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DNP Final Report

Pediatric Delirium: Development of a Standard of Practice in a CVICU and PICU Setting

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University of Kentucky

College of Nursing

Spring, 2018

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Dedication

This DNP project and my continued journey of studying pediatric delirium is dedicated to my husband and three sons who have supported me through this journey of furthering my career. I could not have completed this without their love and encouragement. I would also like to dedicate my project to Christen Hunt who believed in me to make a difference by encouraging me to make a move to a new hospital. While I did change the original aspect of where to start in scoring and treating pediatric delirium with a needs assessment, we now are truly improving care in our new hospital with this small start in the education and assessment of pediatric delirium.

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Abstract

Pediatric delirium remains a significant cause of morbidity in pediatric critical care resulting in longer lengths of stay and increased healthcare costs that may extend beyond critical illness. Prevalence rates of pediatric delirium in pediatric intensive care settings are 20%. Not all children's hospitals regularly assess for pediatric delirium. At the time of this project, the assessment of pediatric delirium was not a standard of practice at John Hopkins All Children's Hospital (JHACH). Examining provider's experience, knowledge and self-efficacy of pediatric delirium was the primary aim of this project. The secondary aim was to use information obtained through the first aim to develop education on pediatric delirium and the use of an assessment tool for all providers in the pediatric intensive care unit and the cardiovascular intensive care units. Care providers in the pediatric and cardiovascular intensive care units were surveyed. Of the responders, 93% thought they had cared for a patient who was delirious. In regard to ability to distinguish between the three types of delirium, 31% of the respondents indicated they could recognize hypoactive delirium, 32% indicated they could recognize mixed delirium and 64% indicated that they could recognize hyperactive delirium. A summative proficiency score on experience, knowledge, and self-efficacy about pediatric delirium was obtained and 73% of the respondents scored 80% or greater, indicating a baseline proficiency in knowledge about pediatric delirium. These results provide a framework to focus education and awareness of pediatric delirium at JHACH and reinforce the need for a transition in hospital culture. The findings of the study, thus, serve as the first step for changing the culture at JHACH by prioritizing assessment of and strategies to minimize the morbidities associated with pediatric delirium.

Pediatric Delirium: Development of a Standard of Practice in a CVICU and PICU Setting

Introduction

Pediatric delirium is an unappreciated and significant cause of morbidity of critically ill children. Delirium can evolve during critical illness as a manifestation of the critical illness or from the effects of treatment (Traube et al., 2014). Much research on delirium has been conducted for the adult population and findings from this research has guided practice. The Society of Critical Care Medicine (SCCM) developed revised guidelines for pain, sedation, and delirium in 2013 for the adult population. The original guidelines only addressed pain and sedation in 2002 (Barr et al., 2013). However, Barr et al (2013) reviewed 19,000 references on the subjects of pain, sedation practices, and assessment and treatment of delirium over a 6-year time period. The study further ranked the quality of evidence to develop a standard of care and practice for the adult population. The revised guidelines describe strategies and interventions that have culminated to form a bundle tool for use in adult intensive care units (ICU). Many institutions have implemented this tool to appropriately treat pain, provide adequate sedation when indicated, assess and treat delirium, and improve mobility for patients in their ICU's.

The pediatric community has slowly incorporated the guidelines from the adult bundle for care of critically ill children in the intensive care units. Simone, et al (2017) describe a successful stepwise implementation of the bundle in their pediatric intensive care unit (PICU) through the development of three protocols, amongst which the first protocol requires standardizing screening for delirium. Guidelines for the pediatric population regarding sedation, analgesia and delirium are currently being developed with a taskforce through SCCM to review current literature (Berkenbosch, Smith 2018). This implies that routine screening and treatment of pediatric delirium may promote best practice and could be a standard of care.

The ability to appropriately screen for delirium requires education on signs and symptoms as well as the use of screening tools (Traube, et al. 2014). The culture of pediatric critical care stems from mutual goals that all staff will provide children a safe environment to heal, minimize negative sequelae of critical illness, and provide comfort (Simone, et al. 2017). Assessing the knowledge of all staff who care for critically ill children can illuminate the depth of education required to provide competent assessment of pediatric delirium. Moreover, such a knowledge assessment can provide directions to promote delirium screening and a standard of care aligning with current pediatric critical care culture.

Background

Pediatric delirium has been defined as a disturbance of cognition and attention that presents acutely with a variable course of inattention and an impaired ability to receive, process, store, or recall information (American Psychiatry Association, 2013) It can present in three different manifestations: hypoactive, hyperactive and combative hyperactive (Smith, Fuchs, et al., 2011). Children who require the cardiovascular intensive care unit (CVICU) and the pediatric intensive care unit (PICU) may require mechanical ventilation as a treatment strategy, which may also require the addition of sedation and analgesia to maintain device safety. Hyperactive and combative hyperactive symptoms are usually treated with benzodiazepines and narcotics and provide an avenue for increased physiologic dependence to these drugs. This phenomenon can contribute to a worse clinical outcome including a withdrawal syndrome, which is associated with higher prevalence of pediatric delirium (Smith, Fuchs, et al., 2011).

Pediatric delirium is well described to have a prevalence rate of 20% in the PICU (Silver et al., 2015; Smeets et al., 2010; Traube et al., 2014). Alvarez et al (2018) describe a higher prevalence of pediatric delirium in the pediatric cardiac population at 57% of all patients; which

is a higher reported prevalence compared to previous PICU studies. Furthermore, risk factors contributing to the higher incidence of pediatric delirium in the CVICU in their study were length of cardiopulmonary bypass time, age, and The Society of Thoracic Surgeons and the European Association for Cardiothoracic Surgery Congenital Heart Surgery Mortality Score (STS-EACTS). This study also revealed that delirious patients were diagnosed within the first 48 hours of admission (Alvarez et al., 2018).

Assessment of delirium requires a tool that is reliable, accurate and has been validated. Two screening tools meet these criteria: the pediatric Confusion Assessment Method in ICU (pCAM-ICU) and the Cornell Assessment of Pediatric Delirium (CAPD). The pCAM-ICU has a sensitivity of 88% and a specificity of 99%, however, it cannot be used in children five years or younger (Smith, et al. 2011). A Preschool CAM-ICU is also available with validity research in process and can be used in infants 6 months and older (Smith, et al., 2013). Both tools require a two-minute assessment period. The CAPD has a sensitivity of 94% with a specificity of 79% and can be used on infants aged six weeks and older (Traube, et al. 2014). The CAPD tool can be completed in a brief period of time and can be incorporated into routine nursing assessments due to their short time commitments.

Kudchadkar, Yaster, & Punjabi (2014) have described that routine assessment for pediatric delirium has not been a priority in the PICU setting. Smith, Brink, Fuchs, Ely, and Pandharipande (2013) delineated the barriers identified during the implementation phase of a delirium screening tool within a hospital setting as: 1) screening for delirium is not essential to the care of the critically ill child, 2) assessing delirium will not alter the care plan of the critically ill child, therefore is not a meaningful assessment, 3) assessing for delirium will advocate the suspension of use of sedatives, which could lead to more safety events and distress of the

critically ill child, and 4) assessing delirium may lead to a psychiatric diagnosis and long term requirement of antipsychotics. All four of these barriers can be overcome with appropriate education with the current body of evidence.

Improving outcomes of the critically ill child is multifactorial and requires foresight. As the U.S. continues to struggle with health care costs, lack of screening and treating pediatric delirium could impact reimbursement from insurance companies. Smeets et al. (2010) conducted a five-year prospective observational study to assess the correlation of pediatric delirium and a prolonged PICU stay in the Netherlands. Results from the study, among forty-nine children diagnosed with delirium as compared to the non-delirious control group of ninety-eight children, was a significant increase in the delirium group's length of hospital stay by 2.39 days (Smeets et al., 2010). The financial burden of a prolonged PICU hospitalization is significant regardless of the payer party. With an average increase in stay due to delirium of greater than two days, Smeets et al (2010) concluded that for the year 2007 in the Netherlands, the cost of the PICU stay was increased by 1.5%. Traube, Mauer, and Gerber, et al. (2016) published a recent study which demonstrated that delirium increases costs in the PICU by 85% in the U.S. With these estimates of increased healthcare costs of 1.5% and 85%, diagnosing and treating pediatric delirium requires improved knowledge and a standard of practice of screening.

Given the serious health risks and costs associated with pediatric delirium, as well as the need for improved management, this project examined the experience, knowledge, and self-efficacy among staff related to pediatric delirium. It is expected that this study will provide awareness and knowledge of pediatric delirium to all caregivers in the PICU and CVICU at John Hopkins All Children's Hospital (JHACH). The hospital does not currently screen or identify patients at risk for pediatric delirium. This assessment project is the beginning of the journey to

implementing standard screening for pediatric delirium and prioritizing interventions to decrease the effects of pediatric delirium, improve patient outcomes from critical illness, with a goal to decrease healthcare costs attributed to pediatric delirium at JHACH.

Specific Aims

The goal of this project was to assess staff experience, knowledge, and self-efficacy regarding pediatric delirium in two critical care units: PICU and CVICU at JHACH in St. Petersburg, Florida. The overall outcome of this project was to develop a process of systematically screening for pediatric delirium on all patients and establish a standard of practice in the PICU and CVICU.

The specific aims were:

AIM 1: To assess the experience, knowledge and self-efficacy related to pediatric delirium among all staff who interact with patients who require care in the PICU and CVICU at John Hopkins All Children's Hospital (JHACH).

AIM 2: To develop an educational module appropriate for all education levels and care providers on pediatric delirium, the scope of its morbidity, and the two validated and reliable screening tools available.

Methods

A cross-sectional design was used in this project. After reviewing the current literature on pediatric delirium, a sixteen-item questionnaire was developed (see Appendix Table 1). Using the Qualtrics software platform, the questionnaire was transitioned to the Qualtrics format in preparation for the assessment of general knowledge and self-efficacy of pediatric delirium. Providers were defined as physicians, advanced practice providers (APP), nurses, respiratory therapists, child life specialist, occupational, physical, and speech therapists. JHACH has a 259 -

bed capacity and serves the pediatric population of the Tampa Bay/St. Petersburg area. The PICU is a 28-bed unit that provides care critical care from admission until they meet criteria for safe transfer to another unit. The CVICU is a 22-bed unit that serves children who have any form of cardiac disease. Patients who require the CVICU are cared for from admission to discharge.

Sample

The sample consisted of all care providers who had a valid email address within the JHACH email list serve list during the month of August 2017 and who actively worked in either the CVICU or PICU or both units. A total of 237 email addresses were assessed and found to meet the defined inclusion criteria as a care provider in the CVICU or PICU.

Data Collection

Institutional Review Board (IRB) approval and acknowledgement was obtained through both University of Kentucky and JHACH. JHACH uses a tiered system for research and quality improvement whereas the IRB has a quality improvement acknowledgement and the project is reviewed by both the Quality and Safety Council and the Nursing Research and Evidence-Based Practice Peer Review Committee. Both the CVICU and PICU nurse managers provided letters of support for the project as the permission to use their department email lists were required. The questionnaire was sent with the Qualtrics survey link embedded in the email and completion of the questionnaire implied consent. Please refer to Tables 1 and 2 for a list of the variables assessed through the survey which included demographic data (age, profession, length of time in profession) and experience, knowledge, and self-efficacy measures (recognize pediatric delirium, differentiate types of pediatric delirium). The questionnaire was open for 2 months with a reminder email sent one month into the data collection time frame.

Data Analysis

Using SPSS version 25 statistical software, all data were analyzed for descriptive statistics, frequency distributions, and means and standard deviations to describe care provider demographics and self-efficacy categorical variables. In addition, differences in experience, knowledge, and self-efficacy variables by years of experience and provider role were analyzed using chi-square assessment and Mann-Whitney *U*-test and one-way ANOVA. Finally, a proficiency score was calculated by examining participant who scored 80% or higher on a summary score of the experience, knowledge, and self-efficacy questionnaire (with the exception of the question: Have you ever thought that a patient you cared for was delirious?) Statistical significance was demonstrated with an [*alpha*] level of 0.05.

Results

Sample Characteristics

A total of 65 (28%) questionnaires out of 237 survey emails from both the CVICU and PICU were obtained from Qualtrics. As one survey was incomplete, 64 were analyzed. Of the individuals who completed the surveys, 83% and 17% were women and men, respectively. The majority of responders were nurses 68% (n=44). The remainder of the responders were comprised of respiratory therapists (9%), APP's (9%), physicians (9%) and ancillary services (child life, speech, occupational therapy, physical therapy) (3%). Year of experience was also notable for those who had practiced for 10 years or less: 30% had practiced 0-5 years and 30% had practiced 6-10 years, representing 60% of the overall sample. Of the remaining 40% surveyed, 14% had 11-15 years of experience and 15% had greater than 20 years of experience.

Experience with Pediatric Delirium

Experience with pediatric delirium was assessed. Of those surveyed, 93% stated that they have cared for a patient they thought was delirious. Pediatric delirium was also perceived to impact length of stay and/or severity of illness by 83% of the respondents. A majority of those surveyed (72%) also indicated that pediatric delirium should be assessed in all children.

Knowledge of Treatability of Delirium

Most respondents (80%) indicated that pediatric delirium is treatable. In regard to knowledge of interventions, 78% of all respondents indicated they knew that non-pharmacological interventions are available and 75% knew that pharmacologic interventions are available. Years of experience and provider role did not affect knowledge about the treatability of pediatric delirium or interventions available.

Self-Efficacy of Pediatric Delirium

Recognition of the three types of pediatric delirium were answered using a Likert scale. After preliminary analysis of responses, variables were renamed to reflect “agree” or “disagree.” Only 31% of the respondent felt capable of recognizing hypoactive delirium, 32% indicated that they felt capable of recognizing mixed delirium. However, 64% felt confident that they could recognize hyperactive delirium.

Self-efficacy regarding “best” treatment either pharmacologic or non-pharmacologic were also ascertained using a 4- point Likert scale or strongly agree, agree, disagree, and strongly disagree. Notably, 51% of those surveyed “disagree” with the belief that pharmacologic treatment is best and 57% “agree” that non-pharmacological treatment is best. Similarly, to the findings regarding knowledge about pediatric delirium, years of experience or provider role did not significantly impact how pediatric delirium is best treated.

Responses were further analyzed to assess an overall baseline knowledge proficiency about pediatric delirium. A summation score of 80% was determined as a baseline level of proficiency in the knowledge of pediatric delirium. All questions were used in the summation score except one: “have you ever thought that a patient you cared for was delirious.” Of the respondents, 72.3 % scored 80% or higher, indicating a proficient baseline knowledge of pediatric delirium.

Discussion

Most providers in the PICU and CVICU at JHACH who participated in the survey indicated that they have provided care for a patient that they felt was delirious regardless of having access to an assessment tool. The respondents also indicated that their self-efficacy of the three types of delirium was less in regard to hypoactive and mixed delirium, though more confident with hyperactive delirium. Overall, among those who completed the survey, 73% were able to demonstrate proficiency.

Whether a facility screens for delirium or not, the current prevalence rate in a PICU for pediatric delirium is 20% (Silver et al., 2015; Smeets et al., 2010; Traube et al., 2014). The results of the survey regarding if a provider thought they had cared for a patient who was delirious was 93%, the author hypothesizes that JHACH would also demonstrate that prevalence rate in the PICU and CVICU. In addition, 83% of the respondents indicated that delirium impacts length of stay and severity of illness which has been demonstrated by Traube, et al.(2014) and Smith, (2011). These results suggest that the providers at JHACH are ready to have a change in hospital culture and standardize screening for delirium.

Pediatric delirium can be treated and its effects minimized as demonstrated by Simone, et al. (2017). The results from this current study also suggest that the providers who participated in

the survey appreciate that pediatric delirium can be treated. They also displayed knowledge that there are both non-pharmacologic and pharmacologic interventions available to treat and minimize pediatric delirium. Simone, et al. (2014) found that strategies used to combat pediatric delirium, both non-pharmacologic and pharmacologic, reduced the incidence of pediatric delirium from 19.3% prior to their protocol implementation to 11.9% after the protocol implementation. After establishing routine screening at JHACH in the PICU and CVICU, the providers responses indicate a readiness to improve pediatric delirium outcomes.

The ability to accurately screen for pediatric delirium at the bedside is a key component to having an effective change in practice. Simone, et al. (2017) have advocated a planned approach for education and transition in practice. Using a reliable scoring tool requires education. Based on the results from this study, education will concentrate on differentiating between types of delirium and use of the chosen pediatric screening tool, the CAPD. The education will be congruent across all providers as the results of the survey did not demonstrate a higher experience, knowledge or self-efficacy based on years of experience or provider role. In Simone et al. (2017), efforts to establish a transition in hospital culture requires a multidisciplinary approach with key providers being physicians, nurses and nurse practitioners. Thus, for JHACH, a multidisciplinary approach to education and standardizing routine screening will be used by targeting physicians, nurses, therapy staff (i.e., child life therapy) and advanced practice providers. Hence, it is expected that educating JHACH providers in pediatric delirium will contribute to an effective change in culture and lead to full implementation of the ICU bundle.

Limitations

The primary limitation with the study was the extremely low response rate of the survey. One of historical impacts that may have affected response rate during the survey time period was

Hurricane Irma. JHACH was preparing for Hurricane Irma and was in disaster preparedness and provision of care for three weeks during the survey period. This could have impacted the survey return rate. Also, due to high email volume during the disaster period, only one reminder email was provided after the initial invitation to the survey.

Another perceived limitation of the low response rate is that providers may not truly understand or appreciate pediatric delirium as a significant morbidity. This has been previously described by Smith, Brink, Fuchs, Ely, and Pandharipande in 2013. The only persons willing to take the survey may have been those who felt that pediatric delirium is a significant morbidity, as indicated by the fact that > 90% of all participants felt that they have taken care of a patient that was delirious regardless of having a pediatric delirium screening tool.

Conclusion

With prevalence rates of pediatric delirium at about 20% of all critically ill children, the next steps are translating a change of practice and standard of care at JHACH. The needs assessment study demonstrated a baseline knowledge proficiency of pediatric delirium with a need for education in the ability to distinguish between the three types of delirium: hyperactive, hypoactive and mixed. As JHACH does not have any assessment of pediatric delirium in either the PICU or the CVICU, screening on pediatric delirium will be the next step in implementing the ICU bundle after multidisciplinary education to promote assessing and treating pediatric delirium. With two key interventions that have been associated with minimizing pediatric delirium (Simone, et al. 2017) standard screening and prioritizing mobility, JHACH will promote high-quality care to the critically ill child.

References

- Alvarez, R. V. P., C., Czaja, A. S. Peyton, C. Silver, G. Traube, C. Mourani, P. M. Kaufman, J. (2018). Delirium is a Common and Early Finding in Patients in the Pediatric Cardiac Intensive Care Unit. *The Journal of Pediatrics*. doi: 10.1016/j.jpeds.2017.11.064.
- American Psychiatric Association (2013). Delirium. In *Diagnostic and statistical manual of mental disorder* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Barr, J., Fraser, G. L., Puntillo, K., Ely, E. W., Gelinas, C., Dasta, J. F., . . . American College of Critical Care, M. (2013). Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. *Critical Care Med*, 41(1), 263-306. doi:10.1097/CCM.0b013e3182783b72
- Berkenbosch, J. S., Heidi. (2018). [Pediatric PAD Guideline Taskforce 2018 Congress Business Meeting San Antonio].
- Cavallazzi, R., Saad, M., Marik, P. E. (2012). Delirium in the ICU: an overview. *Annals of Intensive Care*, 2(49).
- Curley, M. A., Wypij, D., Watson, R. S., Grant, M. J., Asaro, L. A., Cheifetz, I. M., . . . Sepsis Investigators, N. (2015). Protocolized sedation vs usual care in pediatric patients mechanically ventilated for acute respiratory failure: a randomized clinical trial. *JAMA*, 313(4), 379-389. doi:10.1001/jama.2014.18399
- Daoud, A. D., J.P. Joffe, A.R. (2014). Diagnostic accuracy of delirium diagnosis in pediatric intensive care: a systematic review. *Critical Care*, 18(5), 10.
- Dorfman, T. L., Sumamo Schellenberg, E., Rempel, G. R., Scott, S. D., & Hartling, L. (2014). An evaluation of instruments for scoring physiological and

- behavioral cues of pain, non-pain related distress, and adequacy of analgesia and sedation in pediatric mechanically ventilated patients: A systematic review. *Int J Nurs Stud*, 51(4), 654-676. doi:10.1016/j.ijnurstu.2013.07.009
- Grant, M. J., Balas, M. C., Curley, M. A., & Team, R. I. (2013). Defining sedation related adverse events in the pediatric intensive care unit. *Heart Lung*, 42(3), 171-176. doi:10.1016/j.hrtlng.2013.02.004
- Joyce, C., Witcher, R., Herrup, E., Kaur, S., Mendez-Rico, E., Silver, G., . . . Traube, C. (2015). Evaluation of the Safety of Quetiapine in Treating Delirium in Critically Ill Children: A Retrospective Review. *J Child Adolesc Psychopharmacol*, 25(9), 666-670. doi:10.1089/cap.2015.009
- Kudchadkar, S. R., Yaster, M., & Punjabi, N. M. (2014). Sedation, sleep promotion, and delirium screening practices in the care of mechanically ventilated children: a wake-up call for the pediatric critical care community. *Crit Care Med*, 42(7), 1592-1600. doi:10.1097/CCM.0000000000000326
- Mansouri, P., Javadpour, S., Zand, F., Ghodsbin, F., Sabetian, G., Masjedi, M., & Tabatabaee, H. R. (2013). Implementation of a protocol for integrated management of pain, agitation, and delirium can improve clinical outcomes in the intensive care unit: a randomized clinical trial. *J Crit Care*, 28(6), 918-922. doi:10.1016/j.jcrc.2013.06.019
- Patel, A. B., K. V. Clark, E. Traube, C. (2017). Delirium in the Pediatric Cardiac Extracorporeal Membrane Oxygenation Patient Population: A Case Series. *Pediatric Critical Care Medicine*, 18(12), 621-624.
- Ratcliff, S. L., Meyer, W. J., Cuervo, L. J., Villarreal, C., Thomas, C. R., & Herndon,

- D. N. (2004). The Use of Haloperidol and Associated Complications in the Agitated, Acutely Ill Pediatric Burn Patient. *Journal of Burn Care & Rehabilitation*, 25(6), 472-478. doi:10.1097/01.bcr.0000144540.21272.2c
- Rivosecchi, R. M. P., Smithburger, P.L., PharmD.,MS, BCPS, Svec, S., RN, BSN, CCRN.,Campbell, S., RN, BSN., Kane-Gill, S.L., PharmD, MS. (2015). Nonpharmacological Interventions to Prevent Delirium: An Evidence Based Systemic Review. *Critical Care Nurse*, 35(1), 39-49.
- Schieveld, J. N. (2014). Rapid diagnosis of PICU delirium. *J Pediatric*, 165(3), 643. doi:10.1016/j.jpeds.2014.06.037
- Silver, G., Traube, C., Gerber, L. M., Sun, X., Kearney, J., Patel, A., & Greenwald, B. (2015). Pediatric delirium and associated risk factors: a single-center prospective observational study. *Pediatric Crit Care Med*, 16(4), 303-309. doi:10.1097/PCC.0000000000000356
- Simone, S. E., S. Lardieri, A. Waler, K. Graciano A. Kishk, O. Custer, J. (2017). Implementation of an ICU Bundle: an Interprofessional Quality Improvement Project to Enhance Delirium management and Monitor Delirium Prevalence in a Single PICU. *Pediatric Critical Care*, 18(6), 531-540.
- Smeets, I. A., Tan, E. Y., Vossen, H. G., Leroy, P. L., Lousberg, R. H., van Os, J., & Schieveld, J. N. (2010). Prolonged stay at the paediatric intensive care unit. associated with paediatric delirium. *Eur Child Adolesc Psychiatry*, 19(4), 389-393. doi:10.1007/s00787-009-0063-2
- Smith, H. A., Boyd, J., Fuchs, D. C., Melvin, K., Berry, P., Shintani, A., . . . Ely, E. W. (2011). Diagnosing delirium in critically ill children: Validity and reliability

- of the Pediatric Confusion Assessment Method for the Intensive Care Unit. *Crit Care Med*, 39(1), 150-157. doi:10.1097/CCM.0b013e3181feb489
- Smith, H. A., Brink, E., Fuchs, D. C., Ely, E. W., & Pandharipande, P. P. (2013). Pediatric delirium: monitoring and management in the pediatric intensive care unit. *Pediatr Clin North Am*, 60(3), 741-760. doi:10.1016/j.pcl.2013.02.010
- Smith, H. A., Fuchs, D. C., Pandharipande, P. P., Barr, F. E., & Ely, E. W. (2011). Delirium: an emerging frontier in the management of critically ill children. *Anesthesiol Clin*, 29(4), 729-750. doi:10.1016/j.anclin.2011.09.011
- Stamper, M. J., Hawks, S. J., Taicher, B. M., Bonta, J., & Brandon, D. H. (2014). Identifying pediatric emergence delirium by using the PAED Scale: a quality improvement project. *AORN J*, 99(4), 480-494. doi:10.1016/j.aorn.2013.08.019
- Traube, C., Mauer, E.A. Gerber, L.M. Kaur, S. Joyce. C. Kerson, A. Carlo,C. Notterman, D. Worgall, S. Silver, G., Greenwald, B. (2016). Cost Associated with Pediatric Delirium in the ICU. *Critical Care Medicine*, 44(12), 1175-1179. doi:10.1097/CCM0000000000002004
- Traube, C., Silver, G., Kearney, J., Patel, A., Atkinson, T. M., Yoon, M. J., . . . Greenwald, B. (2014). Cornell Assessment of Pediatric Delirium: a valid, rapid, observational tool for screening delirium in the PICU. *Crit Care Med*, 42(3), 656-663. doi:10.1097/CCM.0b013e3182a66b76
- Turkel, S. B. (2017). Pediatric Delirium: recognition, Management, and Outcome. *Current Psychiatry Reports*, 19(101), 7

Appendix

Table 1. Study Measures: Demographics

Measures	Description	Level of Measurement	Analysis	Data Source
Sex	Sex (male, female, other)	Nominal	Frequency (%)	Survey via Qualtrics
Age	Age of respondent in years	Interval/Ratio	Means (SD)	Survey via Qualtrics
Ethnicity	Ethnicity (African-American, Hispanic, Caucasian, Other)	Nominal	Frequency (%)	Survey via Qualtrics
Work tenure	Years in current career	Interval/Ratio	Means (SD)	Survey via Qualtrics
Care provider role	RN, RT, Therapy staff, APP, MD	Nominal	Frequency (%)	Survey via Qualtrics

Table 2 a. Outcome Measures: Experience with Delirium

Description	Level of Measurement	Analysis	Data Source
Have you ever through a patient you cared for was delirious? (Yes/No)	Nominal	Frequency (%)	Survey via Qualtrics
Does pediatric delirium impact length of stay and/or severity of illness? (Yes/maybe/no)	Nominal	Frequency (%)	Survey via Qualtrics
Should pediatric delirium be assessed in all patients? (Yes/no/maybe)	Nominal	Frequency (%)	Survey via Qualtrics

Table 2 b. Outcome Measures: Knowledge of treatability of delirium

Description	Level of Measurement	Analysis	Data Source
Is delirium treatable? (Yes/no/maybe)	Ordinal	Frequency (%)	Survey via Qualtrics
Are there non-pharmacological interventions available to treat pediatric delirium? (Yes/no/maybe)	Ordinal	Frequency (%)	Survey via Qualtrics
Are there pharmacological interventions available to treat pediatric delirium? (Yes/no/maybe)	Ordinal	Frequency (%)	Survey via Qualtrics

Table 2 c. Outcome Measures: Self efficacy for recognizing pediatric delirium

Description	Level of Measurement	Analysis	Data Source
I can recognize hypoactive delirium (Strongly agree/agree/disagree/strongly disagree)	Ordinal	Frequency (%)	Survey via Qualtrics
I can recognize hyperactive delirium (Strongly agree/agree/disagree/strongly disagree)	Ordinal	Frequency (%)	Survey via Qualtrics
I can recognize mixed delirium (Strongly agree/agree/disagree/strongly disagree)	Ordinal	Frequency (%)	Survey via Qualtrics

Table 2 d. Outcome Measures: Self-efficacy for treating pediatric delirium

Description	Level of Measurement	Analysis	Data Source
I believe non-pharmacologic methods are best for treating pediatric delirium. (Strongly agree/agree/disagree/strongly disagree)	Ordinal	Frequency (%)	Survey via Qualtrics
I believe pharmacologic methods are best for treating pediatric delirium. (Strongly agree/agree/disagree/strongly disagree)	Ordinal	Frequency (%)	Survey via Qualtrics

Table 3. Demographics

Descriptive	Percentage (%)	Count
<i>Gender</i>		
Male	14.29%	9
Female	85.71%	54
<i>Age of participant in years</i>		
20-30	26.98%	17
31-40	30.16%	19
41-50	30.16%	19
51-64	12.7 %	8
➤ 65	0	0
<i>Number of years in current career</i>		
0-5	31.25%	20
6-10	31.25%	20
11-15	14.06%	9
16-20	7.81%	5
➤ 20	15.63%	10
<i>Provider role</i>		
RN	68.75%	44
RT	9.38%	6
Ancillary staff	3.13%	2
APP	9.38%	6

MD	9.38%	6
<i>Ethnicity</i>		
African-American	0	0
Caucasian	91.8%	56
Hispanic/Latino	8.2%	5
Asian	0	0
Other	0	0

Table 4. Summation Score

	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
<i>Valid 0.00</i> <i>(80%)</i>	47	72.3	72.3	72.3
<i>1.00</i> <i>(<80%)</i>	18	27.7	27.7	100
<i>Total</i>	65	100	100	