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Theresa Carroll
t.carroll@usa.edu

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Implementing an Evidence-Based Practice Change for Alcohol Withdrawal in an Acute Care Hospital

Theresa Carroll, RN, BSN

School of Nursing, University of St. Augustine for Health Sciences

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Course Faculty: Mary Brann, DNP, RN

Preceptor: Deene' Mollon, PhD, RN, NE-BC

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Abstract

Practice Problem: Alcohol Use Disorders (AUD) affects a significant portion of the population in the United States. When AUD is either unrecognized or inadequately treated in the acute care setting it can lead to medical complications, increased length or stay (LOS), increased healthcare expense, and increased patient mortality.

PICOT: In a population of adult patients admitted to an acute care hospital progressive care unit (P), how does applying an initial evidence-based screening tool to detect risk for moderate to severe alcohol withdrawal, the PAWSS (I), compare to no standard screening or assessment for potential alcohol withdrawal symptoms (C) affect the occurrence of patient deterioration for acute alcohol withdrawal symptoms (O) within an eight week timeframe (T)?

Evidence: The primary research articles included resulted in Level II grade criteria according to the Johns Hopkins EBP Model rating hierarchy. The PAWSS tool was supported as both a reliable and valid predictive measure of risk for developing AWS in the acute care setting.

Intervention: The PAWSS tool was utilized to screen all patients admitted to the progressive care unit. Patients identified at moderate to severe risk by a score of ≥4 were treated according to the standard facility practice with included CIWA-Ar monitoring and medication management with benzodiazepine medication.

Outcome: The project was able to demonstrate a significant decrease in the mean LOS for those patients identified at risk and treated for AWS, with an average decrease of 50 hours in length of stay for those patients treated during the project implementation.

Conclusion: Early recognition of patients at risk for AWS is an important component of effective management and treatment. Further study is needed into best practices for treatment of patients at risk, and internal compliance measures within the organization.

Implementing an Evidence-Based Practice Change for Alcohol Withdrawal in an Acute Care Hospital

Alcohol Use Disorders (AUD) create a significant impact on mortality and medical co-morbidity in the United States. According to the Centers for Disease Control and Prevention (CDC), the excessive use of alcohol is responsible for approximately 95,000 deaths annually, and in 2010 created more than $249 billion in economic costs (CDC, 2020). The development of more effective preventative recognition and pharmacotherapies to treat the disease of AUD is a global health concern. Early recognition of the presence of an AUD in acute hospital care settings and identifying risk for withdrawal by evidence-based practice interventions can help improve patient care and outcomes. This DNP project will discuss the implementation of an evidence-based practice change utilizing the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) to detect acute risk for moderate to severe alcohol withdrawal in the acute care setting. The PAWSS can be used as a screening tool for risk to predict the need for other standard monitoring methods already used in AWS treatment such as the use of the Clinical Institute Withdrawal Assessment for Alcohol-revised version (CIWA-Ar) or use of medication-assisted treatments. Implementation of early risk assessment is one factor that will ultimately improve outcomes for patients with AUD, including those patients who are at risk for moderate to severe symptoms of Alcohol Withdrawal Syndrome (AWS) in acute care hospital settings.

Significance of the Practice Problem

Alcohol Use Disorder is a global public health problem that continues to significantly impact the population in the United States (Xierali et al, 2021). The World Health Organization Global Information Systems on Alcohol and Health estimates that on an annual basis alcohol consumption results in the death of 3 million people globally and is associated with 230 different

types of diseases (World Health Organization, 2016). AUD and the excessive use of alcohol have been identified as leading causes of preventable death in the United States (Esser et al., 2020). AUD is estimated to affect 12.7% of the population in the United States, with a projected two-fold increase anticipated following the COVID-19 pandemic (Da, Im & Schiano, 2020). Excessive drinking accounts for approximately 1 in 10 deaths among working-age adults in the United States (Stahre et al., 2014). In the state of California, excessive alcohol use is estimated to cost more than $35 million annually in 2015 due to loss of workplace productivity, health care expenses, and other costs related to criminal justice expenses, car accidents, and property damage (CDC, 2015). For individuals arrested in San Diego County in 2018, 43% of males and 27% of females reported drinking within the last 24 hours (Burke, 2019). There is also early evidence that the COVID-19 pandemic has increased alcohol consumption in the United States, putting more people at risk for potential adverse health effects (Capasso et al., 2021).

Alcohol consumption has been linked to an increased burden of disease and mortality for several health conditions (Rehm et al., 2017). For patients undergoing elective surgery, acute alcohol withdrawal was associated with perioperative complications, 40% higher overall cost of treatment, and 85% longer length of stay (Lin et al., 2017). Chernyavsky et al. (2020) estimate in the United States that more than 20% of patients admitted to the acute care hospital setting meet the criteria for AUD and that more than 2 million patients experience withdrawal symptoms each year. The percentage of patients admitted to the hospital for medical issues other than AUD who experience alcohol withdrawal can be as high as 42% in veteran populations (Shu, Lin & Chang, 2015).

For those patients with AUD, there is an increased risk for AWS when alcohol is abruptly discontinued, as is the case for those patients admitted to an acute care hospital for treatment of a

medical condition (Sukhenko, 2015). Complications of withdrawal can include mild symptoms like nausea, vomiting, or increased blood pressure (Trevisan et al., 1998). Up to 20% of patients with acute alcohol withdrawal develop severe symptoms associated with complicated AWS, including delirium tremens and withdrawal seizures (Maldonado et al., 2010) or Wernicke encephalopathy (Ostrovsky, 2018). For those patients that do experience these more severe complications, up to 20% may ultimately die from these complications compounded by other medical comorbidities (Campos et al., 2011).

PICOT Question

The PICOT question addresses the relationship between a population (P), intervention (I), comparison (C), outcome (O) and time (T). This project poses the question in a population of adult patients admitted to an acute care hospital progressive care unit (P), how does applying an initial evidence-based screening tool to detect risk for moderate to severe alcohol withdrawal, the PAWSS (I), compare to no standard screening or assessment for potential alcohol withdrawal symptoms (C) affect the occurrence of patient deterioration for acute alcohol withdrawal symptoms (O) within an eight week timeframe (T)? The population will include all adult patients admitted to the progressive care unit in an acute care hospital. The intervention would be the application of the PAWSS at the time of admission to the unit. The comparison would be the current practice of no standard assessment at the time of admission for risk for alcohol withdrawal. The outcome of patient deterioration would be defined by indicators of severe alcohol withdrawal including the need for rapid response, CIWA-Ar scores increased over mild range indicated by a score of greater than 15, “code green” security personnel response for patient behavioral deterioration, or symptoms requiring a higher level of care or ICU transfer. The timeframe would be eight weeks.

Evidence-Based Practice Framework & Change Theory

This project utilized the John's Hopkins Evidence-Based Practice (EBP) model to describe the practice change. The John Hopkins Nursing EBP model follows a three-step process for practice change: practice question, evidence, translation (Dang & Dearholt, 2018). The goal of this model is to incorporate the latest research findings and best practices into patient care in a manner that efficient and appropriate (Dang & Dearholt, 2018). This model starts with generating a practice question, then evaluates evidence to support practice change, and finally translates the evidence into practice change.

This change project utilized Lewin's Change Theory to facilitate practice change. According to Lewin's Change Theory as it is applied to nursing practice, "change occurs in three stages: unfreezing, moving and refreezing" (Lee, 2006, p. 489). Specific strategies are needed at each stage of change to continue to facilitate the change process. This theory was a good fit to address practice change for implementing an alcohol withdrawal assessment tool because it was easily applied to evidence-based practice change (Manchester et al., 2014). In the initial unfreezing stage, evidence-based practice change was identified and stakeholder buy-in helped drive momentum for the practice change. The project manager helped develop an awareness of the significance of the practice problem and the gaps within the current organizational practices. Additionally, the project manager helped to identify nurse champions to keep change momentum progressing during the "moving" stage. During the moving phase, the project manager, along with key stakeholders in the process, implemented the change in practice. Throughout this "moving" stage, staff were educated and encouraged to implement the change to drive better patient outcomes. During the "refreezing" stage, the change continues to be reinforced. This

included organizational and environmental changes to sustain the change, and recommendations to include other techniques like periodic auditing to cement the practice change.

Evidence Search Strategy

To gain an initial understanding of the scope and depth of the problem, as well as to become more familiar with some of the current literature trends and key relevant search terms, initial literature searches were conducted via databases such as the Cochrane Database of Systemic Reviews (CDSR), PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) complete and APA PsychINFO database search as well as Google Scholar website. Some of the terms searched in different combinations included inclusion criteria of the terms: alcohol withdrawal syndrome, AWS, alcohol withdrawal assessment, and acute care, clinical assessment, and acute alcohol withdrawal. Articles that were systematic reviews or meta-analyses were identified within the literature review were also examined to help further define search criteria and potential exclusions. Medical Subject Headings (MeSh) terms of “Alcohol Withdrawal Syndrome” and “Clinical Assessment” were utilized also as inclusion criteria. These searches resulted in over 2200 articles from the 2010 to 2021 timeframe.

Exclusion criteria were developed to attempt to eliminate research content related to emergency department or ICU care setting, mental health settings, studies primarily focused on medication management strategies, pediatric population, articles focused on animal populations, and articles not written in the English language. The abstracts were reviewed for exclusion criteria and those articles that met the inclusion criteria for relevance to the PICOT question were full-text reviewed. A total of 48 articles were included for full-text review and 26 articles were included in the final synthesis of the literature.

Evidence Search Results

To understand and define AUD, understand AWS, and evaluate the evidence-based recommendations for assessment and treatment of the disorder, a comprehensive literature review was conducted. Initial search results were outlined according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model as discussed above (See Figure 1 for PRISMA model). Of these, four articles were identified as primary research related to the PICOT question (see Appendix A) and four were identified from systematic reviews as relevant to the PICOT question (See Appendix B).

Those articles included as primary research were graded according to the Johns Hopkins EBP Model rating hierarchy for the level of research evidence (Dang & Dearholt, 2018). All of the primary research articles included resulted in Level II grade criteria of research (Griessbach et al., 2019; Mahabir et al., 2020; Maldonado et al., 2015; Padron, 2019). One study was a retrospective analysis design (Griessbach et al., 2019), while the others were quasi-experimental designs. Due to the nature of AUD and AWS, there were no primary research studies identified in the literature that would allow for randomized control studies (RCTs) which would allow for Level I research evidence.

Those articles included in the systematic review and meta-analysis were narrowed down to represent those related to predicting the development of AWS and Severe Alcohol Withdrawal Syndrome (SAWS). There were two articles with Level I quality data (Hlleck, Merchant & Gunderson, 2019; Pribek et al., 2021) and another two with Level II quality data (Goodson, Clark & Douglas, 2014; Maldonado et al., 2014) according to the John Hopkins EBP Model rating hierarchy for the level of research evidence (Dang & Dearholt, 2018). (See Appendix B). These systematic reviews related directly to the assessment of risk for developing AWS or SAWS.

Themes with Practice Recommendations

Understanding the Population

Multiple studies have shown that patients who have an Alcohol Use Disorder (AUD) diagnosis, pre-existing their admission to an acute care hospital, are at increased risk for developing complications from AWS, including potentially death (Maldonado et al., 2014, Shu et al., 2015; Sukhenko, 2015). Chernyavsky et al. (2020) estimate in the United States that more than 20% of patients admitted to the acute care hospital setting meet the criteria for AUD and that more than 2 million patients experience withdrawal each year. The percentage of patients admitted for medical issues other than AUD who experience alcohol withdrawal can be as high as 42% in veteran populations (Shu, Lin & Chang, 2015). Maldonado, et al. (2014), estimated only 7% of physicians correctly identify patients at risk for complicated AWS in the acute care setting. Additionally, studies support that no one factor is predictive of severe alcohol withdrawal (Goodson, Clark, & Douglas, 2014; Burkhardt et al., 2020; Rosoff et al., 2020).

Evidence-Based Treatment for Patients at Risk for Acute Alcohol Withdrawal Syndrome

Most assessment and treatment strategies for AWS are based on the understanding of the physiology of withdrawal (Maldonado et al., 2014). The ingestion of alcohol has an inhibitory effect on the N-methyl-D-aspartate (NMDA) receptors in the central nervous system and an agonistic effect on gamma-aminobutyric acid type-A ($GABA_A$) receptors within the central nervous system (Dixit et al., 2016; Haass-Koffler, Cannella & Ciccocioppo, 2020). Over time, the continued exposure to alcohol leads to tolerance in the central nervous system, reflected in the NMDA receptors being up-regulated while the $GABA_A$ receptors are down-regulated (McKeon, Frye, & Delanty, 2008). When the alcohol exposure in the central nervous system is abruptly decreased or eliminated, these roles are reversed, leading to “dopaminergic

dysregulation" and producing the signs and symptoms of AWS (Sykhenko, 2015). Generally, AWS is made up of a cluster of symptoms resulting from this dopaminergic dysregulation. Symptoms (See Table 1 for the stages of AWS) usually develop within 24-48 hours after last use including tachycardia, diaphoresis, tremors, irritability, agitation, hypertension, seizures, and sometimes delirium or hallucinations in the later stages (Holt et al., 2016; Ostrovsky, 2018). Not all patients experience all stages, nor do they progress sequentially through them, making recognition of the potential for AWS and ongoing monitoring for those at risk essential in the appropriate management of alcohol withdrawal (Lindsay et al., 2020; Maldonado et al., 2014; Monte et al., 2010).

Evidence-Based Screening for Risk Assessment

While assessment for alcohol withdrawal was previously relegated to those patients displaying risk factors of alcohol abuse, more evidence has shown that routine screening of patients for risk for alcohol withdrawal is more effective than just relying on clinical judgment (Keys, 2011; Maldonado et al., 2014; Sutton & Jutel, 2016). The Clinical Institute Withdrawal Assessment for Alcohol-Revised (CIWA-Ar) has been the most widely researched tool; however, despite its prevalent use, the CIWA-Ar has shown to be inconsistent in its ability to correctly identify patients needing intervention for withdrawal (Hecksel et al, 2008; Holleck et al., 2019; Pribék et al., 2021) In fact, Hecksel et al. (2008) reported that as many as 64% of patients on CIWA-Ar monitoring may be incorrectly identified as needing medication. One of the major critiques of this tool has been its moderate performance at predicting severe alcohol withdrawal (Eloma et al., 2018) presumably because it was designed as a monitoring tool, not a predictive assessment tool.

The Alcohol Withdrawal Triage Tool (AWTT) (Mahabir et al., 2020) is comprised of a complicated set of independent predictors of risk for AWS that need to be gathered from the medical record. The AWTT showed some potential to identify patients at risk for severe AWS, but the validation dataset "resulted in a c-statistic pf 0.786" which was not sufficient to support this as a stand-alone tool (Mahabir et al., 2020, p. 5). The Alcohol Withdrawal Assessment Tool (AWAT) was developed as a shorter version of the CIWA-Ar that took into account some of the physiological symptoms of alcohol withdrawal and had 4 questions related to pulse/blood pressure, agitation/tremors, confusion/hallucination, and diaphoresis (Davis et al., 2018). While the AWAT is one of only a few tools that was tested in the acute care setting, the AWAT was only tested with a small sample size (n=51), and the predictability was compared against the CIWA-Ar which as discussed was not designed to predict risk for alcohol withdrawal. The Luebeck Alcohol withdrawal Risk Scale (LARS) was also developed to predict the severity of withdrawal and has been validated in psychiatric settings (Wetterline et al., 2006). However, there was no evidence of validation for the tool within the acute care hospital setting.

The Prediction of Alcohol Withdrawal Severity Scale (PAWSS) has been both studied and validated in the acute care hospital setting (Maldonado et. al., 2014) for its predictive validity in identifying patients at risk for severe alcohol withdrawal (Maldonado et al., 2015; Padron & Salzman, 2019). See Appendix A. The PAWSS tool research was graded according to the Johns Hopkins EBP Model rating hierarchy for the level of research evidence (Dang & Dearholt, 2018) and was graded Level II primary research, due to strong predictive validity (Maldonado et al, 2015) with a Positive Predictive Validity of 93.1% (95%CI), and Negative Predictive Validity of 99.5% (95%CI). The PAWSS lacks randomized controlled trials, which was anticipated given the nature of the tool. The PAWSS is an open-source tool that does not

require permission to use. The application of this assessment tool has not been shown to have any potential risks for the patient population as it can be incorporated into the standard admission assessment.

Practice Recommendation

The evidence-based practice recommendation for patients admitted to an acute care hospital unit was to utilize the PAWSS to screen and predict risk for severe alcohol withdrawal. By standardizing the risk assessment tool, the facility would be able to more accurately identify those patients at risk for moderate to severe AWS. Those patients identified at moderate to severe risk by a score of ≥4 would be treated according to the standard facility practice which included utilizing the CIWA-Ar (see Appendix H) to monitor for current alcohol withdrawal symptoms and to treat the patient according to the current standard practice which included symptom-based benzodiazepine medication or fixed-dose dependent on the physician orders. The early and accurate identification of those patients at risk for AWS would support appropriate treatment recommendations to minimize the risk for patient deterioration from unrecognized AWS.

Setting, Stakeholders, and Systems Change

The Southern California setting identified for this evidence-based change project was in an acute care hospital on a progressive care unit. The mission of the organization was to improve the health of those served with a commitment to excellence in all that the organization does. The organizational goal was to offer quality care and services that set community standards, exceed patients' expectations, and provide care that is convenient, cost-effective, and accessible. The organization has 524 licensed beds, with services ranging from Emergency Room Care, Medical and Surgical ICU, Progressive Care, Oncology, Women’s Health, Physical Rehab, and

Behavioral Health Services. The healthcare facility has a Magnet Designation for Nursing Excellence®. The hospital Emergency Department (ED) serves a diverse population and demographic area that stretches from the coast of Southern California to the Arizona border and was in the top five percent of the nation in Emergency Room patient volume.

A SWOT analysis was conducted as part of the organization gap analysis. There was an identified opportunity to improve patient outcomes with early recognition and treatment of AUD (see SWOT Analysis, Appendix D). Using the Organizational Cultural Profile developed by Groysberg et al., (2018) the organization demonstrated a change structure that reflects structural stability and authoritative top-down leadership-driven change. This meant that key organizational leadership needed to be supportive of the change process for it to be successful. Key stakeholders identified included the hospital Chief Nursing Officer (CNO), the Director of PCU, the Manager of the PCU, the Hospitalists, the Charge Nurses, the Clinical Nurse Specialists (CNS), and front-line nurses on the progressive care unit, as well as members of the interdisciplinary treatment team like social workers and nursing assistants, and also included the patients.

The CNO and the Director of PCU were already aware of instances of adverse patient outcomes and patient deterioration attributed to AWS within the acute care setting. The cooperation of the interdisciplinary team was also essential to the successful implementation of the evidence-based practice change. The front-line nursing staff were responsible for the implementation of the PAWSS screening tool and communicating with the admitting physician the need for implementation of the alcohol withdrawal order set protocol for those patients who screened positive for risk. The CNS as well as the project manager were involved to support the education around the new tool and to refresh the nurses' knowledge on the general treatment of

alcohol withdrawal. The social workers were also involved for those patients that needed connection to ongoing treatment options once they were medically stable to discharge from the acute care setting.

The change project impacted individual patients on the micro-level by providing early recognition and treatment of AWS within the acute care treatment setting. Providing routine screening may have also decreased the potential patient stigma and potential bedside RN negative bias associated with Substance Use Disorders (SUDs). This effect was not specifically measured during this project but is a focus of ongoing assessment at the organization. On the meso level, the families of patients receiving treatment are affected by the patient's SUD and may have received greater support once the disorder was acknowledged, and may have sought help to improve their own social supports (Church et al., 2018). On the macro level, providing early recognition and interventions for a chronically undertreated or marginalized medical condition such as SUDs has been shown to improve the overall health of the community. Additionally, providing proactive treatment may continue to draw larger attention and support for the treatment of marginalized disorders and increase awareness of the mental health parity laws.

Implementation Plan with Timeline and Budget

The construction of a PICOT question, extensive literature review, and practice recommendation formed the foundation for the evidence-based practice change proposal. This foundation was based on the John Hopkins Nursing EBP model that follows a three-step process for practice change: practice question, evidence, and translation. The implementation plan for the EBP change proposal included identifying key project objectives, outlining SMART goals, and finally the application of the change model. These goals had to be accomplished within a

reasonable timeline for the project to be successful (see Appendix I for Project Goals and Implementation Strategy, and Appendix D for the Project Timeline).

The first objective of the project proposal was to complete a SWOT analysis of the organization and identify an area for practice change within the first four weeks of the NUR7801 class (see Appendix C SWOT Analysis). This formed the foundation for generating a PICOT question and completing a literature review with practice recommendations. The next objective was to identify key stakeholders and gain buy-in for the project. This goal is measured by the stakeholders identified. The goal was accomplished by demonstrated buy-in of the unit and staff, and key stakeholders identified including the hospital CNO, the Director of PCU, the Unit Manager, the CNS, and hospital informaticist within the first 12 weeks of NUR7801. Once the PICOT question was refined, the literature review was completed, and a practice recommendation was generated. The practice change recommendation was to implement the PAWSS predictive risk assessment at the time of admission to the acute care PCU (see Appendix G for the PAWSS tool). A potential budget was also developed at this stage as it is part of the final approval process for the healthcare organization. The only associated expenses for the project were under $50 for paper supplies to provide the PAWSS assessment tool to the unit, which was incorporated into the existing unit budget, and the CNS/nurse educator time (approximately 10 hours X $60/hr = $600) to help with unit staff training and audits for compliance during the eight weeks of implementation. Since these tasks were incorporated into the CNS regular unit responsibilities, it did not end up creating any additional cost to the organization. The project had the potential to decrease costs to the organization due to decreasing length of stay or need for a higher level of care, however, these specific monetary calculations were outside of the scope of this project. The department manager reviewed and approved the

potential budget. The work done to define the problem and propose an evidence-based change aligns with the "unfreezing" stage of Lewin's change theory. It was essential to develop an awareness of the problem and foster motivation for change.

The next portion of the change project timeline consisted of components in Lewin's Change Theory's second stage; the "moving" stage. Primary objectives during this stage included gaining approval for the project implementation from the DNP program and healthcare organization within the first three weeks of NUR7802 (see Appendix D). The University's approval was gained through the EBP Project Review Council (EPRC) process. The facility approval was gained by first submitting the project proposal to the entity-based IRB representative as a project proposal, then once it was determined that the project proposal was EBP not research then the proposal was submitted to the Innovations and Professional Excellence Committee for final approval. A primary reviewer was assigned and requested that an additional flyer detailing the project information to be generated and provided to patients agreeing to be screened with the PAWSS tool. Additionally, the request for data from the EMR needed to be submitted to the organization informatics department, rather than allowing the project manager to collect data directly. This was to ensure that all patient identifiers were removed prior to data analysis.

After gaining both university and facility approval for EBP project, the next stage was the implementation of the educational/training for the unit staff on the PAWSS tool and reinforcing the healthcare facility protocol for the monitoring and treatment of alcohol withdrawal (See Appendix I for Project Goals and Implementation Strategy). The final component of the "moving" stage of change was the implementation of the screening tool on the unit for the eight week intervention period and monitoring for compliance.

During the final stage of Lewin's Change Theory, the "refreezing" stage the focus was on sustaining the practice change. During this stage, the project data was analyzed while impact and practice implications were shared with the key stakeholders. During the "refreezing" stage, the key stakeholders including the Unit Manager, front-line nurses, and the interdisciplinary team took over ownership of sustaining the change process. During the "refreezing" stage, the unit CNS took on the responsibility to continue to perform chart audits to identify any reverting to prior behaviors of not completing the PAWSS screening. Re-education and reinforcement of the application of the PAWSS will be offered by the CNS to sustain practice change. There was a recommendation to "hardwire" the assessment into the electronic medical record however the organization is in the process of changing EMR systems. There was reluctance to spend money to incorporate this assessment tool in the old EMR; however, there is an opportunity to incorporate this practice change in the design of the new EMR, which would support "refreezing" of this practice change.

The EBP change project implementation required a project manager to keep the project on track. This role required the DNP student project manager to be clear and consistent in setting project goals. The project manager was also responsible for gaining key stakeholder buy-in and delegating tasks like nursing education to the unit clinical nurse specialists. The project manager also developed key partnerships with information technology staff to assist with data collection and validation during and following the project implementation. The project manager was responsible for the analysis of the project results and disseminating the findings, clinical significance and future practice considerations to the key stakeholders.

Results

In the PICOT question, the outcome reflecting patient deterioration were defined by indicators of the need for rapid response, CIWA-Ar scores increased over mild range, code green security personnel response for behavioral deterioration, or symptoms requiring a higher level of care or ICU transfer. The literature demonstrates the absence of effective AWS recognition and treatment has resulted in the need for rapid response, transfers to a higher level of care, and longer length of stay (Holt et al., 2016; Maldonado et al., 2014; Muzyk et al., 2017) which supports face validity for these measures. Pinkhasov et al. (2020) report AWS was associated with a 13-fold increase in the risk of a behavioral disturbance (95% CI, 8 to 22-fold). The need for security to respond to behavioral disturbances has been correlated with adverse patient outcomes and increased risk for staff and patient injury, which was identified as an important area of concern by key stakeholders including the unit manager and CNO. The project also measured the time interval between when the patient was admitted to the unit and when the alcohol withdrawal order set was implemented based on the time the CIWA-Ar was initiated. The significance of this measure was to identify when treatment may have been delayed due to failure to recognize the risk or AWS at the time of admission.

Once EBP Project Review Council (EPRC) at the university and the entity-based IRB committees approved the project proposal, data was collected for the eight weeks before the implementation of the project and then again during the eight week project implementation (see Appendix E &F for data description and data collection sheet). Paper copies of the completed PAWSS tool were collected and stored in the nursing lead office on the unit, in a folder, not visible to the public, and stored according to HIPAA guidelines the same as patient medical records on the unit. They were collected by the project manager weekly for analysis, and even though they contained no patient information, the paper copies were stored on-site, double-

locked, and not visible to the public until the completion of the project. Upon completion of the project, the PAWSS tools were disposed of according to hospital practice for patient data utilizing the secure document shredding procedure. All data from the EMR was validated in conjunction with the organization's information technology staff, and all patient identifiers were removed prior to inputting the data points into Microsoft Excel© for statistical analysis. Statistical analysis was completed on a hospital computer with hospital software.

During the project implementation period, the admitting nurse attempted to screen each patient admitted using the PAWSS tool (See Appendix G). A total of 242 patients were screened with the PAWSS tool. Patients who were non-verbal, whose level of consciousness did not allow them to participate in the screening, and patients who refused to participate with the PAWSS assessment were excluded. A PAWSS assessment was completed on 60% of all patients admitted to the unit. For patients screened, 41 patients met threshold criteria and 30 patients had a score ≥4, indicating High Risk for developing moderate to severe AWS.

During the initial eight week pre-project implementation period, a total of 38 patients admitted to the progressive care unit required treatment for AWS, while a total of 46 patients required treatment for AWS in the eight week project implementation period ($N = 84$). The primary outcomes compared between these groups were; (1) the time interval in minutes between admittance and ordering treatment for AWS; (2) the number of rapid response team (RRT) incidents per patient; (3) the highest recorded scores on the CIWA-Ar instrument; (4) the patient's length of stay in hours; and (5) code green events. Each of these outcomes were compared using a between subjects t-test with unequal variances assumed.

The average interval between admittance and beginning treatment for AWS was not significantly different in the pre-EBP change assessment period ($M = 304.08$, $SD = 739.91$) and

the post-EBP change assessment period (M = 321.39, SD = 900.51, p = 0.92). There was also no significant difference in the number of RRT incidents between the pre-EBP change group (M = 0.342, SD = 0.71) and the post-EBP change group (M = 0.348, SD = 0.71, p = 0.97). There was also no significant difference between the highest recorded CIWA scores in the pre-EBP change group (M = 15.71, SD = 9.24) and the post-EBP change group (M = 16.15, SD = 10.38, p = 0.83), nor in the proportion of scores in the moderate to severe range. However, there was a significant difference in the average length of stay between the pre-EBP change group (M = 146.97, SD = 169.97) and the post-EBP change group (M = 96.54, SD = 75.17, one-tailed p = 0.048), where patients in the post-EBP change period had a length of stay that was approximately 50 hours shorter on average. The code green data was not able to be collected according to the patient, only the total number of responses to the unit was able to be recorded. During the pre-EBP project timeframe, there were eight code green events. During the post-EBP implementation, there were 16 code green events.

Impact

A demonstrated need exists to improve the early identification and treatment of patients at risk for complications from AWS in the acute care setting. The PAWSS represents a reliable and valid measure of risk for patients developing complicated AWS (Maldonaldo et al., 2014; Maldonado et al., 2015). The results for this EBP project demonstrated a statistically significant reduction in hospital length of stay, which decreased overall healthcare costs. By providing a timely and evidence-based practice intervention for early risk assessment, this healthcare organization will be better positioned to provide timely quality care to its patients, while at the same time decreasing the overall length of stay.

The implementation of this project generated interest within hospital leadership to more closely examine how the organization provides care to patients with substance use disorders. The hospital leadership initiated an internal committee to further explore the established treatment pathways, patient outcome results and to develop evidence-based practice change to address areas of deficit. Additionally, at the unit level, the CNS is continuing to explore staff confidence and competency in treating alcohol withdrawal following the project implementation. That study is ongoing at this time, but shows a deepened organizational interest in both evidence-based practices as well as treating the AUD population.

Limitations

The relatively low sample size and the short period of data collection may have made it difficult to detect any statistical significance in the data points for the number of rapid response events. The average interval between admittance and beginning treatment for AWS did slightly increase in the implementation period. Although this finding is not statistically significant, it may suggest that the PAWSS tool would be most helpful if implemented in the emergency department prior to arrival to the unit. By waiting until the time of admission, the time interval may have been increased. Alternatively, this slight increase in the time interval could also suggest that patients were identified as being at risk who may have otherwise been missed. Due to limitations in how the code green data was able to be accessed at the organization, this data point could not be correlated for any association with patients at risk for alcohol withdrawal. The increase in the overall number of responses may be important to continue to investigate from an organizational perspective. For future implementation, the organization may be able to explore if this data could be captured in a different way that could include the appropriate patient identifier to correlate the findings.

Although this project was in its design phase before the impact of the COVID-19 pandemic could be anticipated, it was also implemented at a particularly challenging time for the population. Early research suggests that the pandemic has increased alcohol consumption in the United States (Attonito, Villalba & Fontal, 2021; Wardell et al., 2020). This increase in consumption put more patients at risk for complications of AWS during their hospital stay. At the same time that the project was implemented, there was a nationwide shortage in chlordiazepoxide medication, one of the main medications used by this organization in its standard treatment for alcohol withdrawal (American Society of Health System Pharmacists, 2021). The lack of availability of this medication may have negatively impacted patient care outcomes during this project. Additionally, the COVID-19 pandemic has also impacted nursing training and staffing needs. It was difficult to ensure that all nurses working on the unit were equally educated about the intervention because of the increased use of float staff and travelers. Nurse fatigue and burnout may also impact the enthusiasm for the adoption of practice and culture change.

Dissemination Plan

The results of the project were first shared with the project manager's preceptor and presented to the manager and staff of the acute care unit via the staff daily huddle meeting and a poster presentation on the unit. Next, results were disseminated within the system's Innovation and Professional Excellence Committee for review and feedback. Additionally, the results from the project were shared with hospital leadership, including the CNO, and department managers during the monthly leadership forum.

Outside of the hospital organization, the results of the DNP project will be published in the Scholarship and Open Access Repository (SOAR@USA) collection as a DNP student project

manuscript. Additionally, the results could be considered for submission for publication through peer-reviewed journals such as the Clinical Nurse Specialist: The Journal for Advanced Nursing Practice and will be submitted for consideration to present at a professional nursing conference. The results will be relevant to a large audience, including hospital administrators as well as front-line acute care staff. This practice change could help decrease the length of stay in this patient population, increase patient safety, increase nurse satisfaction, increase nursing knowledge about assessing and treating acute alcohol withdrawal and provide better community population health practices for decreasing stigma associated with AUD treatment.

Conclusion

Early recognition of the presence of an AUD in acute hospital care settings and identifying risk for AWS by evidence-based practice interventions can help improve patient care and outcomes. This evidence-based project utilized the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) in conjunction with the facility's standard practice of care using the Clinical Institute Withdrawal Assessment for Alcohol, revised version (CIWA-Ar) for early identification of patients at risk for AWS in an acute care hospital setting. The use of effective early recognition strategies for AWS lowered the mean length of stay. Further investigation on the standard practices for the treatment of AWS may further improve patient care outcomes and contribute to the nursing practice knowledge of evidence-based practice.

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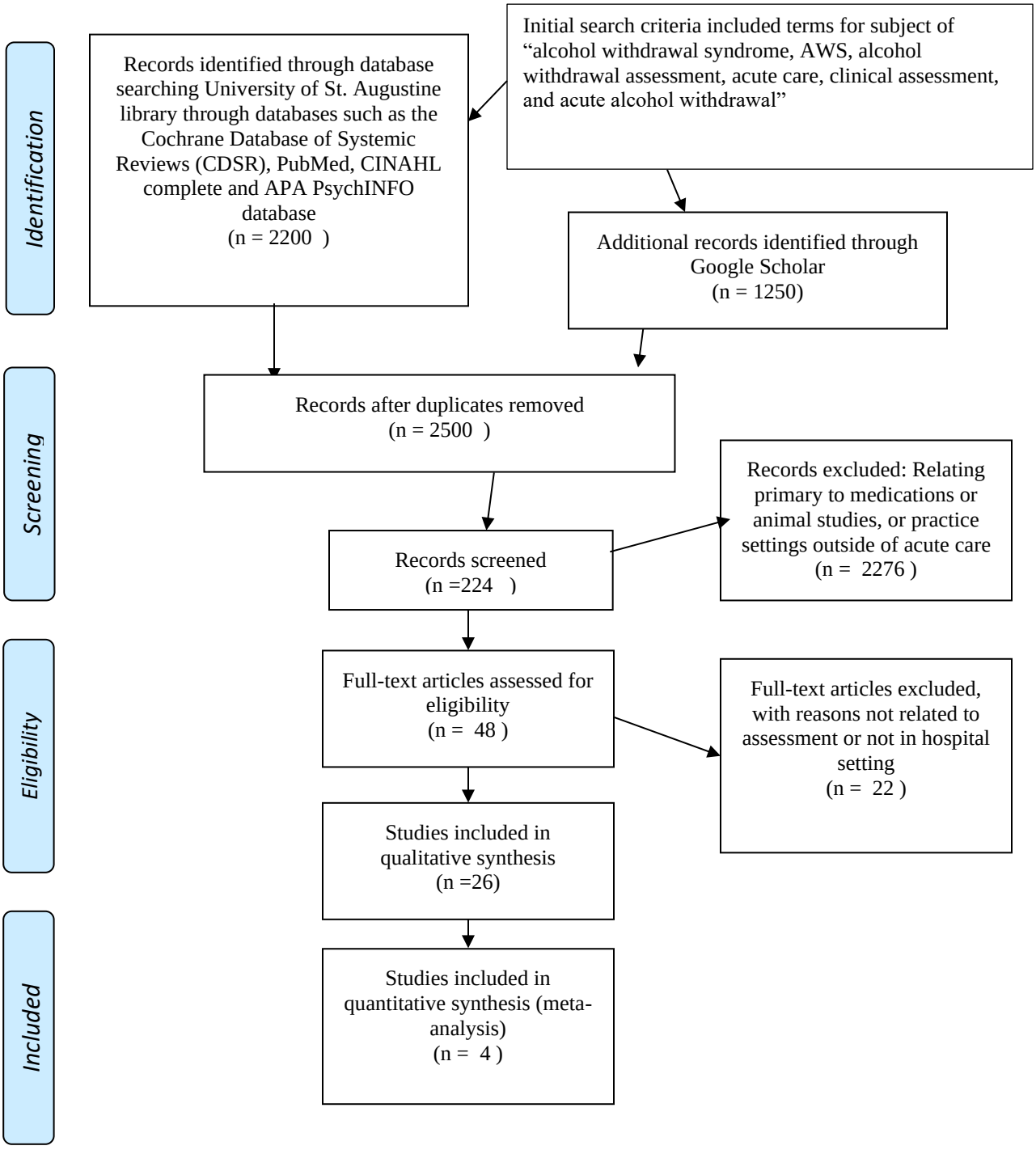
Table 1

The Stages of Alcohol Withdrawal Syndrome (Ostrovsky, 2018)

Stage of AWS	Timeframe	Common Symptoms
Stage 1: Minor withdrawal symptoms	May occur 6-12 hours after stopping alcohol	Common symptoms include: tremors, insomnia, irritability, mild agitation, anorexia, nausea, vomiting, GI upset, tension, anxiety, heart palpitations, sweating, restlessness
Stage 2: Alcoholic hallucinosis	May occur 12-24 hours after stopping alcohol	Common symptoms include: hallucinations (auditory, visual, or tactile) may occur
Stage 3: Withdrawal seizures	May occur 24-48 hours after stopping alcohol but may begin as early as 2 hours after stopping alcohol	Common symptoms include: usually tonic-clonic seizures
Stage 4: Alcohol Withdrawal Delirium (Delirium Tremens)	Usually occurs 3-7 days after stopping, but can occur at any time up to 14 days after last use	Common symptoms include: hallucinations (usually visual), disorientation, tachycardia, hypertension, agitation, diaphoresis, low-grade fever

Figure 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model



Note. Adapted from Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine, 6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Appendix A

Summary of Primary Research Evidence

Citation	Design, Level Quality Grade	Sample Sample size	Intervention Comparison (Definitions should include any specific research tools used along with reliability & validity)	Theoretical Foundation	Outcome Definition	Usefulness Results Key Findings
Griessbach, A. N., Mueller, B. U., Battegay, E., & Beeler, P. E. (2019). The maximum Alcohol Withdrawal Syndrome score associates with worse clinical outcomes—A retrospective cohort study. *Drug and Alcohol Dependence*, *205*. https://doi.org/10.1016/j.drugalcdep.2019.107708	Retrospective study	2464 hospital stays with 19,312 AWS assessments were included	A retrospective analysis collected data from the medical record from CIWA-Ar measures along with physiological data to complete Wetterling scale (11-item combination of CIWA-Ar measures with physiological markers). The results from the first three days of the stay along with presence of diagnosis of AWS were grouped into "mild"(<6) "moderate" (6-9) or "severe" (>9) and then correlated with hospital outcome data	STROBE guidelines (STrengthening the Reporting of OBservational studies in Epidemiology)	The authors analyzed potential associations of the maximum AWS score with worse clinical outcomes, i.e., increased LOS and in-hospital mortality, using multivariable linear and logistic regression, respectively	According to the authors "Higher maximum AWS scores are associated with increased Legnth of Stay (LOS) and in-hospital mortality. Determination of the maximum AWS score within 3 days after the first assessment appears to be sufficient and may predict increased LOS and in-hospital mortality. This may help health care providers to anticipate AWS progression and in properly preparing short-, medium-, and long-term care."
Mahabir, C. A., Anderson, M., Cimino, J., Lyden, E., Siahpush, M., & Shiffermiller, J. (2020). Derivation and validation of a multivariable model, the alcohol withdrawal triage tool (AWTT), for predicting severe	Randomized, retrospective analysis, without a control group	2038 unique patients	In order to study the Alcohol Withdrawal Triage Tool (AWTT) 8 different preditors of severe AWS were studied	None stated	The authors uses regression analysis to study the	The use of the 8 factors that can be collected from the electronic medical record can

Alcohol Withdrawal Syndrome. *Drug and Alcohol Dependence*, *209*. https://doi.org/10.1016/j.drugalcdep.2020.107943	Level II		with a retrospective analysis. Patients were randomly divided into two cohorts: the "Derivation cohort" and the "Validation cohort. Within the "derivation cohort" 908 patients were analyses and in the "Validation cohort" 461 patients were analyzed		relationship between the 8 identified predictors of Severe Alcohol Withdrawal Syndrome (SAWS).	predict SAWS with high sensitivity. The makers were identified individually, but not studied as individual predictors of SAWS. The reliance on ICD-10 codes for a number of predictive factors is problematic for reliability. The AWTT could be useful as part of a standardized admission protocol, but not as a stand-alone tool for the prediction of risk for SAWS
Maldonado, J. R., Sher, Y., Das, S., Hills-Evans, K., Frenklach, A., Lolak, S., Talley, R., & Neri, E. (2015). Prospective Validation Study of the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) in Medically Ill Inpatients: A New Scale for the Prediction of Complicated Alcohol Withdrawal Syndrome. *Alcohol & Alcoholism*, *50*(5), 509–518. https://doi.org/10.1093/alcalc/agv043	Quazi-experimental prospective study Level II	403 patients	All patients admitted to the hospital during the study time that could speak English and were willing to participate were screened. The patients were also screen using the CIWA-Ar as per the usual hospital protocol. The participants were followed for three days with the research team blinded to results from other assessments	None stated	The primary outcome consisted of the PAWSS ability in predicting complicated AWS, its sensitivity, specificity, positive and negative predictive values, as well as inter-rater reliability	The PAWSS showed good inter-rater reliability (CI of .936) indicating moderate to substantial agreement With a cut off score or 4: PAWSS has 93.1% sensitivity (95%CI) 99.5% specificity (95% CI) Positive Predictive Validity of 93.1% (95%CI) Negative Predictive Validity of 99.5% (95%CI)
Padron, A. & Salzman, M.(2019). "PAWSS: Validation of the Prediction of Alcohol	Quazi-experimental	880 patients	Intervention: Application of the PAWSS	None stated	Alcohol withdrawal	With a PPV of 79% and a NPV of 88% the

Withdrawal Severity Scale (Poster). Cooper Medical School of Rowan University Capstone Projects. 18. https://rdw.rowan.edu/cmsru_capstones/18	Level II		questionnaire to adults 18 and older admitted to ED and Trauma admitting		symptoms were measured and documented using the Glasgow Modified Alcohol Withdrawal Scale (GMAWS) within 48 hours of admission A positive PAWSS was considered a score of 4 or greater. Patients were considered to have undergone alcohol withdrawal if they had AWS as a primary diagnosis or they scored a 2 or greater on the GMAWS	PAWSS can be used as an effective tool to predict alcohol withdrawal but it is important to be aware of its limitations and how it can be further improved The GMAWS itself does not account for all the symptoms of AWS, such as autonomic instability, and possess subjective categories such as anxiousness

Legend: John Hopkins Rating Hierarchy for Level of Research Evidence of Level I, Level II, Level III. AWS is Alcohol Withdrawal Syndrome. CI is Confidence Interval. PPV is Positive Predictive Validity. NPI is Negative Predictive Validity.

Appendix B

Summary of Systematic Reviews (SR)

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
Goodson, C. M., Clark, B. J., & Douglas, I. S. (2014). Predictors of severe Alcohol Withdrawal Syndrome: A systematic review and meta-analysis. *Alcoholism: Clinical and Experimental Research*, *38*(10), 2664–2677. https://doi.org/10.1111/acer.12529	Level II	Can a review and synthesis of the existing published literature reporting risk factors for Severe Alcohol Withdrawal (SAWS) help us better understand the strength of evidence for predictive risk measures?	A systematic literature search was conducted a MeSH search in OVID using the terms "substance withdrawal syndrome" limited to "alcohol" and excluding non-English language and non-human subjects	Inclusion: epidemiologic studies of Alcohol Withdrawal Syndrome (AWS) published in English Exclusion: Articles not including primary data regarding baseline characteristics of inpatients with AWS, articles with lack of standard definition of AWS, articles with number of patients not reported or ranges of potential predictor variable were missing	17 studies were included for qualitative review with 15 reporting primary findings with sufficient detail for meta-analysis A meta-analysis was conducted of demographic and comorbid variables related to AWS Most studies were retrospective design There was evidence of systematic bias as indicated by the asymmetry of funnel plots	The prediction of SAWS is highly variable, with few demographic, clinical or biochemical parameter are consistently predictive of SAWS episodes. Previous experience of SAWS was a predictor of future incidence of AWS Some findings contradict the "kindling" theory of withdrawal	The findings support that prior studies have failed to identify reliable risk prediction score for SAWS. No single variable is sufficient to predict SAWS
Holleck, J. L., Merchant, N., & Gunderson, C. G. (2019). Symptom-triggered therapy for Alcohol Withdrawal Syndrome: A systematic review and meta-analysis of	Level I	Is symptom-triggered therapy rather than fixed does therapy superior in terms of mortality,	A systematic literature search using Medline, Embase, and the Cochrane Registry from	Inclusion: Randomized controlled studies for management of AWS with benzodiazapines	Data was collected with a standardized form. Methodological quality was assessed with Cochrane Risk of Bias Tool. The research was	For major outcomes of mortality, seizures and delirium there were to few events in the review for	Continual monitoring with a monitoring tool like the CIWA-Ar allows for

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
randomized controlled trials. *Journal of General Internal Medicine*, *34*(6), 1018. https://doi.org/10.1007/s11606-019-04899-7		delirium, seizures, total benzodiazepine dose and duration of therapy to treat AWS.	database inception through February 12, 2018, was conducted for randomized controlled trials of patients with Alcohol Withdrawal Syndrome comparing fixed-dose benzodiazepine schedules to symptom-triggered therapy.	comparing fixed-dose schedules to symptom driven therapy Excluded: Observational studies	graded by Agency for Healthcare Research and Quality (AHRQ) recommendations. For dichotomous outcomes, odds ratios were calculated. For continuous variables, means and standard deviations were calculated. 6 manuscripts were included in the review	meaningful comparison. Total benzodiazepine dose and duration of therapy where statistically significantly less in the symptom-triggered therapy compared to the fixed-dose.	symptom-triggered therapy of AWS. Symptom triggered therapy uses less benzodiazepine medication and has less duration of therapy than fixed-dose approach
Maldonado, J. R., Sher, Y., Ashouri, J. F., Hills-Evans, K., Swendsen, H., Lolak, S., & Miller, A. C. (2014). The "Prediction of Alcohol Withdrawal Severity Scale" (PAWSS): Systematic literature review and pilot study of a new scale for the prediction of complicated Alcohol Withdrawal Syndrome. *Alcohol*, *48*(4), 375–390. https://doi.org/10.1016/j.alcohol.2014.01.004	Level II	Is there a validated screening tool to detect risk for developing AWS in medically ill patients to allow for timely prophylaxis measures? And what factors can be identified in the literature that predisposes a person to develop AWS	Using PRISMA guidelines, a systematic literature search was conducted with four electronic databases: Cochrane Database of Systematic Reviews, PubMed, PsychInfo, and MEDLINE, from January 1966 for January 2011, for factors	Inclusion: Articles related to AWS, dealing with human subjects 18 years or older, manuscripts directly dealing with AWS or its predisposing factors, case reports, naturalistic case descriptions and all types of clinical trials, animal data that directly dealt with variables	Data extraction from the literature review yielded a threshold criterion of alcohol withdrawal consumption within the last 30 days, and 10 other predictive risk characteristics to construct the PAWSS. The data was used to construct a tool and a pilot study to test for the predictive validity of the tool	The PAWSS tool was able to demonstrate 100% predictive validity in the pilot study of severe AWS The limitations of the study included the PAWSS reliance on patient self-report, the tool needs further validation through a larger trial with larger sample size	The development of the PAWSS was based on an extensive literature review. The pilot study showed good predictive validity but needs further study to validate findings through larger sample size

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
			associated with the development of AWS	described in humans Excluded: Articles not related directly to AWS or its predisposing characteristics. Articles primarly done with animals and not directly related to variables described in humans			
Pribék, I. K., Kovács, I., Kádár, B. K., Kovács, C. S., Richman, M. J., Janka, Z., Andó, B., & Lázár, B. A. (2021). Evaluation of the course and treatment of Alcohol Withdrawal Syndrome with the Clinical Institute Withdrawal Assessment for Alcohol – Revised: A systematic review-based meta-analysis. *Drug and Alcohol Dependence, 220*. https://doi.org/10.1016/j.drugalcdep.2021.108536	Level I	To assess whether the CIWA-Ar is suitable for following the course of AWS during pharmacotherapeutic treatment, and to compare Benzodiazepine and FDA-approved non-benzodiazepine treatments in patients with AWS.	Three authors independently systematically searched four databases (PubMed, ScienceDirect, Web of Science and Cochrane Registry) in order to identify studies published before January 31, 2020, which documented the severity of AWS with the CIWA-Ar in patients treated with AWS	Inclusion: Articles documenting the severity of AWS with the CIWA-Ar in patients with AWS Exclusion: Non-English articles, Grey literature, publications not connected to AWS, articles with specific populations, articles with modified versions of CIWA. Also excluded were articles with	11 studies were incorporated in the meta-regression and the final unit of data analysis was the comparison of the cumulative mean CIWAAr total scores of the two phases of the course of AWS. There was no statistically significant difference between decrease in CIWA-Ar scores the Benzodiazapine group and the non-benzodiazapine group	The results showed a significant decrease of CIWA-Ar total scores in the course of AWS indicating that this tool appropriately followed the course of AWS (as a means of the ecological validity of this measure). Furthermore, the group receiving benzodiazapine treatment did not show a significant difference from the non-benzodiazapine group from the perspective of the course of AWS	The systematic review supports the use of CIWA-Ar for monitoring of AWS for both benzodiazapine based treatments and non-benzodiazapine treatment.

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
				lack of CIWA-Ar means or standard deviations, articles with only baseline CIWA-Ar score (non-monitoring), and non-eligible medications		measured by the CIWA-Ar total scores	

Legend: John Hopkins Rating Hierarchy for Level of Research Evidence Level I, Level II or Level III. AWS is Alcohol Withdrawal Syndrome. MeSH is Medical Subject Heading. CIWA-Ar is the Clinical Institute Withdrawal Assessment for Alcohol-Revised.

Appendix C

SWOT Analysis for the Healthcare Organization

Strengths • High patient volumes • Good community reputation • Magnet Status and emphasis on nurse driven practice change • Strong leadership/stakeholder buy-in for practice change • Alcohol Withdrawal order set already in place in the EMR to address AWS when identified • Healthcare organization does have residential and out-patient Substance Use Disorder treatment programs already available for privately insured persons	Weakness • Limited to paper assessment rather than integration into EMR • Staff burn-out, exhaustion post-COVID • NOC shift resistance to process change • Internal staff bias with AUD treatment
Opportunities • PAWSS assessment for predictive risk assessment • Affordable Care Act integrated Substance Use Disorders as medical conditions covered by health insurance under the Mental Health Parity and Addiction Equity Act (MHPAEA) and the Affordable Care Act. • No hospital currently identifies as a provider for alcohol detoxification services	Threats • External community bias effecting chronic underfunding of SUD treatment • Higher percentage of persons needing SUD treatment with lower socio-economic status, unfunded or underinsured population • Inconsistence reimbursement practices from private insurance for SUD treatment

Appendix D

Project Timeline

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Complete an organizational assessment to determine needs	X																							
Identify area of need for Evidence-Based Practice Change Project	X																							
Substantiate the need for change with relevant evidence and statistical support and the state, local community and individual hospital level	X																							
Complete literature review based on PICOT question	X	X	X																					
Operationally define components of the PICOT question		X																						
Review hospital EBP change protocols for necessary components needed for eventual approval		X																						
Gain initial support from preceptor for project		X																						

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Complete a Practice Change Project Proposal			X	X	X	X	X																	
Present project proposal to DNP preceptor for feedback							X																	
Revise project proposal based on preceptor feedback							X	X																
Identify potential agency sources to assist with data collection to substantiate need		X					X																	
Meet with the Unit Manager for stakeholder buy-in and review potential proposal features to gauge support							X	X																
Submit Project Proposal to University Faculty to approval									X	X	X	X												
Submit Project Proposal to EPRC for approval												X	X											
Revise Proposal as needed to gain EPRC approval												X	X											
Submit EPRC approval and facility documents to IIIC for facility approval													X	X										

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
CNO/Unit Director approval for project proposal and budget											X													
With facility approval meet with the unit educators to present PAWSS assessment tool and schedule trainings for acute care nursing staff															X									
Collect pre-intervention data for alcohol withdrawal rates in the acute care floor for 8 week period prior to intervention start date												X	X	X	X	X	X							
Review PAWSS and Education material with the unit nurse educators and front line-staff														X	X									
Implement the PAWSS risk assessment screening tool															X	X	X	X						
Supervise Observation Audits with the nurse educators to assure completion of tool and fidelity to the tool															X	X		X						
Re-educate unit staff as needed to address any fidelity issues																X	X	X						

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Weekly check of chart audits to assure compliance with completions of the PAWSS															X	X	X	X						
Collect intervention data for PAWSS and outcome measures for eight week intervention period															X	X	X	X	X					
Compile results of data collected																	X	X	X	X				
Analyze data with statistical software																				X				
Generate statistical analysis of findings to support clinical significance																			X	X				
Write up findings and outcome of practice change																				X	X			
Present finding to preceptor for feedback																				X				
Revise with preceptor's feedback																				X	X			
Submit results and final EBP change results to the university faculty																					X	X		
Present findings to key stakeholders including Director, CNO, Unit																					X	X		

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Manager, Preceptor, unit staff and IIIC																								
Submit findings for publication or poster presentation																						X	X	X

Appendix E

Data Variable Descriptions

	Variable Name	Variable Description	Data Source	Possible Range of Values	Level of Measurement	Time Frame for Collection
Population	Number of patients admitted	Total number of patients admitted to the unit	EMR	Any numerical value	Numerical	Duration of the intervention
	Blood Alcohol Result	Results of Blood Alcohol Screen	EMR	0-700, absent results recorded as missing data	Ratio	Duration of stay in hospital
	AWS Time interval	The time interval from admission to the AW order set order	EMR	Any numerical value	Interval	Duration of stay in hospital
Intervention	PAWSS tool completed	Completion of the PAWSS	Paper form	1=yes 0=no	Nominal	Onset of intervention
	PAWSS Score	Documented score from the PAWSS	Paper form	0-10	Ratio	Onset of intervention
Outcome	Rapid Response	Rapid Response occurrence	EMR	1=yes 0=no	Nominal	Duration of stay in the hospital
	Change in level of care	Patient transfer to higher level of care	EMR	1=yes 0=no	Nominal	Duration of stay in the hospital

	Code green events	The number of times security is called to respond patients screening positive on PAWSS	Security staff event log	0-200	Ratio	Duration of stay in the hospital
	CIWA-Ar Score-Min	The minimum CIWA-Ar assessment score recorded	EMR	0-67	Ratio	From initiation until assessment is discontinued
	CIWA-Ar Score_Max	The maximum CIWA-Ar assessment score recorded	EMR	0-67	Ratio	From initiation until assessment is discontinued
	Length of stay	Total time from admission to discharge in hours	EMR	0-10,000	Ratio	From time of admission to time of discharge

Appendix F

Data Collection Sheet

Subject ID #	BAL result	PAWSS tool completed	PAWSS tool score	Rapid Response Occurrence	Change in Level of Care	CIWA-Ar Minimum	CIWA-Ar Maximum	Time Interval of AW order set	Code green event	Length of Stay

Appendix G

Prediction of Alcohol Withdrawal Severity Scale (PAWSS)

Maldonado et al., 2014

Part A: Threshold Criteria:

("+" or "-", no point)

Have you consumed any amount of alcohol (i.e., been drinking) within the last 30 d? OR did the patient have a "+" BAL upon admission? _____

IF the answer to either is YES, proceed with test:

Part B: Based on patient interview:

(1 point each)

1. Have you ever experienced previous episodes of alcohol withdrawal? _____
2. Have you ever experienced alcohol withdrawal seizures? _____
3. Have you ever experienced delirium tremens or DT's? _____
4. Have you ever undergone alcohol rehabilitation treatment? _____
   (i.e., in-patient or out-patient treatment programs or AA attendance)
5. Have you ever experienced blackouts? _____
6. Have you combined alcohol with other "downers" like benzodiazepines or barbiturates during the last 90 d? _____
7. Have you combined alcohol with any other substance of abuse during the last 90 d? _____
8. Have you been recently intoxicated/drunk within the last 30 d ? _____

Part C: Based on clinical evidence:

(1 point each)

9. Was the patient's blood alcohol level (BAL) on presentation >200? _____
10. Is there evidence of increased autonomic activity?
    (e.g., HR >120 bpm, tremor, sweating, agitation, nausea) _____

Total Score: _____

Notes: Maximum score = 10. This instrument is intended as a SCREENING TOOL. The greater the number of positive findings, the higher the risk for the development of alcohol withdrawal syndromes. A score of ≥4 suggests HIGH RISK for moderate to severe AWS; prophylaxis and/or treatment may be indicated.

Appendix H

Alcohol Withdrawal Assessment Scoring Guidelines (CIWA - Ar)

Nausea/Vomiting - Rate on scale 0 - 7

0 - None
1 - Mild nausea with no vomiting
2
3
4 - Intermittent nausea
5
6
7 - Constant nausea and frequent dry heaves and vomiting

Tremors - have patient extend arms & spread fingers. Rate on scale 0 - 7.
0 - No tremor
1 - Not visible, but can be felt fingertip to fingertip
2
3
4 - Moderate, with patient's arms extended
5
6
7 - severe, even w/ arms not extended

Anxiety - Rate on scale 0 - 7
0 - no anxiety, patient at ease
1 - mildly anxious
2
3
4 - moderately anxious or guarded, so anxiety is inferred
5
6
7 - equivalent to acute panic states seen in severe delirium or acute schizophrenic reactions.

Agitation - Rate on scale 0 - 7
0 - normal activity
1 - somewhat normal activity
2
3
4 - moderately fidgety and restless
5
6
7 - paces back and forth, or constantly thrashes about

Paroxysmal Sweats - Rate on Scale 0 - 7.
0 - no sweats
1- barely perceptible sweating, palms moist
2
3
4 - beads of sweat obvious on forehead
5
6
7 - drenching sweats

Orientation and clouding of sensorium - Ask, "What day is this? Where are you? Who am I?" Rate scale 0 - 4
0 - Oriented
1 – cannot do serial additions or is uncertain about date

2 - disoriented to date by no more than 2 calendar days

3 - disoriented to date by more than 2 calendar days
4 - Disoriented to place and / or person

Tactile disturbances - Ask, "Have you experienced any itching, pins & needles sensation, burning or numbness, or a feeling of bugs crawling on or under your skin?"
0 - none
1 - very mild itching, pins & needles, burning, or numbness
2 - mild itching, pins & needles, burning, or numbness
3 - moderate itching, pins & needles, burning, or numbness
4 - moderate hallucinations
5 - severe hallucinations
6 - extremely severe hallucinations
7 - continuous hallucinations

Auditory Disturbances - Ask, "Are you more aware of sounds around you? Are they harsh? Do they startle you? Do you hear anything that disturbs you or that you know isn't there?"
0 - not present
1 - Very mild harshness or ability to startle
2 - mild harshness or ability to startle
3 - moderate harshness or ability to startle
4 - moderate hallucinations
5 - severe hallucinations
6 - extremely severe hallucinations
7 - continuous hallucinations

Visual disturbances - Ask, "Does the light appear to be too bright? Is its color different than normal? Does it hurt your eyes? Are you seeing anything that disturbs you or that you know isn't there?"
0 - not present
1 - very mild sensitivity
2 - mild sensitivity
3 - moderate sensitivity
4 - moderate hallucinations
5 - severe hallucinations
6 - extremely severe hallucinations
7 - continuous hallucinations

Headache - Ask, "Does your head feel different than usual? Does it feel like there is a band around your head?" Do not rate dizziness or lightheadedness.

0 - not present
1 - very mild
2 - mild
3 - moderate
4 - moderately severe
5 - severe
6 - very severe
7 - extremely severe

Procedure:

1. Assess and rate each of the 10 criteria of the CIWA scale. Each criterion is rated on a scale from 0 to 7, except for "Orientation and clouding of sensorium" which is rated on scale 0 to 4. Add up the scores for all ten criteria. This is the total CIWA-Ar score for the patient at that time. Prophylactic medication should be started for any patient with a total CIWA-Ar score of 8 or greater (ie. start on withdrawal medication). If started on scheduled medication, additional PRN medication should be given for a total CIWA-Ar score of 15 or greater.
2. Document vitals and CIWA-Ar assessment on the Withdrawal Assessment Sheet. Document administration of PRN medications on the assessment sheet as well.
3. The CIWA-Ar scale is the most sensitive tool for assessment of the patient experiencing alcohol withdrawal. Nursing assessment is vitally important. Early intervention for CIWA-Ar score of 8 or greater provides the best means to prevent the progression of withdrawal.

Assessment Protocol a. Vitals, Assessment Now. b. If initial score ≥ 8 repeat q1h x 8 hrs, then if stable q2h x 8 hrs, then if stable q4h. c. If initial score < 8, assess q4h x 72 hrs. If score < 8 for 72 hrs, d/c assessment. If score ≥ 8 at any time, go to (b) above. d. If indicated, (see indications below) administer prn medications as ordered and record on MAR and below.	**Date**											
	Time											
	Pulse											
	RR											
	O_2 sat											
	BP											
Assess and rate each of the following (CIWA-Ar Scale):	**Refer to reverse for detailed instructions in use of the CIWA-Ar scale.**											
Nausea/vomiting (0 - 7) 0 - none; 1 - mild nausea ,no vomiting; 4 - intermittent nausea; 7 - constant nausea , frequent dry heaves & vomiting.												
Tremors (0 - 7) 0 - no tremor; 1 - not visible but can be felt; 4 - moderate w/ arms extended; 7 - severe, even w/ arms not extended.												
Anxiety (0 - 7) 0 - none, at ease; 1 - mildly anxious; 4 - moderately anxious or guarded; 7 - equivalent to acute panic state												
Agitation (0 - 7) 0 - normal activity; 1 - somewhat normal activity; 4 - moderately fidgety/restless; 7 - paces or constantly thrashes about												
Paroxysmal Sweats (0 - 7) 0 - no sweats; 1 - barely perceptible sweating, palms moist; 4 - beads of sweat obvious on forehead; 7 - drenching sweat												
Orientation (0 - 4) 0 - oriented; 1 - uncertain about date; 2 - disoriented to date by no more than 2 days; 3 - disoriented to date by > 2 days; 4 - disoriented to place and / or person												
Tactile Disturbances (0 - 7) 0 - none; 1 - very mild itch, P&N, ,numbness; 2-mild itch, P&N, burning, numbness; 3 - moderate itch, P&N, burning ,numbness; 4 - moderate hallucinations; 5 - severe hallucinations; 6 – extremely severe hallucinations; 7 - continuous hallucinations												
Auditory Disturbances (0 - 7) 0 - not present; 1 - very mild harshness/ ability to startle; 2 - mild harshness, ability to startle; 3 - moderate harshness, ability to startle; 4 - moderate hallucinations; 5 severe hallucinations; 6 - extremely severe hallucinations; 7 - continuous hallucinations												
Visual Disturbances (0 - 7) 0 - not present; 1 - very mild sensitivity; 2 - mild sensitivity; 3 - moderate sensitivity; 4 - moderate hallucinations; 5 - severe hallucinations; 6 - extremely severe hallucinations; 7 - continuous hallucinations												
Headache (0 - 7) 0 - not present; 1 - very mild; 2 - mild; 3 - moderate; 4 - moderately severe; 5 - severe; 6 - very severe; 7 - extremely severe												
Total CIWA-Ar score:												
PRN Med: (circle one) Diazepam Lorazepam	**Dose given (mg):**											
	Route:											
Time of PRN medication administration:												
Assessment of response (CIWA-Ar score 30-60 minutes after medication administered)												
RN Initials												

Scale for Scoring: Total Score = 0 – 9: absent or minimal withdrawal 10 – 19: mild to moderate withdrawal more than 20: severe withdrawal	**Indications for PRN medication:** a. Total CIWA-AR score 8 or higher if ordered PRN only (Symptom-triggered method). b. Total CIWA-Ar score 15 or higher if on Scheduled medication. (Scheduled + prn method) Consider transfer to ICU for any of the following: Total score above 35, q1h assess. x more than 8hrs required, more than 4 mg/hr lorazepam x 3hr **or** 20 mg/hr diazepam x 3hr required, or resp. distress.

Patient Identification (Addressograph)

Signature/ Title	Initials	Signature / Title	Initials

Alcohol Withdrawal Assessment Flowsheet (revised Nov 2003)

*Note.*Adapted from Sullivan, J.T., Skora, K., Schneiderman, J., Naranjo, C. L. & Sellers, E.M. (1989). Assessment of Alcohol Withdrawal: The revised clinical insititute withdrawal assessment for alcohol scale (CIWA-Ar). *Society for the Study of Addiction*. https://doi.org/10.1111/j.1360-0443.1989.tb00737.x

Appendix I

Project Goals and Implementation Strategy

Project Stage	Goal or task to accomplish	Timeframe	Who is responsible	Barriers to overcome
Pre-Intervention	Complete Organization assessment, SWOT analysis, PICOT question and literature review • The organizational assessment will help identify area of opportunity and leadership styles to consider for change theory • The SWOT analysis will help to identify additional areas of opportunity with the agency and the key stakeholders • The PICOT question will help drive a focused literature review for current evidence-based practice	Within the 12 weeks prior to submitting a project proposal	DNP student with input from agency preceptor and USA facility	COVID-19 restrictions
Pre-Intervention	Complete Project Proposal, incorporating Evidence-Based Practice Recommendation	Within the 12 weeks prior to submitting a project proposal	DNP Student	
Pre-Intervention	Identify key stakeholders within the organization and develop working relationship • Relationships with key stakeholders will need to be fostered for organizational buy-in	Within the 12 weeks prior to submitting a project proposal	DNP Student	
Pre-Intervention	Identify facility process for EBP project approval • Review both process and organizational requirements for project approval	Within the 12 weeks prior to submitting a project proposal	DNP Student	

Pre-Intervention	Develop key educational concepts to help staff understand and implement PAWSS and organize an educational outline of key concepts • Although the project is not based on education, it will be important for general compliance and fidelity to provide staff education on key concepts of the PAWSS and overview of AWS	Within first week of NUR7802	DNP Student	
Pre-Intervention	Submit the proposal the USA EPRC for Approval	During the first three weeks of NUR7802, prior to project implementation	DNP Student	Request for modification of proposal
EBP Project Implementation	Gain USA and facility project approval	Within the first 4 weeks for NUR7802	DNP student, EPRC, facility IRB board	Any requests for modification of the proposal
EBP Project Implementation	Meet with the Unit Manager for final overview of the project implementation and education materials	Within the 5th week of NUR7802	DNP student	
EBP Project Implementation	Meet with the Unit Educators to review outline of Education Materials (see education outline, Appendix J)	Within the 5th week of NUR7802	DNP student	
EBP Project Implementation	Begin education of the staff with roll out of education materials “elevator speech” at the daily huddle on the unit with Charge Nurse and Nurse Manager • The DNP student will attend daily huddles with a short “elevator speech” to outline the EBP project	Within the 5th week of NUR7802	DNP Student, CNS educators, Charge Nurse	

	• The Charge nurse will communicate the practice change in the shift report to all on-coming staff			
EBP Project Implementation	Unit CNS educating floor staff on the PAWSS • The CNS educators will highlight the practice change within their "poster presentation area" on the unit where they normally highlight best practices for the unit. The CNS will also work with each staff on the unit approximately 5 minutes to review the PAWSS tool and see a return demonstration of the staff administering the tool	Within the 5th week of NUR 7802	CNS Nurse Educator	
EBP Project Implementation	Provide staff access to written education materials outlining the PAWSS and current practices for treatment of AWS for reference • The unit staff will be provided with an electronic link to a recorded educational presentation on the administration of the PAWSS tool and a general overview of AWS management. This will be prepared by the DNP student with input from the CNS	Within the 5th week of NUR7802	DNP Student and CNS Nurse Educator	
EBP Project Implementation	Prepare copies of the PAWSS for use on the unit	Within the 5th week of NUR7802	DNP Student	none
EBP Project Implementation	Begin implementing the PAWSS assessment for all patient admitted to the unit	Week 6 of NUR7802	Unit nursing staff	Staff buy-in. Time management with assessments. Compliance with the new procedure.

	• The paper tool will be completed by the bedside RN with each patient admitted to the unit. • Nursing staff will be directed to record positive scores (≥4) in the nursing interdisciplinary note in the EMR and to notify the attending physician according to the standard process when there is a need for additional orders • The completed PAWSS tool will be collected in a folder in the charge nurse office, not viewable to the public, and stored in accordance with all HIPAA compliance measures to protect health information			COVID restrictions Staffing challenges Lack of appropriate medications (nation wide Librium shortage)
EBP Project Implementation	Collect pre-intervention data for a period of 8 weeks prior to implementation • The EMR will be accessed for data collection as well as the security safety logs for the unit for the 8 weeks prior to project implementation.	After gaining facility IRB approval for EMR access	DNP Student	
EBP Project Implementation	Supervise Observation Audits with the CNS nurse educators to assure completion of tool and fidelity to the tool. • The CNS will complete a minimum of 7 audits per week during the first week, each of different staff, to ensure compliance and fidelity to the tool • Audits will be repeated at the third week and then at the 5th week, to	Week 6-14 of NUR7802. These audits will happen weekly	CNS Nurse Educator	

	verify compliance and fidelity to the tool. • The audit will consist of the CNS verifying that for a random patient admission that the PAWSS tool was completed and there is documentation of physician notification in the EMR for scores ≥4. This information will be recorded on a checklist on the front inside cover of the PAWSS collection folder in the nursing office			
EBP Project Implementation	Collect intervention data for PAWSS and outcome measures for eight week intervention period (see data sheet in Appendix F)	Week 6-14 of NUR7802.	DNP Student	Time management.
Post-Intervention	Compile results of data collected and perform statistical analysis • Using the results collected in the date sheet, the data will be entered into the Intellectus Statistic software for data analysis	NUR7803 (see timeline in Appendix D)	DNP Student	Delays in data pull from IT department due to conflicting priorities
Post-Intervention	Analyze findings and complete write up of the analysis and outcomes from the practice change with feedback from USA faculty advisor and DNP preceptor	NUR7803 (see timeline in Appendix D)	DNP Student, USA faculty and DNP preceptor	
Post-Intervention	Finally, the results and clinical significance will be synthesized and disseminated to the key stakeholders and the larger healthcare community • Results and significance will be reported back to the unit manager and staff during the daily huddle	NUR7803 (see timeline in Appendix D)	DNP student	

	• Results and significance will be presented to the USA faculty of course NUR7803 • Results and significance will be reported back to the facility Innovations, Inquiry and Professional Excellence Committee • Summary of results and significant will be presented to hospital leadership including the CEO and CNO with recommendation for future sustainability practices • Final results and significance will be published in a scholarly journal to further nursing EBP			

Appendix J

Education Material Outline

Brief Overview of the Prevalence and Impact of AWS in Acute Care Setting

Pathophysiology of Alcohol Withdrawal

- GABA and Glutamate pathways
- Wernicke's encephalopathy and Korsakoff's psychosis
- Complicated alcohol withdrawal
- Delirium Tremens
- Death

Overview and Demonstration of the PAWSS Assessment

- Review of Questions
- Modeling of Assessment

Overview of current Medical Management Practices

- Thiamine, Multivitamins, Folic Acid
- Magnesium
- Smoking Cessation
- Hydration (IV Fluids)
- Benzodiazepines
- Other commonly seen medications

CIWA-Ar Protocol for Monitoring

- Assessment overview and modeling to create accurate scoring
- Score and medications: lorazepam and diazepam
- Prophylaxis: Chlordiazepoxide, Gabapentin

Lab Work and Other Diagnostic Tests

Consult Social Worker, Dietician or Psychiatric Services

Non-pharmacological Interventions

- Early hydration, nutrition
- Early mobilization
- Promote circadian light rhythm, sleep hygiene
- Visitations/Intellectual Stimulation
- Seizure precautions
- Fall precautions
- Aspiration precautions

Patient/Family Education and Community Resources