealed a correlation between extended periods of hypoactive delirium and the sustained decline of cognitive function one year later. Strengthening bedside screening processes and overall delirium knowledge was expected to yield measurable improvements in short-term outcomes with the potential for improvement in long-term outcomes. Conceivably, these changes would benefit the patients, healthcare staff, and organization alike.

PICOT Question

A review of the observed organizational clinical practices led to the development of the clinically relevant PICO question: “Among the nursing staff of an adult non-critical care unit (P), what is the impact of a delirium education session coupled with the implementation of a screening tool (I) compared to existing practices (C) on enhancing overall comprehension and retention of knowledge of delirium (O)?” and led to the following exhaustive literature search.

Literature Search

A thorough and exhaustive database search was undertaken to identify current evidence on all aspects of the PICO question. The search encompassed five pertinent and clinically relevant databases: CINAHL, PubMed, Cochrane, MEDLINE, and NIDUS. From this search, a multitude of primary research sources (e.g., randomized controlled trials, cohort studies, mixed methods studies, or qualitative studies) and a selection of secondary literature sources (e.g., systematic literature reviews or meta-analyses) were procured. Key terms and phrases such as *delirium*, *nursing*, *nurse(s)*, *education*, *educational course*, *module*, *education program*, *comprehension*, and *knowledge* were employed to refine search results.

Initial search yields varied by database. CINAHL yielded 64 articles with the initial query and 46 after refinement. PubMed produced 784 results initially and 92 after further modification. The Cochrane search resulted in 28 Cochrane reviews, three protocols, and three editorials with no significant changes by modifiers. NIDUS yielded 120 initially and 41 articles, with additional searches refined by contributing relevant information. MEDLINE produced 143 articles. The search criteria included a publication date range of 2018-2023, the English language, and the adult or older adult age group. The studies had to involve education as the primary intervention and nursing staff as the primary participants. After a critical review, ten articles were included, comprising nine quasi-experimental studies and one randomized control trial.

Evidence Synthesis

The final selection of studies underwent an assessment of quality and rigor using a rapid critical appraisal (RCA) tool (Melnyk & Fineout-Overholt, 2019) with a focus on bias evaluation. The biases identified were minimal; attrition bias was the most consistently recognized. This appears in three of the ten studies (see Appendix A, Table A1). The included studies generally had sufficient sample sizes and homogeneity in participant attributes. The

majority were conducted in non-critical care hospital units within the United States (see Appendix A, Table A2). The interventions often combined online and in-person formats lasting an hour or less. Post-intervention measurements were taken immediately or at a pre-determined length of time follow-up to determine knowledge retention. The times ranged from 2 weeks to 6 months, and the nurses' Delirium Knowledge Questionnaire (DKQ; Hare et al., 2008) was utilized in all studies. The evidence derived from these studies demonstrated improvements in delirium knowledge, knowledge retention, confidence levels, utilization and performance of screening tools, detection rates, and incidence rates (Aldawood et al., 2021; Byrnes, 2021; Choi et al., 2020; Cyrus et al., 2021; Ewens et al., 2021; Francisco et al., 2022; Grealish et al., 2019; Oberai et al., 2021; Sinvani et al., 2021; Van Velthuijsen et al., 2018). The most pronounced positive outcomes were observed in knowledge improvement, screening tool utilization, and screening tool performance.

Overall, the culmination of this rigorous review of the literature validated the pivotal role that nurse delirium education programs play in enhancing the quality of delirium care. In-person, didactic education or a combination of online and in-person formats emerged as effective in improving knowledge compared to strictly online methods (Aldawood et al., 2021; Byrnes, 2021; Choi et al., 2020; Cyrus et al., 2021; Ewens et al., 2021; Grealish et al., 2019; Oberai et al., 2021; Sinvani et al., 2021; Van Velthuijsen et al., 2018). This suggests that the interactive nature and immediate feedback of in-person education would effectively drive knowledge acquisition and retention among nursing staff. Therefore, an in-person education session was decided upon for this EBP project program. Additionally, the evidence showed that knowledge retention was achievable (Aldawood et al., 2021; Grealish et al., 2019; Oberai et al., 2021). This was applied with the integration of a 3-month post-intervention knowledge assessment.

A noteworthy gap in the literature was the lack of evaluation for patient indicators pre- to post-intervention. Identifying the gap between the aim for patient outcome improvement and the inclusion of patient indicators established the addition of secondary outcome measures for patient morbidity indicators (e.g., falls, restraints, length of stay, and discharge disposition).

Theoretical Framework

Learning is a complex and abstract phenomenon that can be challenging to conceptualize without a technique for evaluating and illustrating its parts. This prompts the use of a theory to guide understanding. Theories describe constructs and perceived relationships between primary concepts to clarify complex phenomena (Reed & Shearer, 2018). A theory is essential for structuring and exemplifying the fundamental pieces for developing a successful education intervention that caters to an individual's learning process.

Kolb's (2014) theory of experiential learning proposes that learning is a continuous cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation (see Appendix B, Figure B1). Concrete experience and active experimentation represent the practical aspects of learning, involving hands-on participation and application. Conversely, reflective observation and abstract conceptualization encompass the cognitive processes of learning. This involves interpreting information evaluated in relation to its meaning or value and analyzing connections, relationships, or patterns that extend beyond the physical representation (Kolb, 2014). It is within these domains that learning styles emerge.

Kolb (2014) suggests that a person's dominant learning style is evident in their time allocation within the cycle's four elements (see Appendix B, Figure B2). *Accommodators* are hands-on learners inclined towards practical experiences. *Divergers* are creative and imaginative learners excelling in idea generation. *Assimilators* are analytical learners seeking organized

frameworks. Lastly, *convergers* are adept problem solvers applying practical solutions to distinct scenarios. Learners will cycle through all steps when encountering new information. However, Kolb (2014) found that an individual's profession often aligns with their dominant learning style. For instance, his research revealed that around 70% of nurses are *accommodators* or *divergers*. Applying this theory in crafting a nurse education session can aid in effectively addressing nurses' learning needs through experience, reflection, and experimentation.

Implementation Framework

While the development of the project intervention is guided by the theory of experiential learning (Kolb, 2014), the project implementation process will be tailored to the model for change to evidence-based practice (see Appendix C; Rosswurm & Larrabee, 1999). This model provides a structured framework for implementing change in alignment with EBP principles based on change theory and research utilization practices. The model is designed for healthcare professionals in a hospital setting, focusing on planning and integrating EBP protocols (Rosswurm & Larrabee, 1999).

In line with the model for change to evidence-based practice (Rosswurm & Larabee, 1999), the project's course began with identifying the need for practice change through stakeholder involvement, internal data collection, and external evidence comparison. By integrating the screening tool and implementing a nurse education session, the current practice was replaced due to the identified need for change. This is then followed by connecting the identified problem with research evidence and extracting potential interventions, tools, and outcome indicators (Rosswurm & Larrabee, 1999). Synthesizing and assessing the evidence for applicability to practice is crucial in this phase. A comprehensive plan for resource acquisition, implementation procedures, and outcome definition was then crafted. Piloting and evaluating the

intervention's adaptation, adoption, or rejection follows. Sustainable change is emphasized through a maintenance plan involving stakeholder engagement, practice protocols, and continuous outcome monitoring (Rosswurm & Larrabee, 1999). The model delineates the essential cycle of steps for effectively integrating evidence into practice. Each of these phases were utilized to guide the process of developing this EBP project. The project adhered closely to the model's guidance through each step for successfully moving EBP changes into practice.

Methods

Setting and Stakeholders

The organization addressing delirium is a non-profit healthcare organization in the Arizona metropolitan area. The project site was a level-one trauma and comprehensive stroke care center serving individuals aged 16 years and older. The participating unit was a 52-bed neuro-trauma-ortho step-down floor. The unit’s patient population included an estimated 40-50% stroke or other acute neurological conditions and 50-60% trauma or orthopedic patients (Unit Director, personal communication, August 2022). Among these, an estimated 30-40% were ICU downgrades (Unit Director, personal communication, August 2022). Given the multitude of patient risk factors and predisposing conditions, the unit was projected to have high delirium rates.

Falls, restraints, longer lengths of hospital stay, and discharges to a facility were identified through a unit review of potential patient delirium-associated adverse outcomes. Therefore, the delirium-related consequences were enlisted as secondary outcomes measured for this project. Accordingly, the primary stakeholders in this EBP project were bedside nurses. From the evidence in the literature, they were deemed fundamental in their administration of the screening assessments and in providing patient interventions. The organization had a vested

interest in addressing this issue for the potential of reduced adverse patient outcomes and reduced associated costs of delirium care.

Project affiliates included the unit director, unit-appointed clinical nurse educator, network director of professional practice, and the neuro-stroke clinical nurse specialist. These affiliates each held a stake in this EBP project for the opportunity it extends for sustainable enhancements across the organization. Their primary roles in the project were to facilitate initial participation and act as resources for staff to reinforce the proposed changes.

Participants and Recruitment

Participant selection was enlisted from a targeted sample of nursing staff on the unit suspected of encountering delirium patients routinely. The eligible staff consisted of part-time, as needed (PRN categorized), or full-time registered nurses (RN) on the selected unit with any degree preparation and English proficiency. Exclusion criteria included float staff (those without permanent unit assignments), nursing students, RNs hired after the education intervention's completion, and certified nurse assistants or patient care technicians. These exclusions were due to their inability to fully participate in all intervention requirements or be followed for post-education survey evaluations. Participants had to be licensed individuals capable of performing the screening tool assessment. The number of nurses who met the inclusion criteria on the selected unit at the time of intervention was 69. The target enrollment number was 59 people to achieve a 95% confidence interval with an $e = 0.05$ margin of error and $\sigma 2 = 0.25$ population variance (Intellectus Statistics™, 2023). The project lead managed recruitment, enrollment, and consent procedures. Staff recruitment was facilitated by an initial announcement email, which was dispatched one week prior to the project's onset and covered the project's main elements. Participation in the project was voluntary through attendance at the staff's pre-shift huddle.

Measurements and Instruments

Delirium

Delirium is an acute neurocognitive condition characterized by a sudden disruption in attention, awareness, and cognitive processes (APA, 2022). The CAM tool (short form; Inouye et al., 1990) is a valid and reliable diagnostic tool substantiated by DSM-V criteria (APA, 2022; Helfand et al., 2021; Jones et al., 2019). CAM's psychometric tests indicate high reliability (presence/absence of delirium 100% k =1.0; assessing 4 CAM features 93% k =0.81), convergent validity, sensitivity/specificity (1.00/0.95 [site 1], 0.94/0.90 [site 2]), and predictive validity (Inouye et al., 1990). With robust psychometric testing and diagnostic alignment, CAM is optimal for nursing staff to detect delirium. The CAM tool has been cited as one of the leading tools for assessment in works evaluating nurse screening tools for delirium (Brefka et al., 2022; Heinrich et al., 2019; Hefland et al., 2021; Jones et al., 2019; Mulkey et al., 2018; Oh et al., 2022). The limitation of this screening tool is the time required to assess the patient for each feature, which is an estimated 3 minutes of cognitive evaluation (NIDUS Measurement and Harmonization Core, 2020). Additionally, the tool requires training necessary to properly administer it. The CAM tool short form comprises four questions addressing acute onset/fluctuating course, inattention, disorganized thinking, and altered consciousness. Acute onset with fluctuating course and inattention are required for diagnosis, with disorganized thinking and altered consciousness as interchangeable conditional features (Inouye et al., 1990). Due to the robust evaluations and recommendations from the literature, this tool was selected for use. Additionally, the CAM tool was selected by the organization for its continuity from the critical care evaluations utilizing the ICU version.

Delirium Knowledge

Delirium knowledge is the basic understanding of the condition at the pathophysiologic level, along with the nature of treating the condition. The overall delirium comprehension and retention were measured using the nurses' DKQ (Hare et al., 2008). The literature review of works revealed that the DKQ is the most utilized tool for evaluating delirium knowledge and the only validated tool for non-critical care nursing staff (Grealish et al., 2019; Sinvani et al., 2021). The DKQ is a three-section evaluation with components of delirium definition, detection, and general information (Hare et al., 2008). It is comprised of an 8-item demographic and 36-item knowledge questionnaire (see Appendix D). Question one utilizes a multiple-choice selection for the delirium definition. Questions 2-8 utilize a multiple-choice selection with a single prompt for connecting the listed tool to associated conditions. A three-point Likert scale format is used for questions 9-36 with agree (1), disagree (2), or unsure responses (3). The DKQ underwent face validity testing with delirium experts (Hare et al., 2008) and content validity testing by Zilenski et al. (2023), yielding a high score of 0.88 on the Content Validity Index (CVI). The limitation of the content validity evaluation is the evaluators' inclusion of additional questions in the questionnaire. However, the authors report that the item level CVI scores (I-CVI) of the original 36 questions from the questionnaire were determined to be content valid with no changes to their original verbiage. The DKQ tool was utilized for evaluating nurse delirium knowledge due to its validity and its applicability in a non-critical care environment.

Delirium Impact

Delirium impact is quantifiable through measurement of adverse outcomes such as frequency of falls, restraint use, discharge disposition, and average length of hospital stay before and after intervention. As a secondary measure for this project, these indicators can reflect a starting point for patient outcomes in the selected unit. Changes in these indicators can signify

improvements in nurse detection and understanding of best patient care. These data points were assessed to determine the initial impact that delirium understanding translates into practice.

Procedures

This EBP project employed a repeated measure cross-sectional survey design, where data was collected at three time points: pre-intervention (T1), immediate post-intervention (T2), and 3 months post-intervention (T3). This design aligned with the project goals of assessing the impact of conducting an education session on nurse knowledge improvement and retention. Each program element was tailored for an intended target, with anticipated short to long-term outcomes accompanying their achievement (see Appendix E). These projected outcomes collectively advanced the overarching aims of the project.

The CAM tool (Inouye et al., 1990), prior to intervention initiation, was incorporated into the EMR in collaboration with the Information Technology (IT) department. The CAM tool was made accessible to unit nursing staff within their charting under the neurological assessment section of the chart flowsheets. The CAM tool populated for each patient assigned to the nurse along with a row for documenting completed interventions by that nurse for that shift. Additionally, the CAM tool appeared in the required documentation checklist that was already present in the charting system. Documentation adherence by the nurses for the CAM tool screening protocol of one screening per shift per patient was monitored through chart audits. This adherence measurement was a percentage of actual screenings completed relative to the potential opportunities.

Nurses completed the DKQ (Hare et al., 2008) prior to receiving education or supporting handouts. The education sessions were delivered by the project lead for 7 days at each pre-shift huddle for day and night shift. The sessions were brief, lasting 10 minutes or less. The

PowerPoint presentation was displayed on a conference room television. It covered delirium definition, risk factors, physiological causes, prevention measures, non-pharmacological/pharmacological treatments, and CAM tool use. Additionally, the nurses were instructed on locating the CAM tool within the EMR. Nurses received three handouts summarizing the main concepts, an evidence-based checklist of therapeutic interventions, and case studies. The case study handout incorporated five practice scenarios with delirium-related signs or symptoms assessable using the CAM tool to simulate the experience of evaluating delirium. The correct answers were provided separately.

After the educational session, the nurses were instructed to complete the DKQ again and where it was collected during walking rounds. This evaluation was to determine knowledge improvement immediately following the education session. Then, the project lead provided an additional 20 minutes of 'walking rounds' to facilitate reflective observation. This time was utilized to address inquiries, provide further instruction on CAM tool use, and offer one-on-one guidance for the nurses. The project lead also offered feedback and guidance for incorrect responses on the case study scenarios.

The same nurses who completed the initial surveys, identified by the project lead, were given the DKQ 3 months post-intervention completion to evaluate knowledge retention. The distribution and collection of the 3-month DKQs took place during the nurse huddle and were collected by the project lead for one week. The initial pre and post DKQs were paired by preassigned exam IDs given by the project lead and distributed coupled. This method failed to continue to the 3-month DKQs. Thus, the 3-month post-DKQs were assessed as an independent composite score.

Data Collection and Management

The education intervention was completed in the third week of September 2023. The project intervention ended 1 day early because all possible participants had been successfully recruited prior to the scheduled termination date. Participants completed the DKQ and a demographic data survey anonymously. Demographic information included age, gender, time in current position (years), shift status (day versus night), work-time status (part-time, full-time, PRN), years of nursing experience, and the highest level of nursing degree achieved. The DKQs and demographic surveys were securely stored in the project lead's home office. After transcribing DKQ and demographic survey responses to data sheets in Intellectus Statistics™ (2023), the paper surveys were shredded and discarded. The 3-month follow-up surveys adhered to the same secure storage and destruction process.

The secondary project outcomes for patient indicators consisted of unit fall rates, restraint usage, discharge disposition (home versus facility), CAMICU screenings, and the average length of hospital stay. For data security purposes, an organization-designated data analyst from the IT department extracted and organized all data in order to adhere to organizational data usage limitations (see Appendix F). A data report including all of the patient indicator measures was generated for the 3 months pre-intervention. With the addition of the CAM short-form screenings, a report was generated for the 3 months post-intervention. All reports related to patient indicator data and nurse screening chart audit data were stored in a secure file drive managed by the organization-designated data analyst. The data will be retained for 6 months following project completion. Access to DKQs, demographic surveys, and nurse chart audit data was restricted to the project lead, the organization-designated data collector, and the appointed organization’s statistician.

Ethical Considerations

This project adheres to three fundamental ethical principles: respect for persons, beneficence, and justice. Respect for persons involves safeguarding participants' dignity by protecting privacy, confidentiality, welfare, and autonomy (Melnyk & Fineout-Overholt, 2019). Beneficence is the principle of minimizing harm and promoting benefits to participants. Justice is the principle of equitable, fair treatment and equal opportunity to persons through access or availability (Buppert, 2021; Melnyk & Fineout-Overholt, 2019). These principles guided the project's approach to participant interactions, risk mitigation, and equitable treatment.

Participants' dignity and well-being were prioritized by safeguarding their privacy, autonomy, and confidentiality. Data collection was conducted anonymously, and patient measures were de-identified. Informed consent was obtained through a handout that specified comprehensive details about the project, ensuring participants were fully informed before agreeing to participate. Attendance at the education session served as implied consent, and a waiver of signed written or verbal consent was granted due to the minimal risk to the participant and the risk generated by a consent form for participant re-identification.

The principle of beneficence is upheld by minimizing harm and maximizing benefits for participants. The project posed minimal risks to participants, mainly involving the inconvenience of attending a short 10-minute education session and incorporating a screening tool into their routine daily charting. There was a minute risk of additional anxiety or stress from the added work tasks. No significant economic, physical, or legal risks were foreseen. Nurse participants could benefit from increased work satisfaction, reduced stress, fewer staff assaults, and a sense of control or autonomy. In adherence to ethical standards, the project methodology was reviewed by faculty mentors and the Institutional Review Board (IRB) to ensure respect for persons, beneficence, and justice were upheld throughout the project's execution.

Data Analysis

DKQ and demographic data was stored, managed, and analyzed utilizing Intellectus Statistics™ (2023) software. Descriptive statistics were utilized to describe the sample (e.g., shift, age group, gender) and compliance rates in frequencies and percentages. Inferential statistics were conducted to evaluate outcome variables. A two-tailed Wilcoxon signed rank test was conducted to examine whether there was a significant difference between pre-DKQ and immediate post-DKQ scores for the outcome of knowledge improvement. The two-tailed Wilcoxon signed rank test is a non-parametric alternative to the paired samples *t*-test and does not share its distributional assumptions (Conover & Iman, 1981). A Kruskal-Wallis rank sum test was conducted to assess for significant differences in pre-DKQ and immediate post-DKQ scores based on participant characteristics (length of time in current position, age group, degree preparation, ethnicity, work shift, gender). The Kruskal-Wallis test is a non-parametric alternative to the one-way ANOVA and does not share the ANOVA's distributional assumptions (Conover & Iman, 1981). A critical value of $p \leq .05$ was considered significant. Compliance rates of CAM documentation are expressed as a percentage of actual occurrences to the total potential opportunities (two/24 hours/patient).

Results

Demographics

The participant nurses of the neuro-trauma-ortho unit, $n = 60$, were recruited from a potential pool of 69 nurses who met the inclusion criteria. The participant group was predominantly female ($n = 56$, 83.33%), full-time ($n = 56$, 93.33%), BSN prepared ($n = 43$, 71.67%), aged 20 – 29 ($n = 23$, 38.33%), Caucasian ($n = 40$, 66.67%), with three or fewer years in nursing ($n = 31$, 51.67%) and in their current position for 1 – 3 years ($n = 19$, 31.67%). The

demographic characteristics of participants are shown in Table 1. Of the original 60 nurse participants, only 17 completed and returned the 3-month follow-up survey.

Table 1

Frequency Table for Demographic Data

Demographic	*n*	%
Work Shift		
Day	31	51.67
Night	29	48.33
Total Number of Years in Nursing		
3 or less	31	51.67
4 - 6	9	15
7 - 10	4	6.67
11 - 20	12	20
20+	4	6.67
Gender		
Female	50	83.33
Male	10	16.67
Work Status		
Full-time	56	93.33
Part-time	3	5
PRN	1	1.67
Length of Time in Current Position		
Less than 12 months	16	26.67
1 - 3	19	31.67
4 - 6	6	10
7 - 10	8	13.33
10+	11	18.33
Ethnicity		
Caucasian	40	66.67
Asian	9	15
Hispanic or Latino	7	11.67
Native American	1	1.67
Prefer not to say	2	3.33
Other	1	1.67

Degree		
MSN	5	8.33
BSN	43	71.67
ADN	12	20
Age Group		
20 - 29	23	38.33
30 - 39	20	33.33
40 - 49	9	15
50+	8	13.33

Note. Due to rounding errors, percentages may not equal 100%. PRN - As Needed, ADN - Associate Degree in Nursing, BSN - Bachelor Degree in Nursing, and MSN - Master Degree in Nursing

Primary Outcomes

The pre-DKQ (T1) score average was 25.60 (*SD* = 4.99, *Mdn* = 27) out of the possible 36 points with the scores ranging from 8 to 34. The immediate post-DKQ (T2) average score rose to 30.37 (*SD* = 2.46, *Mdn* = 31) with the scores ranging from 23 to 35 points. The two-tailed Wilcoxon signed rank test revealed a significant improvement between pre-DKQ and immediate post-DKQ ($V = 129.00$, $z = -5.19$, and $p < .001$). This signifies that the differences between pre-DKQ and immediate post-DKQ are unlikely due to random variation, indicating that the intervention increased nursing delirium knowledge. The 3-month follow-up post-DKQ (T3) score average was 31.29 (*SD* = 1.99, *Mdn* = 31) with scores ranging from 27 to 34. Due to a subject identification error, further analysis of the 3-month follow-up post-DKQ could not be accomplished. The summarized data of the three time-point survey results are shown in Table 2 and depicted in Figure 1.

Table 2

Summary Statistics Table for Time Points T1, T2, and T3 Survey Results

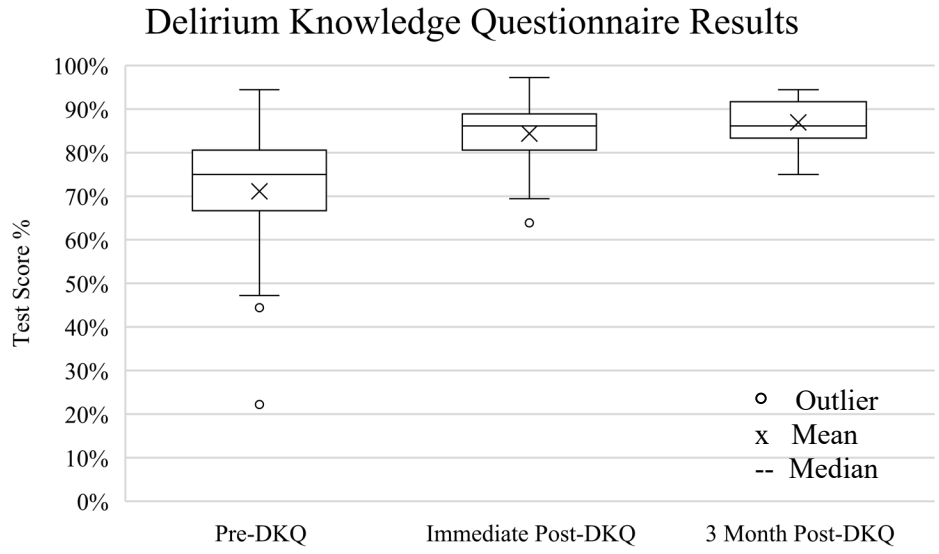
Variable	*n*	*M*	*SD*	*Mdn*	Min	Max	Total Points
Pre-DKQ Scores	60	25.60	4.99	27	8	34	36

Immediate Post-DKQ Scores	60	30.37	2.46	31	23	35	36
3-Month Post-DKQ Scores	17	31.29	1.99	31	27	34	36

Mean (*M*) – The average value of a scale-level variable.
Median (*Mdn*) – The value that 50% of the sample falls above and below after sorting values in an ascending manner.
Standard Deviation (*SD*) – The spread of the data around the mean of a scale variable.

Figure 1

Graph of Three Time Point Survey Results



The results of the Kruskal-Wallis test did not demonstrate an association of significance between T1 or T2 scores and the participant characteristics of ethnicity (pre: $p = .430$; post: $p = .317$), length of time in current position (pre: $p = .096$; post: $p = .746$), degree preparation (pre: $p = .266$; post: $p = .092$), number of years in nursing (pre: $p = .229$; post: $p = .459$), gender (pre: $p = 0.065$, post: $p = .092$), work shift (pre: $p = .870$; post: $p = .823$), and age group (pre: $p = .090$; post: $p = .184$). The DKQ outcomes were not influenced by the participant's demographic qualities, suggesting an objective evaluation.

The nurses' documentation of the CAM tool once per patient per shift was evaluated and found to have a 99.4% compliance rate. It is suspected that some of the missed CAM tool

screenings may have included float staff assigned to the unit during the post-intervention monitoring timeframe. Due to their unfamiliarity with the tool, those screenings were missed. Overall, nurses complied with documenting the CAM tool once a shift for each patient per the protocol.

Secondary Outcomes

The patient indicator data for pre- and post-intervention demonstrated a significant disparity in adverse outcomes for delirium-positive patients. The CAM-ICU screenings were evaluated for patients transferred to the selected unit during the pre-intervention time period. CAM-ICU positive patients represented 60% of those restrained. These patients were discharged to a facility (skilled nursing or acute rehabilitation) 60% of the time as opposed to 27% of the time for the general patient population. This demographic also experienced markedly longer hospital stays, with an average of 12.42 days, in sharp contrast to the general patient population's average stay of 3.38 days. Additionally, the CAM-ICU positive patients accounted for 57% of the unit falls during this time period.

In the post-intervention phase, the proportion of restrained patients who were CAM positive increased to 78%. This is likely due to the post-intervention period capturing floor CAM positive patients who had not been in the ICU. Similarly to the pre-intervention period, 56% of CAM-positive patients were discharged to a facility compared to 21% of the general patient population. Unit falls involving CAM-positive patients constituted 32% of the total occurrences. However, the total number of falls increased, which may be associated with the shift in average patient age during the post-intervention period. The average length of hospital stay for a CAM-positive patient decreased to 8.69 days, while the average stay for the general patient population was relatively similar at 3.13 days. This striking decrease in the patient length of stay may reflect

improvements in nursing care but may also reflect the inclusion of positive patients who did not require critical care time. These patients typically need fewer hospital days than those who require ICU care. Regardless, continued monitoring will be beneficial in assessing the impact of nursing knowledge on patient outcomes.

Impact and Sustainability

Sustainability in EBP emphasizes the need for ongoing reinforcement to maintain effective change (Melnyk & Fineout-Overholt, 2019). Thus, this project's implementation plan incorporated a sustainability strategy to ensure lasting change within the system. Research has shown that nurses who are satisfied with their work environment experience lower rates of emotional exhaustion and have a greater sense of autonomy and control, which reduces their intent to leave (Alharbi et al., 2020). In sustainable change, securing buy-in from the stakeholders is the main challenge.

Nurse and leadership endorsement was obtained following presentations of project evidence in organizational initiative groups. Network dissemination of the permanent integration of the CAM paired with an interactive education module on the organization’s online platform was granted. The education will be enforced through a yearly renewal of the online module. This format limits the associated cost of continuing the desired education (see Appendix G). The delirium module has been designed to be completed in 13 minutes or less and will be easily integrated into the standard required modules. The concise education session covers essential aspects, providing necessary information without overwhelming learners. The handouts from the project were embedded into the proposed online continuing education module. Additionally, the CAM tool has been incorporated into the existing nursing-required documentation checklist in

the EMR. This measure ensures enhanced accessibility of the screening tool to ensure proper utilization.

The hospital educators within the organization have been coached on the dissemination plan and topic to ensure a smooth transition for the other hospitals within the system. A dedicated organization champion, the neurology and trauma clinical nurse specialist with extensive delirium proficiency, will continue to support the practice change. They will offer ongoing support to leaders and help guide future network initiatives in delirium care.

Discussion

This EBP project aimed to enhance delirium understanding and attain knowledge retention among the nursing staff of a neuro-trauma-ortho unit suspected to encounter a high incidence of delirium patients. A concise educational session incorporating adjunct activities for facilitating learning needs in experience, reflection, and experimentation was utilized. The EBP project followed a repeated measure cross-sectional survey design with data collection at three time points to assess for knowledge improvement and subsequent retention. This provided a reflection of the impact of the intervention over time on delirium understanding.

The observed outcomes align closely with the research findings that informed the development of this project. There were notable increases in knowledge scores between the pre- and immediate post-questionnaires, with an indication of successful retention from the 3-month post-surveys. This suggests that the educational session effectively accomplished the established aims of enhancing and maintaining nurses' understanding of delirium. Furthermore, the valid and reliable delirium screening tool, CAM (Inouye et al., 1990), has been successfully integrated into the nurses' EMR to aid in detecting the condition's presence. This provided a pragmatic approach

to evaluating and monitoring delirium in patients. Thereby empowering the nurses to identify and intervene promptly for these patients.

Employing a tailored educational program for addressing various learning needs maximized the potential engagement of the individual nurse's learning style. The multifaceted approach allowed learners to dictate their education needs while limiting ineffective or extraneous activities. In moving forward, the project's sustainability employed an alternative program that mirrored these same concepts for the learner. The visual aids with supportive practice recommendations offered comparable didactic education. Although a plethora of alternative methods have been studied and deemed successful, the goal for this program was efficiency and effectiveness. The concise program was both effective and efficient.

Overall, the project's strengths lie in its conscientious design with a thoughtful approach to education delivery. The education also systematically encouraged the translation of EBP into actionable changes by the nurses. These strengths not only contributed to the success of the intervention but also laid the groundwork for future initiatives aimed at improving delirium care within the healthcare organization. Further work is needed in the development of practice protocols, broadening stakeholder engagement with physicians, and implementing advanced nursing interventions. Nonetheless, the foundational elements have been established.

Limitations and Barriers

Despite the positive findings from this EBP project, some limitations and barriers were encountered. Variability in individual motivation levels and competing demands on nurses' time may have influenced the extent to which subjects actively participated in the educational activities or survey follow-up. This potentially impacted the degree of effectiveness of the intervention on patient outcomes. Nurse participation in survey completion and the educational

session was ample. However, at the 3-month follow-up, the participation level was suboptimal and unsatisfactory. Several aspects may have contributed to this limited follow-up participation, such as a lack of incentive or the co-occurring educational tasks, but it impacted the ability to fully draw conclusions for determining knowledge retention.

Another limitation of the project was the potential external influence of an independent, concurrent development and implementation of a delirium care order set for the providers. This may have also contributed to the noted changes in secondary outcome measures. Initially, during the post-intervention phase, the providers did not utilize the order set. However, due to interdisciplinary communication, this delirium care order set was employed during the 3-month post-intervention period to aid providers in addressing delirium-positive patients. This may have amplified the program's success in the 3-month post-DKQ data. These limitations and barriers will impact any future iterations of this EBP project.

Conclusion

The synthesis of available evidence highlighted a clear demand for developing and implementing a nurse education intervention in addition to integrating a delirium screening tool. This comprehensive approach empowers nurses with essential knowledge and practical tools, which ultimately cultivates the skills necessary for proficient delirium management. This has been shown to enhance the quality of nursing care and the unit environment. Nurses satisfied with the improvements in the unit environment are more likely to sustain the necessary changes that lead to long-term changes. This equates to a reduced presence and severity of delirium. Recognizing the pivotal role of the organization's nursing staff in achieving this envisioned future state, the implementation plan placed their active participation at its core. By strategically engaging their expertise, insights, and commitment, the project accomplished the essentials for

addressing delirium. This collaborative approach fosters a culture of collective responsibility, wherein nurses become vital catalysts for transformative change—ultimately leading to improved patient outcomes and enhanced care quality.

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Appendix A

Synthesis and Evaluation Tables

Table A1

Evaluation Table for Quantitative Studies

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Aldawood et al., (2021), Impact of educational program on critical care nurses' knowledge of ICU delirium: A quasi-experimental study. **Country**: Saudi Arabia **Funding**: None reported. **Bias**: None identified.	**Inferred:** Theory of reasoned action	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** The aim was to assess the critical care nurse's knowledge of ICU delirium and the effectiveness of an educational program about the recognition and assessment of ICU delirium	*n* = 57 Convenience sampling **Demographics:** Female (94.7%), aged 30-39 (54.4%), and BSN (73.7%) prepared from medical, surgical, or coronary care ICU **Setting:** Medium sized metropolitan hospital **Exclusion:** Only RNs aged 20 years and older with a minimum of 6 months of time in a position **Attrition:** Three participants (5%)	**IV1:** 45-minute in-person PowerPoint **DV1:** DK pre-post intervention based on DKQ (2 weeks between) **Definitions:** Delirium is a neurocognitive disorder of attention and cognitive processes.	**Tools:** A modified version of the DKQ **Validity/ Reliability:** Internal consistency 0.80	**Statistical Tests Used:** Descriptive statistics G-power version 3.1 A paired sample t-test Mann-Whitney U test Kruskal-Wallis test Chi-square test Normality test Kolmogorov Smirnov	**DV1:** The nurses' knowledge post education session test scores (76.2) compared with pre-teaching test scores (38.1; p <0.001).	**Level of Evidence**: Level III **Strengths**: Large sample size Knowledge retention was tested The tool utilized was validated with the modifications made **Weakness**: Developed based on hospital physician directed content, which could pose as unreliable **Feasibility**: Small time requirement Simple format delivery **Application**: Lack of generalizability due to patient population

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Byrnes, (2021), Impact of delirium education on medical-surgical nurses' knowledge. **Country**: United States **Funding**: None declared **Bias**: Attrition bias	**Inferred:** Organizational theory of innovation implementation	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** To assess the effectiveness of the education program on nurses' knowledge, evaluate retention of the knowledge 3 months post intervention, and monitor delirium incidence following the intervention.	*n* = 88 (48 control & 40 intervention) Convenience sampling **Demographics:** Female (94%), BSN graduates (45%), and had 1-9 years of experience (56%). **Setting:** Two medical surgical units at a level 1 trauma hospital **Exclusion:** Nursing students, health care technicians, certified nursing assistants, and travel/resource nurses **Attrition:** (Initial post-test) control *n* = 10 & intervention 2 (3-month post-test) intervention group *n* = 5	**IV1:** 30-minute in-person educational session **DV1:** DK immediate post-intervention based on DKQ **DV2:** DK retention following a 3-month period **DV3:** Delirium incidence pre-post intervention **Definitions:** An older adult is someone aged 65 and older.	**Tools:** DKQ tool **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Descriptive statistics *T*-test(s) Multivariate linear regression	**DV1:** The immediate mean DKQ scores in the intervention group [9.24] were higher than that of the control group [7.24] (p<.001). **DV2:** Intervention group retained the knowledge three months post-intervention (p=.038) but with a decline (8.29 vs. 9.24) in the mean scores. **DV3:** A 40% reduction in delirium incidence was observed	**Level of Evidence**: Level II **Strengths**: Demonstrated increases in nursing pre- and post- DK, along with retention of knowledge at three months. Reliable/valid tool **Weakness**: Small sample size Limited patient population **Feasibility**: Minimal amount of time necessary Single format of the intervention **Application**: Lack of generalizability due to attrition bias

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Choi et al., (2020), Multimodal education program to improve nurses' knowledge and confidence on delirium recognition in a surgical-trauma intermediate-care setting. **Country**: United States **Funding**: None reported. **Bias**: None identified	**Stated:** Bandura's self-efficacy theory were used to develop the ED intervention	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** To determine effectiveness of a multimodal ED program to enhance RNs' knowledge and confidence on delirium recognition.	$n = 23$ Convenience sampling **Demographics:** Participants were <41 years old (73.9%), female (91.3%), BSN (78.3%), <6 years of nursing experience (60.9%). **Setting:** Surgical-trauma intermediate care unit **Exclusion:** Float pool, non-unit-based nurses, nursing assistants, or APRNs. **Attrition:** None	**IV1:** Multimodal ED program (presentation 10-min, video 8-min, & bed-side coaching 15-min) **DV1:** DK based on the DKQ scores **DV2:** RNs' confidence level in DA **DV3:** Accurate DS performance **Definitions:** Delirium as detected by NuDESC screening tool.	**Tools:** DKQ tool Confidence Scale Scores Inter-rater NuDESC DS agreement **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Descriptive and inferential statistics A paired *T*-test McNemar's tests Kruskal–Wallis H test Mann–Whitney *U* test. Spearman's rho	**DV1:** Nurses' DKQ scores $p < .001$ **DV2:** Confidence score $p < .001$ **DV3:** All RNs performed the assessment correctly using the Nu-DESC.	**Level of Evidence**: Level III **Strengths**: Reliable/valid tools Demonstrated increases in nursing DK in pre- and post-evaluations **Weakness**: Small sample size Participant access to alternative material during post-testing No testing of DK retention **Feasibility**: Long duration of intervention Requires multiple skilled DS raters Multiple platforms for intervention **Application**: Lack of generalizability due to population used

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Cyrus et al., (2021), Effectiveness of a delirium prevention initiative on an inpatient neuroscience unit. **Country**: United States **Funding**: A grant from Abbott Northwestern Hospital Foundation and Saint Catherine University Interprofessional Clinical Scholars Program funded the research. **Bias**: None identified.	**Inferred:** Based on the discussion provided by the authors, this research utilized a PDSA framework.	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** Examine the effect of education on nurses' knowledge and confidence in identifying delirium. Additionally, to design and implement a volunteer program for assisting staff in prevention efforts for delirium. Lastly, the third objective was to establish a monitoring approach, measuring nursing education impact, and volunteer team impact in preventing delirium.	*n* = 636 patients (EMR review; 304 pre & 342 post) 47 nurses Convenience sampling **Demographics:** Participants were BSN prepared (79%), >6 years of experience (32%), day shift (41%)/night shift (38%). **Setting:** Neuroscience unit in a large hospital **Exclusion:** Non-regularly staff nurses **Attrition:** One RN from pre to post-test	**IV1:** One hour in-person educational session **DV1:** Nurse self-reported confidence level **DV2:** DK pre-post intervention **DV3:** Volunteer time & activity performed with patient **DV4:** Delirium rates by diagnostic code **Definitions:** Delirium as detected by CAM-ICU screening tool.	**Tools:** DKQ tool (with modifications approved by original creators) CAM-ICU tool **Validity/ Reliability:** This study did not perform reliability or validity testing of the tool, but the tool was revalidated as the modified version by the original creators for the authors.	**Statistical Tests Used:** Descriptive statistics The Wilcoxon signed rank test The McNemar's test A paired *t*-test A Wilcoxon signed rank test Mann-Whitney *U* test	**DV1:** Confidence score $p < .0005$ **DV2:** DK immediate post $p < .0005$ **DV3:** 39 minutes Meaningful conversation (5.5%) most participated activity **DV4:** Mean delirium rate pre-intervention (9.105) post-intervention (8.743) showing no statistically significant difference	**Level of Evidence**: Level III **Strengths**: Increase in DK and confidence Delirium rates remained below the lower control limit from 11/2019 - 11/2020, apart from 04/2020. Anonymously administered survey **Weakness**: Use of colleagues as the educational team Some staff had previous DK education in the past **Feasibility**: The minimal amount of time needed. A singular format **Application**: Lack of generalizability due to population used

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Ewens et al., (2021), A delirium prevalence audit and a pre and post evaluation of an interprofessional education intervention to increase staff knowledge about delirium in older adults. **Country**: Australia **Funding**: From the Centre for Nursing, Midwifery and Health Services Research at Edith Cowan University. **Bias**: Attrition bias Information bias - case acquisition was not ensured to have come from the participating units	**Stated:** The squire checklist reporting guidelines for quality improvement studies	**Design:** Retrospective case review Quasi-experimental with pre- and post-test design **Purpose:** The aim of this study was two-fold: evaluate the level of knowledge of delirium amongst clinicians caring for patients at high risk and determine whether an interprofessional education program could improve clinical assessment of delirium in high-risk patients.	*n* = 118 (pre) 41 (post) Convenience sampling **Demographics:** Respondents were primarily female (92.4%), nurses (68.6%), medical/rehabilitation/surgical staff (41.5/28/30.5%), and 0-12 years of experience (70.2%). **Setting:** A large general hospital in metropolitan western Australia **Exclusion:** Not reported. **Attrition:** 65.3% (loss of 77 participants)	**IV1:** Interprofessional education program (training video, targeted small group sessions, and ED sessions at clinical leadership grand rounds) **DV1:** Nurses' knowledge level based on the DKQ **DV2:** DS 4AT use by nursing staff for delirium detection **DV3:** Delirium prevalence **Definitions:** Delirium as detected by 4AT screening tool.	**Tools:** 4AT tool DKQ tool Freely available training video **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Chi square Independent *t*-tests A post-hoc analysis measuring the effect size Cohen's d G*Power	**DV1:** Nurse scores in overall DK rose from a mean of 60.85 to 65.4% ($p = 0.045$) **DV2:** Tool use increased from 8.5% to 43% **DV3:** Prevalence of delirium 6.5% in 2017 and 4.7% in 2018.	**Level of Evidence**: Level III **Strengths**: Demonstrated increases in nursing pre- & post- DKQ scores Reliable/valid tools Increased screening tool use **Weakness**: The inconsistent duration of time that passed between pre & post surveys due to acquisition method **Feasibility**: Independent education time and small group sessions led by skilled staff members can be costly **Application**: Lack of generalizability due to attrition bias

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Francisco et al., (2022), Nurse-driven assessment, prevention, and management of delirium on an acute inpatient neurology unit **Country**: United States **Funding**: The Health Resources and Services Administration Geriatric Academic Career Awards K01HP39479 **Bias**: None identified.	**Inferred:** Theory of reasoned action	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** Evaluate nurses' knowledge of delirium, examine their ability to implement a delirium screening protocol and delirium interventions and evaluate the impact on falls, falls with injury, restraint usage, remote video monitoring, sitter use, LOS, and discharge disposition	*n* = 36 Convenience sample **Demographics:** Not reported **Setting:** Neuroscience unit at a comprehensive stroke center and academic medical center **Exclusion:** None reported **Attrition:** Six participants (16.6%)	**IV1:** Self-paced two-part online education modules with elective one on one nurse specialist sessions **DV1:** NDQ scores pre- and 6 weeks post-education **DV2:** Screening rates with 4AT **DV3:** Patient outcomes of LOS, falls, falls with injury, and discharge location **Definitions:** Delirium as detected by 4AT screening tool.	**Tools:** DKQ tool 4AT tool **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Descriptive statistics Fisher's exact *T*-test(s)	**DV1:** Mean scores of 80.7% pre-intervention and 81.4% 6 weeks post-intervention ($p = .865$) **DV2:** Screening rates increased in the 6 months post-education (72%) with lowest (50%) in the 5th month **DV3:** Increased restraint discontinuation Falls decreased to 2-3 per month Zero falls with injury occurred from May-October 2021. Length-of-stay decreased from 12/2020 - 5/2021 $p<0.005$.	**Level of Evidence**: Level IV **Strengths**: Valid/reliable tools Statistically significant increases in the secondary outcome measures. **Weakness**: The use of the strictly online platform is potentially one of the reasons why there was not a statistical improvement in DK. **Feasibility**: Minimal work for implementation Requires the participant to be reliable in their execution. **Application**: Lack of generalizability due to limited population

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Grealish et al., (2019), Education for delirium prevention: Knowing, meaning and doing **Country**: Australia **Funding**: Conducted as part of the NHMRC Translating Research into Practice Fellowship (2016–17). Seed funding grant from Griffith University School of Nursing & Midwifery. **Bias**: Attrition bias Confirmation bias	**Stated:** Cognitive constructivism	**Design:** Pre-test & post-test cross-sectional survey design **Purpose:** The purpose was to develop an educational program to increase DK, address negative attitudes, and improve practice through delirium prevention.	*n* = 36 Convenience sampling **Demographics:** Mean age 39.2 years, 6.9 years of experience, and RNs (61%). **Setting:** General medical unit in a hospital **Exclusion:** None. **Attrition:** Only 15 completed the whole program (loss of 58%)	**IV1:** Three-piece education program that is completed online (self-paced) ADHERE program, group discussion meetings, and 1hr in-person simulation **DV1:** DK pre-post intervention based on DKQ (3 months between) **Definitions:** Delirium prevention ED is through 'knowing' (online module), 'meaning' (group discussion), & 'doing' (simulation).	**Tools:** DKQ tool Australian ADHERE delirium education course **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Descriptive statistics One-way analysis of variance analysis	**DV1:** Improvement in knowledge (p = .001), specifically T0 to T2 (p = .03) and T0 to T3 (p = .003).	**Level of Evidence**: Level IV (Polit & Beck, 2021) **Strengths**: Validated education program Reliable/valid tool **Weakness**: Extended duration (9 months of rolling enrollment) Inconsistent involvement of staff participation **Feasibility**: Lengthy program implementation where inconsistency among participants can be high **Application**: The multifaceted program has theoretical basing with potential of implementation.

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Oberai et al., (2021), The effect of an educational intervention to improve orthopaedic nurses' knowledge of delirium: A quasi-experimental study. **Country**: Australia **Funding**: None reported. **Bias**: None identified.	**Inferred:** Experiential learning theory	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** To investigate the effectiveness of a delirium awareness educational program on nurses' knowledge about delirium	*n* = 49 pre (46 post) Convenience sampling **Demographics:** RN (63%), BSN (67%), aged 20-30 years (30.6%), and 6-12 years of nursing experience. **Setting:** Orthopedic unit at a level 1 trauma center hospital **Exclusion:** Nursing aids. **Attrition:** Three participants (6%)	**IV1:** 30-minute online module, weekly unit-based in-service on screening tool performance, and 4hr delirium care workshop **DV1:** DK pre-post intervention based on DKQ (6 month between) **Definitions:** Delirium is an acute change of attention and cognition.	**Tools:** DKQ tool **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both	**Statistical Tests Used:** Descriptive statistics Fisher's Exact tests Mann-Whitney *U* test	**DV1:** No difference in DK scores for domains 1 (definition), 2 (screening tool application), 3 (symptoms) & 4 (diagnostic tool). However, for domain 5 (risk factors; $p < 0.001$) and domain 6 (recognizing delirium; $p < 0.001$) had statistically significant increases post intervention.	**Level of Evidence**: Level III **Strengths**: Larger sample size. Knowledge retention was tested. The use of a multicomponent education program increases exposure to variable learning styles of participants. **Weakness**: Only a portion of the participants completed more than one of the three educational program pieces **Feasibility**: The multicomponent program increases the work demand of the intervention **Application**: Lack of generalizability due to limited population

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Sinvani et al., (2021), Improving delirium detection in intensive care units: Multicomponent education and training program **Country**: United Stated **Funding**: None **Bias**: None identified.	**Stated:** "Train-The-Trainer" model The Kirkpatrick model	**Design:** Quasi-experimental with pre- and post-test design **Purpose:** Describe and evaluate a multicomponent education and training program utilizing a "Train-The-Trainer" model, to improve delirium detection across a large health system.	*n* = 73 Convenience sampling **Demographics:** 11+ years of nursing experience (46.2%), RN (76.9%)/nurse manager (15.4%), and minimal previous delirium education (56.9%). **Setting:** 14 ICUs (4 medical, 4 surgical, 2 cardiac, and 4 mixed) across 9 hospitals (4 tertiary and 5 community). **Exclusion:** None. **Attrition:** 8 participants	**IV1:** 1-day workshop that included:(1) patient testimonials, (2) small group discussions, (3) didactics, and (4) role-playing. OR 1-day workshop with telehealth ICU delirium observation and training **DV1:** CAM-ICU performance with 5 validated delirium cases pre and immediately post intervention **DV2:** CAM-ICU delirium detection **Definitions:** Delirium as detected by CAM-ICU screening tool.	**Tools:** RASS tool CAM-ICU for DS ABCDEF bundle **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Kruskal–Wallis test McNemar test	**DV1:** Feature 1 significantly improved in case 5 (p =0.001). Feature 2 significantly improved in case 2 (p=0.049) and 5 (p=0.016). Feature 3 did not significantly change. Feature 4 significantly improved in case 1 (p =0.001) and 5 (p =0.001). The overall CAM-ICU significantly improved in case 5 (p =0.001). **DV2:** CAM-ICU positive DS in 21.2% of ICUs that participated in the 1-day workshop and 30.1% in ICUs that participated in the workshop + tele-delirium.	**Level of Evidence**: Level III **Strengths**: Increased screening tool knowledge Increased screening performance & use Evaluated delirium incidence through detection pre and post intervention **Weakness**: Did not test delirium knowledge pre and post intervention **Feasibility**: Lengthy program that may reduce staff participation or attention **Application**: The multicomponent program with theoretical basing has the potential of implementation with further investigation in other hospital settings.

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Van Velthuijsen et al., (2018). Can education improve clinical practice concerning delirium in older hospitalized patients? Results of a pre-test post-test study on an educational intervention for nursing staff. **Country**: The Netherlands **Funding**: None declared. **Bias**: None identified.	**Stated:** PRECEDE model (Predisposing, reinforcing, and enabling)	**Design:** Pre-test & post-test quasi-experimental **Purpose:** To evaluate the effects of an educational intervention for nursing staff on the frequency of DS, correctness of DS, and the frequency of geriatric consultations.	*n* = 34 Retroactive patient file review 385(pre) & 159 (post) Convenience sampling **Demographics:** Mean age 34, mean work experience of 11 years, Female (91%), and had delirium education within the last 5 years (15%). **Setting:** Two inpatient medical units in a teaching hospital **Exclusion:** Not reported. **Attrition:** None.	**IV1:** In-person educational sessions tailored to DKQ results **DV1:** Proportion of older patients on the unit screened for delirium **DV2:** Number of patients the DS was completed in accordance with the guideline/ original developers **DV3:** Proportion of patients receive a geriatric consultation **Definitions:** Older adult is 65+ DS frequency is three times per day for three consecutive days. Delirium as detected by DOS screening tool.	**Tools:** Delirium Observation Screening (DOS) DKQ tool The Strain in Care for Delirium Index **Validity/ Reliability:** This study did not perform reliability or validity testing of the tools, but the tools have been previously tested and verified in both.	**Statistical Tests Used:** Logistic regression model	**DV1:** Increased significantly $p = .001$. **DV2:** Increased significantly by 47% in group A and 25% in group B. **DV3:** Did not have a significant increase $p = .083$.	**Level of Evidence**: Level III **Strengths**: Increased screening performance & use **Weakness**: The DKQ was not utilized to measure nurses' knowledge pre- & post- but as guidance for the educational session. Each unit leader was allowed to plan the educational sessions schedule (One was mandatory the other was open attendance) **Feasibility**: Utilizing each unit's needs for adjusting the education session would be difficult. Leadership directed scheduling could pose additional limitations on the success of the intervention. **Application**: Lack of generalizability for DK measures

Key: **BSN** Bachelor of Science in Nursing, **RN** Registered Nurse, **CAM** Confusion Assessment Method, **DA** Delirium Assessment, **DK** Delirium Knowledge, **DKQ** Delirium Knowledge Questionnaire, **DS** Delirium Screening, **DV** Dependent Variable, **ED** Education, **ICU** Intensive Care Unit, **IV** Independent Variable, **LOS** Length of Stay

Key: **BSN** Bachelor of Science in Nursing, **RN** Registered Nurse, **CAM** Confusion Assessment Method, **DA** Delirium Assessment, **DK** Delirium Knowledge, **DKQ** Delirium Knowledge Questionnaire, **DS** Delirium Screening, **DV** Dependent Variable, **ED** Education, **ICU** Intensive Care Unit, **IV** Independent Variable, **LOS** Length of Stay

Table A2

Synthesis Table

Study (Author, year)	Aldawood et al., (2021)	Byrnes, (2021)	Choi et al., (2020)	Cyrus et al., (2021)	Ewens et al., (2021)	Francisco et al., (2022)	Grealish et al., (2019)	Oberai et al., (2021)	Sinvani et al., (2021)	Van Velthuijsen et al., (2018)
Design LOE	III	II	III	III	III	IV	IV	III	III	III
Sample										
n subjects	57	47	23	47	118	36	36	49	73	34
Attrition	3	1	0	1	77	6	23	3	8	0
M-Age (years)	30-39 (54.4%)	~	≤ 40 (73.9%)	~	< 40 (55%)	~	39.2	20-30 (30.6%)	~	34
Degree preparation	BSN (73.7%)	BSN (79%)	BSN (78.3%)	BSN (79%)	~	~	RN unspecified (61%)	BSN (67%)	RN unspecified (76.9%)	~
Years of nursing experience	~	> 6 (32%)	< 6 (60.9%)	> 6 (32%)	0-12 (70.2%)	~	6.9	6-12	11+ (46.2%)	11
Gender	F (94.7%)	~	F (91.3%)	~	F (92.4%)	~	~		~	F (91%)
Setting										
Hospital - CC	X								X	
Hospital - Non-CC		X	X	X	X	X	X	X		X
Conducted in the US		X	X	X		X			X	
Interventions										
In-person	X	X		X						X
Online						X				
Combination			X		X		X	X	X	
Duration of intervention (minutes)	45	30	32	60	~	~	510	270	480	~
Duration to follow up	2 weeks post	Immediate + 3 months post	Immediate	Immediate	Immediate	6 weeks post	Immediate + 3 months post	6 months post	Immediate	Immediate + 2 weeks post
Outcomes/ Themes										
DKQ scores	↑*	↑*	↑*	↑*	↑	≠	↑*	↑*	↑*	~
DKQ retention	*						*	* 2/6 domains		
Confidence score			↑*	↑*						
DS tool use: 4AT tool					↑*	↑*				

Study (Author, year)	Aldawood et al., (2021)	Byrnes, (2021)	Choi et al., (2020)	Cyrus et al., (2021)	Ewens et al., (2021)	Francisco et al., (2022)	Grealish et al., (2019)	Oberai et al., (2021)	Sinvani et al., (2021)	Van Velthuijsen et al., (2018)
DS tool use: DOS tool										↑*
DS Performance: CAM-ICU tool									↑*	
DS Performance: DOS tool										↑*
DS Performance: NuDESC tool			↑*							
DS comfort scores: CAM-ICU				↑*						
Delirium incidence		↓*		≠	↓	≠				
Delirium detection									↑*	
Strain in Care for Delirium Index										≠
Unit falls						↓*				
Average LOS						↓*				

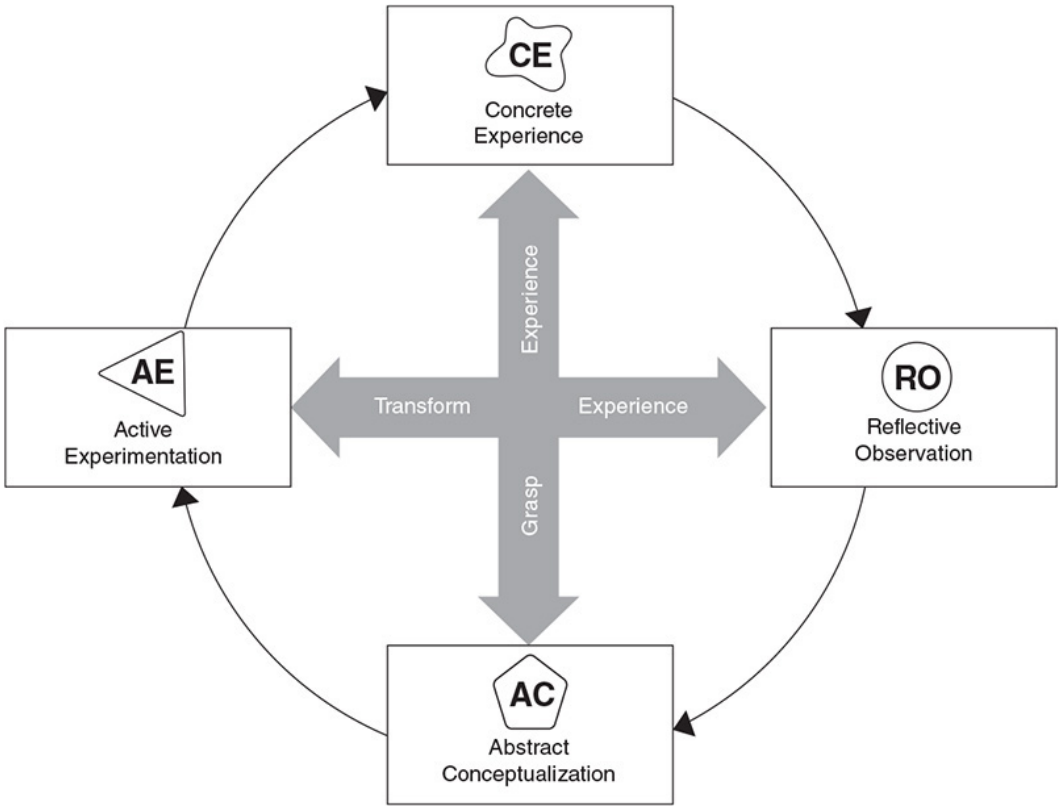
Key: **BSN** Bachelor of Science in Nursing, **CAM** Confusion Assessment Method, **CC** critical care, **DS** Delirium Screening, **DKQ** Delirium Knowledge Questionnaire, **DOS** Delirium Observation Screening tool, **F** Female, **LOE** Level of Evidence, **LOS** Length of Stay, **M-Age** Mean Age, **NP** Nurse Practitioner, **RN** Registered Nurse, **US** United States, ↑ increase, ↓ decrease, ≠ no change, * statistically significant change as set by $p \leq 0.005$, ~ not reported

Appendix B

Theoretical Framework

Figure B1

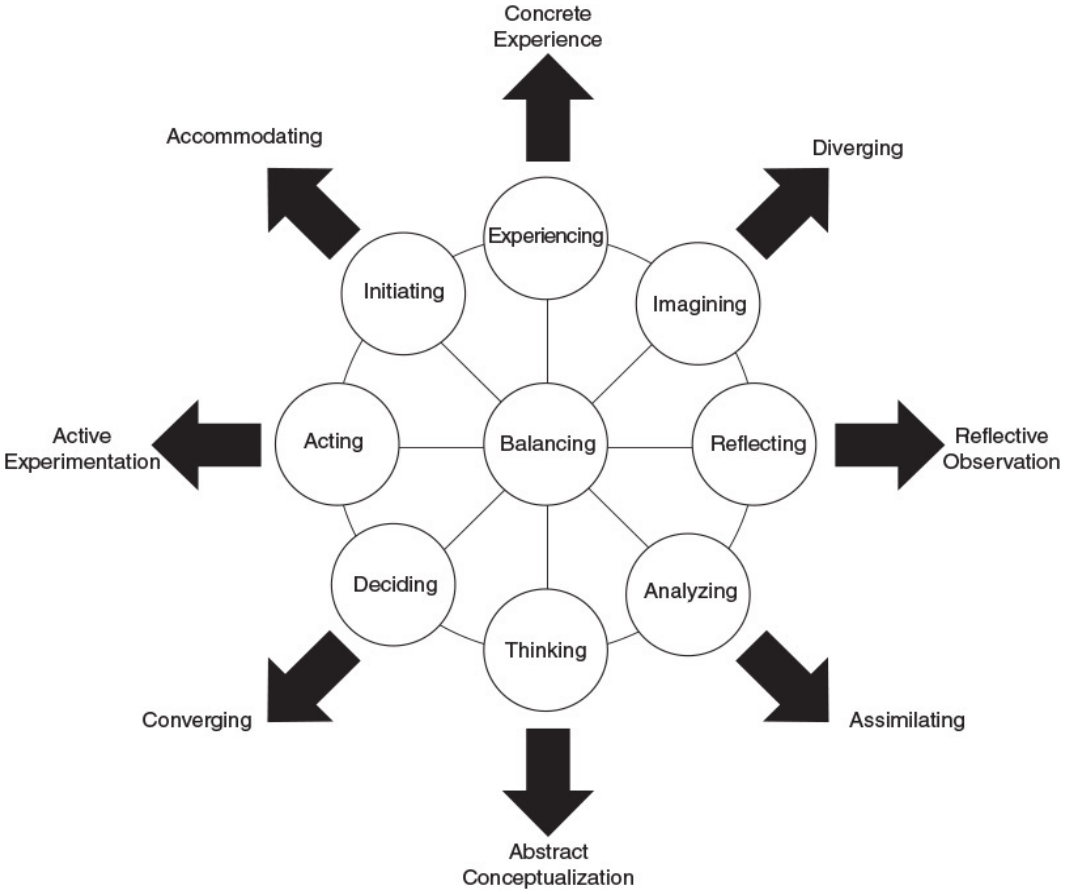
The experiential learning theory



Note. This image depicts the experiential learning theory with the core concepts present in the rectangle boxes. The cycle initiates with concrete experiences and cycles through the learner's continuum of knowledge development. Within the circle, the basic descriptions for each core concept are on the arms of the cross, pointing to the correlating concept. From *Experiential learning: Experience as the source of learning and development* (2nd ed.), by D. A. Kolb, 2014 (Original work published in 1984). Copyright 2014 by Pearson Publishing Inc. Reprinted with permission for educational use.

Figure B2

The experiential learning theory



Note. This image depicts the experiential learning theory with the nine learning principles (initiating, experiencing, imagining, reflecting, analyzing, thinking, deciding, acting, and balancing) and the four learning styles (accommodating, diverging, converging, and assimilating). These are shown in association to the core concepts of the experiential learning theory: concrete experience, reflective observation, abstract conceptualization, and active experimentation. From *Experiential learning: Experience as the source of learning and development* (2nd ed.), by D. A. Kolb, 2014 (Original work published in 1984). Copyright 2014 by Pearson Publishing Inc. Reprinted with permission for educational use.

Appendix C

Implementation Framework: The model for change to evidence-based practice

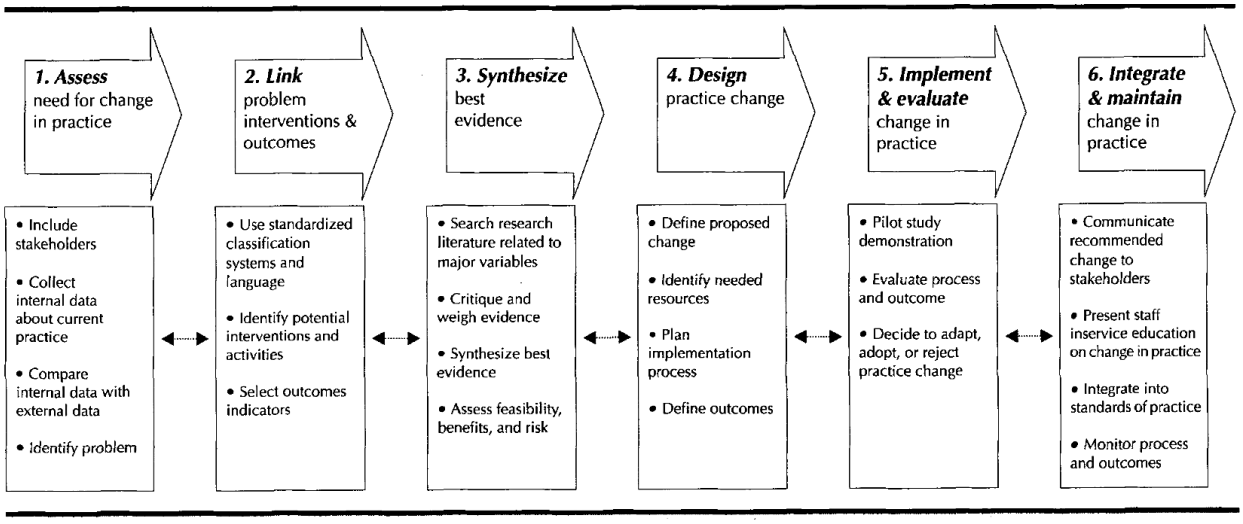


Figure 1. A model for evidence-based practice.

Note. This image depicts the model for change to evidence-based practice for the implementation process of an EBP initiative. Stakeholders consist of discipline-specific healthcare staff, multi-disciplinary partners, administrators, or patients if their involvement is indicated by the practice problem. Standardized classification systems are valid and reliable sources utilized to define the problem in practice. Critical appraisal of literature requires practitioner evaluation of the body of evidence for strengths, weaknesses, applicability, and gaps or conflicts. From "A model for change to evidence-based practice", by M. A. Rosswurm & J. H. Larrabee, 1999, *The Journal of Nursing Scholarship, 31*(4), 317-322 (https://doi.org/10.1111/j.1547-5069.1999.tb00510.x).

Appendix D

Knowledge Assessment: Delirium Knowledge Questionnaire

**Do not place name or another form of identifier on this document.

Please respond by filling in the circle for the corresponding answer (e.g. ●)

Section 2: Knowledge of Delirium

I. Definition of Delirium: Which of the following groups of symptoms best describe or define delirium?
- o Amnesic, drowsy, sudden onset of incontinence, uncontrolled salivation, disorganized thinking.
- o Acute confusion, fluctuating mental state, disorganized thinking, altered level of consciousness.
- o Anxiety, diaphoresis, trembling, muscle weakness, dysphasia, altered arousal level.
- o Slow onset of confusion, memory loss, disorientation, lack of spontaneity, change in personality.

II. Identifying delirium: The following scales/tools are commonly used to detect certain conditions. Match the tool to the most appropriate condition(s). Note that "none of these" may be the best answer and you may choose more than one condition for each tool.

	Delirium	*Dementia*	*Depression*	*None of these*
Mini-Mental State Examination [MMSE]	O	O	O	O
Glasgow Coma Scale [GCS]	O	O	O	O
Delirium Rating Scale [DRS]	O	O	O	O
Alcohol Withdrawal Scale [AWS]	O	O	O	O
Confusion Assessment Method [CAM]	O	O	O	O
Becks Depression Inventory	O	O	O	O
Braden Scale	O	O	O	O

III. General knowledge questions: Please answer with agree, disagree, or unsure for the following statements.

	Agree	***Disagree***	***Unsure***
Fluctuations between orientation and disorientation is not typical of delirium.	O	O	O
Symptoms of depression may mimic delirium.	O	O	O
Treatment for delirium always includes sedation.	O	O	O
Patients never remember episodes of delirium.	O	O	O
A Mini Mental Status Examination [MMSE] is the best way to diagnose delirium.	O	O	O
A patient having a repair of a fractured neck of femur has the same risk for delirium as a patient having an elective hip replacement.	O	O	O
Delirium never lasts for more than a few hours.	O	O	O
The risk for delirium increases with age.	O	O	O
A patient with impaired vision is at increased risk of delirium.	O	O	O
The greater the number of medications a patient is taking, the greater their risk of delirium.	O	O	O

Adapted from Hare et al. (2008) Nurses' Delirium Knowledge Questionnaire

A urinary tract infection in situ reduces the risk of delirium.	○	○	○
Gender has no effect on the development of delirium.	○	○	○
Poor nutrition increased the risk of delirium.	○	○	○
Dementia is the greatest risk factor for delirium.	○	○	○
Males are more at risk for delirium than females.	○	○	○
Diabetes is a high-risk factor for delirium.	○	○	○
Dehydration can be a risk factor for delirium.	○	○	○
Hearing impairment increases the risk of delirium.	○	○	○
Obesity is a risk factor for delirium.	○	○	○
A patient who is lethargic and difficult to rouse does not have delirium.	○	○	○
Patients with delirium are always physically and/or verbally aggressive.	○	○	○
Delirium is generally caused by alcohol withdrawal.	○	○	○
Patients with delirium have higher mortality rates.	○	○	○
A family history of dementia predisposes a patient to delirium.	○	○	○
Behavioral changes in the course of the day are typical of delirium.	○	○	○
A patient with delirium is likely to be easily distracted and/or have difficulty following a conversation.	○	○	○
Patients with delirium will often experience perceptual disturbances.	○	○	○
Altered sleep/wake cycle may be a symptom of delirium.	○	○	○

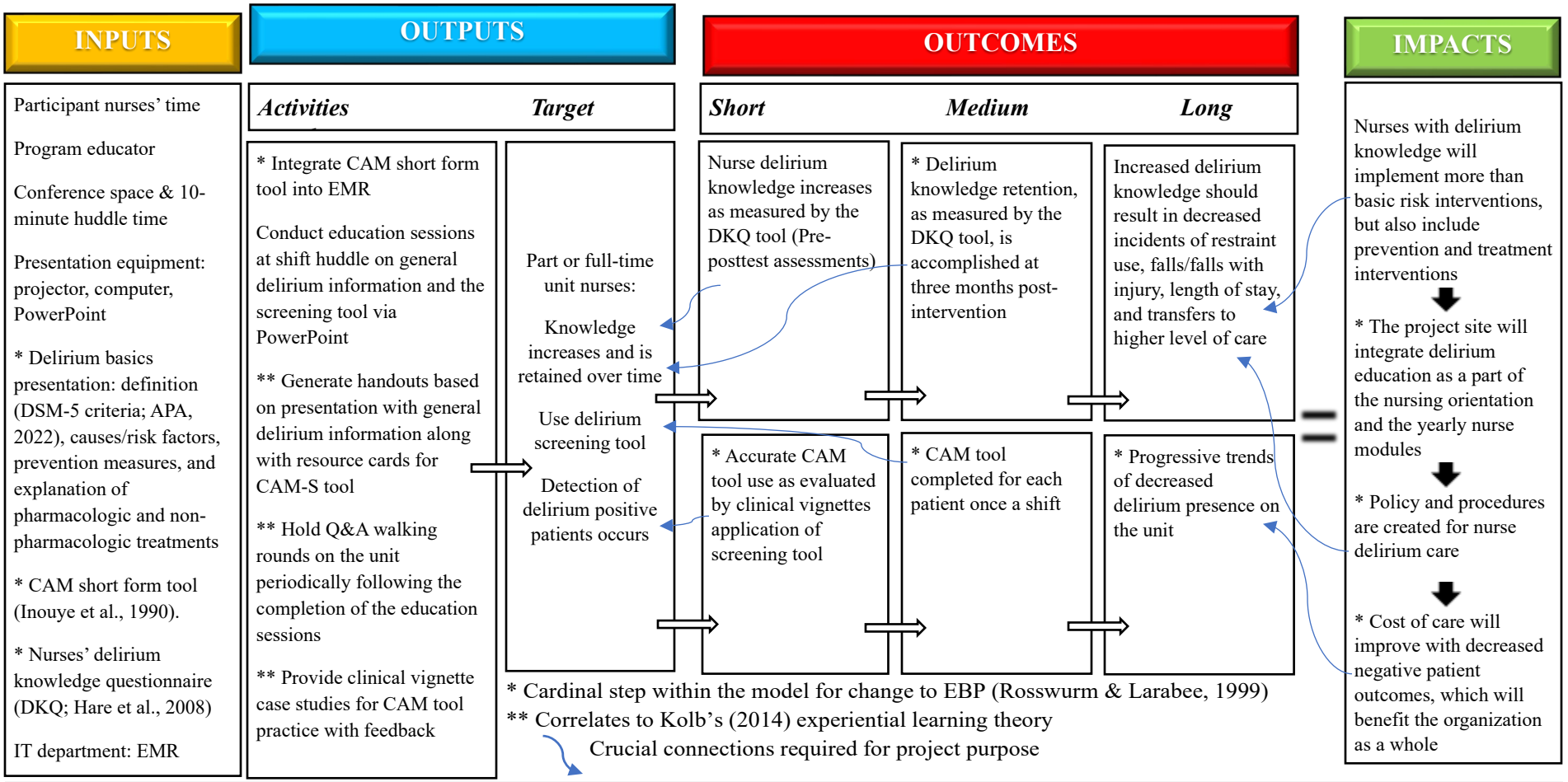
Note. This figure depicts the nurses' Delirium Knowledge Questionnaire, a 36-item assessment for determining basic delirium understanding. An adapted demographics section was made to be relevant to the selected unit's staff. From "A questionnaire to determine nurses' knowledge of delirium and its risk factors", by M. Hare, D. Wynaden, S. McGowan, I. Landsborough, & G. Speed, 2008, *Contemporary Nurse*, *29*(1), 23–31 (https://doi.org/10.5172/conu.673.29.1.23).

Appendix E

Logic Model

Didactic Nurse Education with Screening Tool Use for Delirium Detection and Comprehension

Goals: This evidence-based project aims to address the system gaps of insufficient delirium knowledge and failures of detection by implementing a staff education program and integrating a screening tool into the EMR.



Assumptions: Delirium is a highly impactful neurocognitive condition that affects both the general hospital patient population and ICU population. The issue facing healthcare organizations is the failure to recognize, prevent, and treat delirium. * Nurse understanding of recognition, prevention, and treatment of delirium is necessary for patient outcome improvement. Knowledge transfer occurs following adaptation to context, barrier mitigation, and implementation tailoring. The nurses will learn from the educational sessions, apply the knowledge, and utilize the screening tool as recommended. * The unit has delirium positive patients as determined by the screening tool.

Appendix F

Data Use Agreement

Proposed Data Use Arrangement - Summary for Executive Data Governance Committee

This form shall be completed and submitted to the Executive Data Governance Committee for the approval of any data use arrangement where [redacted] will share its data with an independent organization for purposes that do not directly involve [redacted] or are outside of a collaboration with [redacted]. This form does not need to be completed or submitted for approval for any proposed data use arrangement outlined in Appendix 1 of this document.

1. **Description of Other Party (the "Company")**

Company name: Arizona State University - Sara Buck Smith (Gradute Student)

Is Company organized in the United States? ☑ Yes ☐ No

Type of business: ☐ For-profit ☐ Nonprofit charitable 501(c)(3) ☑ Nonprofit (but not 501(c)(3))

Has [redacted] worked with this Company before? ☑ Yes ☐ No

If yes, describe: Prior ASU graduate student projects

2. **Purpose(s) of Proposed Data Arrangement:**

Explain purposes and check each item that is applicable, below: Implementation of EBP/QI project with [redacted] data evidence supporting success (for network adoption) or rejection. Data will be utilized by the primary investigator for the ASU graduate DNP project repository.

☑ [redacted] product or service development

☑ The Company's product or service development

☐ Other (third party's) product or service development

☐ Help [redacted] gain experience with analyzing its own data (internal use)

☐ General marketing of [redacted] services to the public

☐ Targeted marketing to specific patients by [redacted]

☐ Targeted marketing of non-[redacted] goods/services to patients by the Company or a third party

☐ Marketing to physicians by Company or other third party

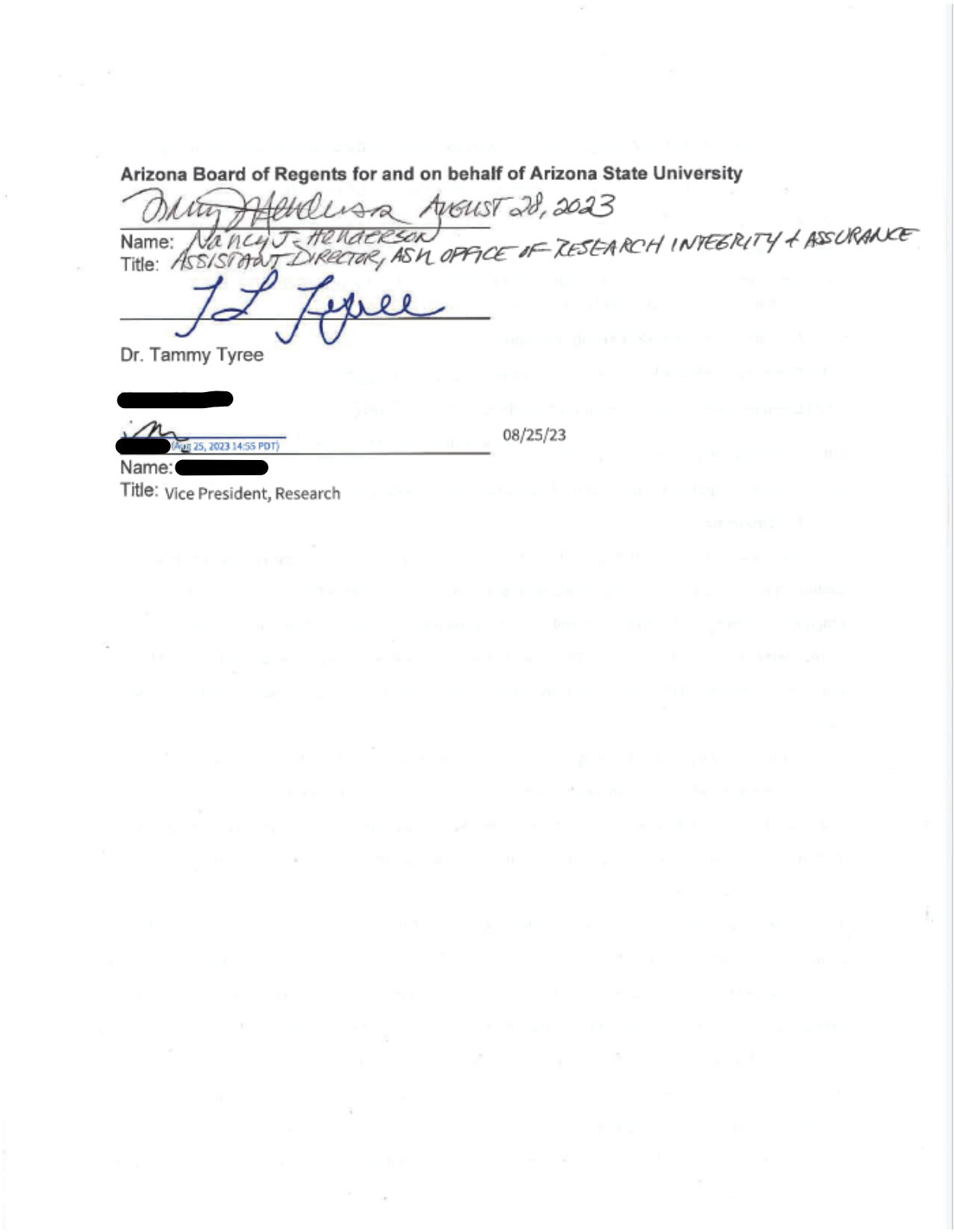
☐ Marketing to [redacted] employees

3. **Population(s) Whose Data will be Collected and/or Used (check each item that may apply)**

☑ [redacted] patients (if this will be a subset of patients—for example, based on a particular diagnosis, procedure or discharge plan—please explain): Patient indicator data (no identifying information; e.g. falls, restraint use, unit average lenght of stay, and discharge to home frequency)

☐ [redacted] employees

☑ [redacted] medical staff members



Arizona Board of Regents for and on behalf of Arizona State University

August 28, 2023

Name: Nancy J. Henderson
Title: Assistant Director, ASU Office of Research Integrity & Assurance

Dr. Tammy Tyree

[redacted]

[redacted] Aug 25, 2023 14:55 PDT) 08/25/23

Name: [redacted]
Title: Vice President, Research

Note. This depicts the first and last page of the organizational data use agreement.

Appendix G

Budget Plan

Phase	Activities	Time Spent	Cost
Personnel & Equipment	Labor hours by project lead Equipment/space cost		$20/hr. (labor) Unknown
Preparation	Create education presentation for intervention	4 hours (labor)	
	Create handouts of: general topic overview, intervention checklist, and practice case studies	5 hours (labor)	
	Adapt/reproduce questionnaire with relevant demographic data	1 hour (labor)	
	Print handouts & questionnaire (85 copies/each)	2 hours (labor)	≈ $63 [680 pp.] (paper $25 + toner $38)
	Prepare initial announcement email for delivery of consent information	1 hour (labor)	
Implementation	Conference room space for education presentation	2.33 hours (labor + use time)	Unknown (already available for free use)
	Computer & presentation screen for duration of education presentation	2.33 hours (labor + use time)	Unknown (already available for free use)
	Donuts + coffee for staff at education presentation	1.75 hours (labor)	≈ $500 total
Evaluation	Print, handout, collect 3-month follow up questionnaire surveys (85 copies)	2 hours (labor)	≈ $8 (paper + toner)
	Review & analyze IT reports on patient/nurse data	8 hours (labor)	
Total		**Cost (labor) ≈ $588.20**	**Cost (supplies) ≈ $571**

Note. This figure depicts the delirium education and screening tool implementation budget plan for this EBP initiative. Funding sources include organizational (supplies for printed handouts & questionnaire ≈ $71) and the PI (refreshments & labor ≈ $888.20). The labor costs are the highest portion of the budget, with the second highest being compensation for refreshments. This was covered by the PI for this project. Following adoption, the costs associated with the sustainability of this project intervention will be minimal in education compensation time for nursing staff.