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IMPACT OF AN EDUCATIONAL INTERVENTION ON PROVIDER PERSPECTIVES ABOUT THE USE OF PHENOBARBITAL IN THE MANAGEMENT OF ALCOHOL WITHDRAWAL SYNDROME

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IMPACT OF AN EDUCATIONAL INTERVENTION ON PROVIDER PERSPECTIVES ABOUT THE USE OF PHENOBARBITAL IN THE MANAGEMENT OF ALCOHOL WITHDRAWAL SYNDROME

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has been approved as meeting the requirement for the Degree of Doctor of Nursing Practice in College of Natural and Health Sciences in the School of Nursing, Program of Nursing Practice.

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ABSTRACT

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Alcohol withdrawal syndrome (AWS) is a clinical diagnosis that occurs when an individual who regularly consumes alcohol either reduces or stops consumption. Complications of AWS include admission to the intensive care unit, prolonged hospitalization, and increased risk of infection and mortality. These complications might lead to poor patient outcomes and increased healthcare costs. Currently, the standard of care in managing this inpatient population includes supportive and pharmacological interventions with sedatives such as benzodiazepines. However, recent research found that a long-acting barbiturate, phenobarbital demonstrated superiority in reducing both hospital length of stay and progression of AWS symptoms when compared to benzodiazepines. Healthcare providers, such as advanced practice providers and physicians, are responsible for prescribing medications to manage AWS. However, without education about the recent research findings of phenobarbital, healthcare providers might be underutilizing phenobarbital in the management of this serious condition. The purpose of this Doctor of Nursing Practice scholarly project was to evaluate if an evidence-based educational intervention delivered to advanced practice providers and physicians at a level one trauma center would influence their knowledge, attitudes, and intention to use an existing phenobarbital order set for the management of AWS among the adult inpatient population. As guided by the knowledge attitude practice model, this study had a pre-posttest design with a virtually delivered

educational intervention based upon an integrated literature review that discussed the safety of phenobarbital and its superiority in the management of AWS among the inpatient population. The impact of the intervention was measured using a modified version of the Continuing Professional Development Reaction questionnaire.

Keywords: alcohol withdrawal syndrome, inpatient, adult, Phenobarbital, provider education, professional development

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CHAPTER I

INTRODUCTION

The cost of excessive alcohol use within the United States totaled $249 billion in 2010 with 11% of that total representing healthcare costs (Sacks et al., 2015). The dysfunctional pattern of alcohol use leading to disability or distress accompanied by periods of intoxication and alcohol withdrawal is known as alcohol use disorder (AUD; Mayo Clinic, 2018). Alcohol withdrawal syndrome (AWS) is an acute form of AUD that occurs when an individual who regularly consumes alcohol either reduces or stops consumption. Complications of AWS include admission to the intensive care unit, prolonged hospitalization, increased risk of infection, and mortality (Mo et al., 2016). These complications might lead to poor patient outcomes and increased healthcare costs.

Among surgical trauma patients, approximately 31% experience AWS (Nejad et al., 2020). The American Society of Addiction Medicine (2020) recommended the use of pharmacological intervention and supportive care in the management of inpatient AWS. Advanced practice providers (APPs) such as nurse practitioners, physician assistants, and other providers such as physicians frequently use pharmacological-based interventions in the management of AWS with the standard of care being benzodiazepines (Nejad et al., 2020). However, recent literature suggested phenobarbital (PHB) had superior patient outcomes compared to benzodiazepines in the management of AWS with decreased intensive care unit (ICU) admissions, length of stay, and progression of symptoms (Nejad et al., 2020). These recent findings contradicted previous concerns among APPs that the use of PHB would result in over-

sedation, loss of airway, and therefore worsen patient outcomes including mortality. Because prescribing healthcare providers must make critical decisions about which pharmacological agent would be used in the management of AWS, neglecting to consider this emergent evidence was problematic.

Background

Alcohol Use Disorder and Symptoms of Alcohol Withdrawal Syndrome

According to the 2018 National Survey on Drug Use and Health, 14.4 million adults suffer from alcohol use disorder (Substance Abuse and Mental Health Services Administration, 2020). Alcohol use disorder is characterized by a dysfunctional pattern of alcohol use despite social, health, and occupational consequences (Mayo Clinic, 2018). With abrupt cessation or reduced intake of alcohol, patients with a history of AUD could experience alcohol withdrawal syndrome (AWS) with mild, moderate, or severe symptoms. The Centers for Disease Control and Prevention (CDC, 2019) estimated that excessive alcohol consumption cost the American healthcare system $249 billion in 2010, the most recent year when this figure was totaled. Mirijello et al. (2015) cited the rate of AWS among hospitalized patients to be about 20% and Ammar et al. (2021) reported the prevalence of AUD among hospitalized patients to be approximately 40%.

The severity of AWS symptoms is dependent upon the amount and duration of consumption of alcohol as well as other compounding factors such as comorbid conditions. The CDC (2021) described binge drinking and excessive drinking for women as four or more drinks during a single occasion or more than eight drinks per week. For men, five or more drinks during a single occasion and more than 15 per week is considered excessive. Symptoms of AWS could begin within 6-24 hours of the last drink or with reduced intake (Pace, 2018). Common

symptoms include agitation, confusion, tachycardia, hypertension, diaphoresis, headache, insomnia, gastrointestinal distress such as nausea and vomiting, tremors, and heart palpitations (Hoffman & Weinhouse, 2021). Delirium tremens is the most severe symptom of alcohol withdrawal and could result in profound confusion, agitation, hyperthermia, and seizures (Mirijello et al., 2015).

Management of Alcohol Withdrawal Syndrome Among the Adult Inpatient Population

Management of AWS includes supportive care such as hydration, nutritional supplements, and providing a safe environment with the use of physical restraints, if necessary (Hoffman & Weinhouse, 2021). Alcohol is an agonist to the gamma-aminobutyric acid receptors located in the brain, which are the major inhibitory neurotransmitters that produce a feeling of sedation (Schmidt et al., 2016). When alcohol intake is stopped or reduced, it "results in decreased inhibitory tone and results in over activity of the central nervous system" (Hoffman & Weinhouse, 2021, p. 2). This overreaction of the central nervous system produces symptoms such as agitation, insomnia, hypertension, diaphoresis, confusion, and seizures. In addition to supportive care (such as hydration and nutrition), sedatives such as benzodiazepines and long-acting barbiturates such as PHB might be administered given their gamma-aminobutyric acid agonist properties (Schmidt et al., 2016). These pharmacological agents reduce the overreaction symptoms of the central nervous system. Dosing of sedatives is typically achieved using facility-specific alcohol withdrawal protocols that guide the healthcare provider based upon each patient's risk factors and the severity of withdrawal symptoms. The use of sedatives such as benzodiazepines could produce sedation and place patients at a higher risk of mechanical ventilation and increased length of hospital stay (Ammar et al., 2021). Conversely, the use of

long-acting barbiturates such as PHB, especially in those with moderate to severe AWS, has been shown to reduce the rate of mechanical ventilation, oversedation, and hospital length of stay. Despite these findings, benzodiazepines remain the most used pharmacological agent among APPs and physicians in the treatment of AWS (Mo et al., 2018). Choosing which pharmacological agent to use is often at the discretion of the APP or physician caring for the patient and is influenced by their knowledge, attitude, and practice habits. For example, Buell et al. (2020) explored practice patterns and knowledge of the use of PHB among physicians and revealed that 60% admitted to not using this particular medication in practice due to knowledge deficits regarding safety and pharmacodynamics. Concerns for the providers in the study included fear of respiratory depression (49%) and fear of decreased level of consciousness (43%); only 5% were aware of a recent systematic review that endorsed the use of PHB for the management of AWS.

The setting of this project was within a trauma step down unit (TSDU) at a level one trauma center. Congruent with national trends, APPs and physicians in the TSDU could choose from an existing PHB order set (see Appendix A) or a BZD protocol when managing patients with AWS. Initially, this facility only had a BZD protocol in place. The BZD protocol uses the Minnesota Detoxification Scale (MINDS), which scores symptoms based on severity with total scores ranging from 0 to 46. Higher MINDS scores indicate higher BZD dosing. However, in response to emergent literature showing PHB superiority in patient outcomes for the management of moderate to severe AWS, the facility instituted an order set in 2020 based upon a Massachusetts General Hospital PHB protocol. The PHB-based order set was approved for use within both the trauma intensive care unit (TICU) and the TSDU. However, observations by the trauma team leadership and the primary researcher of this Doctor of Nursing (DNP) scholarly

project indicated the APPs and physicians appeared to underutilize the PHB order set within the TSDU despite supportive evidence and institutional adoption in 2020. Formal education regarding the order set was not disseminated to the trauma APPs and physicians due to social distancing restrictions and increased workload demands during the COVID-19 pandemic. As a result, this lack of education might have contributed to the limited use of the PHB order set in the trauma units at this organization.

Statement of the Problem

Choosing which pharmacological agent to use in the management of AWS is often at the discretion of the APP or physician caring for the patient as influenced by their knowledge, attitude, and practice habits. Despite evidence showing the superiority of PHB in the management of AWS, the use of benzodiazepines remains prevalent in clinical practice both nationally and at the clinical site of focus for this scholarly project. As described above, a lack of education might have contributed to the limited use of the PHB order set by both APPs and physicians. Providing evidence-based education to providers at the organization about the safety, efficacy, and use of PHB in the management of AWS might lead to an increased adoption of this intervention and potentially improved patient outcomes.

Purpose of Project

The purpose of this DNP scholarly project was to evaluate if an evidence-based educational intervention delivered to advanced practice providers (APPs) and physicians in the trauma department of a level one trauma center would influence their knowledge, attitudes, and intention to use an existing phenobarbital (PHB) order set for the management of alcohol withdrawal syndrome (AWS) among the adult inpatient population.

Need for the Project

Given BZD availability and quick onset, this class of drugs remains commonly prescribed in the management of AWS. However, several high quality and recent studies suggested PHB is a safer pharmacological agent in the management of AWS with demonstrated superiority in improving outcomes such as decreasing length of hospital stay and rates of mechanical ventilation (Hawa et al., 2021; Tidwell et al., 2018). Of note, PHB was found to be more effective in treating those with moderate to severe AWS as well as patients refractive to BZD treatment. This project might potentially impact how APPs and physicians treat patients experiencing AWS. Increasing the receptivity to and utilization of PHB among providers in the management of AWS could potentially lead to improved patient outcomes and reduced cost in healthcare dollars for the patient, insurance provider, and facility.

Project Question

This scholarly project addressed the following question:

Q1 Will an evidence-based educational intervention delivered to advanced practice providers and physicians at a level one trauma center influence their knowledge, attitudes, and intention to use phenobarbital for the management of Alcohol Withdrawal Syndrome among the adult inpatient population?

Objectives of the Project

The overall objectives of this scholarly project were as follows:

1. Utilize the current literature to develop an educational intervention regarding the use of phenobarbital in the management of alcohol withdrawal syndrome (AWS).
2. Recruit a sample of currently practicing advanced practice providers and physicians in the trauma intensive care setting and deliver a virtual and asynchronous evidence-based educational intervention regarding the safety, efficacy, and use of phenobarbital in the management of AWS.

3. Administer pre- and post-intervention surveys to the participants evaluating their knowledge, attitudes, and intention to change clinical practice related to using phenobarbital in the management of AWS.
4. Analyze pre- and-post intervention survey data using descriptive statistics and make recommendations to the practice site based on these findings.

Summary

Alcohol withdrawal syndrome could occur when regular consumption of alcohol is either reduced or stopped, leading to an overreaction of the central nervous system. Management of acute AWS in the inpatient population includes both supportive and pharmacological measures with the latter running the risk of serious side effects. Mismanagement or over-sedation of this patient population could lead to increased length of hospital stay and mechanical ventilation, both of which increase morbidity, mortality, and healthcare costs. Benzodiazepine remains the most common pharmacological intervention in the management of acute AWS. However, recent research suggests the use of phenobarbital for this clinical condition might lead to a reduced hospital length of stay and rate of mechanical ventilation compared to benzodiazepines, especially among those with moderate to severe AWS. Consistent with national trends, APPs and physicians at the project site could choose between benzodiazepine or phenobarbital in the management of acute AWS, with the former being chosen most often. Providing an evidence-based educational intervention on the safety, efficacy, and use of phenobarbital in acute AWS might improve APPs and physicians' knowledge, attitudes, and intention to adopt this superior intervention in their practice.

Definition of Terms

Advanced Practice Provider (APP): An umbrella term that refers to non-physician healthcare providers who have an advanced degree and training in a medical specialty. For the purpose of this project, this term referred to advanced practice nurses (nurse practitioners).

Alcohol Use Disorder: A dysfunctional pattern of substance use leading to clinically notable disability or distress that could be accompanied by periods of alcohol intoxication and alcohol withdrawal (Mayo Clinic, 2018).

Alcohol Withdrawal Syndrome: A clinical diagnosis consisting of a set of symptoms that occur after the reduction of or cessation of excessive or chronic alcohol consumption.

Benzodiazepine: A class of drug that prevents seizure activity and produces sedation with anti-anxiety properties.

Order Set: A set of bundled and standardized orders used in the electronic medical record to help expedite and manage the care of patients (McGreevey, 2013).

Phenobarbital: A long-acting barbiturate class of drugs known to prevent seizures with sedative properties.

Protocol: A pre-drafted document that guides healthcare clinicians in the management of a specific diagnosis that could include dosing of medications.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter focuses on the history of the management of alcohol withdrawal syndrome (AWS) over the last century and a synthesis of the current literature regarding the pharmacological management of this condition. A search of the literature revealed various studies that compared the safety and efficacy of a variety of pharmacological agents used in the management of AWS with phenobarbital showing superiority to benzodiazepines overall. In addition, an overview and application of the knowledge attitude practice (KAP) model is provided as the theoretical framework for this Doctor of Nursing Practice (DNP) scholarly project.

Historical Background

Historically, the treatment of inpatient acute AWS consisted of supportive care such as hydration, electrolyte repletion, restraints, continuous observation for safety, providing a calm and quiet environment, and administering pharmacological agents when symptoms were moderate to severe. In the first half of the 1900s, treatment included electroconvulsive shock therapy and insulin-induced comas (Stern et al., 2010). In the 1920s, chloroform was administered when tremors or seizure like activity (convulsions) were detected (Osler & McCrae, 1920). The 1950s included the use of antipsychotics drugs from the phenothiazines class (such as promazine) and central nervous system stimulants (such as paraldehyde) possessing anticonvulsant properties (Stern et al., 2010). In the 1960s, multiple studies were conducted evaluating the use of promazine and paraldehyde with the former showing superior

efficacy in the management of AWS but with a significant risk of side effects such as oversedation, headache, and gastrointestinal distress. In 1972, a seminal medical text, *The Principles and Practice of Medicine,* suggested the use of diazepam (benzodiazepine class) and barbiturates for the treatment of AWS seizures (Stern et al., 2010). During the 1980s, some studies showed barbital to be more effective when compared to benzodiazepines (BZDs). However, given their quick half-life and widespread availability, the use of BZDs (specifically, lorazepam) has remained the most used pharmaceutical in the management of AWS (Stern et al., 2010). Since BZDs could lead to respiratory distress and oversedation, more recent studies have been conducted comparing rates of mechanical ventilation and hospital length of stay (as measured in days) among those treated with BZDs versus phenobarbital (a long-acting barbiturate) for the inpatient AWS population (Mo et al., 2016). These studies suggested PHB could reduce the rate of mechanical ventilation and hospital length of stay while also providing comparable or even superior control of symptoms.

Literature Review

Methodology

The primary researcher conducted a search for literature pertaining to the use of PHB and BZD in the management of acute AWS among the adult inpatient population. This search was performed to develop the evidence-based educational intervention that would be delivered to APPs (nurse practitioners) and physicians in the trauma department of a level one trauma center with the intention of influencing their knowledge, attitudes, and intention to use an existing PHB order set for the management of AWS among the adult inpatient population. Databases searched included Clinical Index of Nursing and Allied Health Literature (CINAHL) Plus with full text and Pub Med. The search occurred from May 2021 through January 2022. The Boolean operator

"AND" was used to combine the search terms alcohol withdrawal with phenobarbital, benzodiazepines, and inpatient. Inclusion criteria were studies published in the last 12 years, adult population, and English language. Since BZDs were the most utilized and studied pharmacological agent in AWS with a long history of use for this condition, articles published as far back as 2009 were considered to ensure adequate data were extracted. Exclusion criteria included any studies pertaining to populations less than 18 years of age, published more than 12 years ago, outpatient or inpatient psychiatric settings, and studies concerning anticonvulsants, opioids, or anesthetic medications such as ketamine.

Of the 131 articles found, 66 were excluded due to duplication, non-English language, or publication dates prior to 2009. Of the remaining 65 articles, an additional 47 were excluded for pertaining to anticonvulsants, outpatient or psychiatric inpatient settings, opioids, or populations less than 18 years of age. As a result, 18 articles met the inclusion criteria and were reviewed for this project. The PRISMA flow diagram (see Appendix B) provided an overall summary of the database search results, records screened, and records included in the study. The literature synthesis included three systematic reviews (Hammond et al., 2017; Martin & Katz, 2016; Mo et al., 2016), two prospective randomized trials (Hendey et al., 2011; Rosenson et al., 2013), five retrospective cohort studies (Hawa et al., 2021; Nelson et al., 2019; Nisavic et al., 2019; Oks et al., 2020; Tidwell et al., 2018), one literature review (Phan, 2018), one retrospective case series (Ammar et al., 2021), two case presentations (Fujimoto et al., 2017; Hayner et al., 2009), one non-experimental study (Mo et al., 2018), two retrospective chart reviews (Ibarra, 2020; Nejad et al., 2020), and one multidisciplinary cross-sectional study (Buell et al., 2020). The Table of Evidence (see Appendix C) provides an overall summary of these articles.

Synthesis

The results from this literature review revealed that PHB is an effective pharmacological agent in the management of AWS. When compared with BZD, PHB demonstrated superiority in improving patient outcomes such as decreasing length of hospital stay and rates of mechanical intubation. Phenobarbital was found to be more effective in treating those with moderate to severe AWS and patients who were refractive to BZD treatment. Phenobarbital monotherapy and PHB with concurrent use of BZD were also shown to be effective in the management of AWS.

Phenobarbital Safety

Both with and without the use of BZD, PHB was found to be a safe pharmacological intervention for the management of AWS. Mo et al. (2016) evaluated a total of seven studies and found PHB to be at least as safe as BZD and without any demonstrated inferiority. Phenobarbital was more effective in managing severe AWS and provided better symptom control when given early in treatment when compared to BZDs (Mo et al., 2016). Provider concerns surrounding respiratory depression with PHB use were largely unfounded in a systematic review by Martin and Katz (2016) with evidence of reduced rates of mechanical ventilation secondary to AWS complications compared to BZDs. Similarly, Ammar et al. (2021) explored the use of PHB monotherapy for AWS and found no related complications such as respiratory depression or increased mortality. Oks et al. (2020) revealed that of the 12 patients who received PHB monotherapy, none required mechanical intubation. Conversely, all of the17 patients requiring intubation had received high BZD doses for severe AWS prior to being transitioned to PHB. Two prospective randomized trials suggested the use of PHB followed by BZDs lowered the average Clinical Institute Withdrawal Assessment for Alcohol score compared to using BZD monotherapy (Hendey et al., 2011; Rosenson et al., 2013). Overall, PHB appeared to be a safe

pharmacological intervention with a lower risk of respiratory depression and mechanical intubation compared to BZD.

Length of Stay and Intensive Care Unit Admission Outcomes with Use of Phenobarbital

Use of PHB was found to decrease the length of hospital stay and rates of intensive care unit (ICU) admission. Two retrospective studies (Hawa et al., 2021; Tidwell et al., 2018) compared the use of PHB and BZDs for the management of AWS and found a statistically significant difference in hospital length of stay. Hawa et al. (2021) found the PHB group had an average of 2.8 hospital days compared to 3.6 hospital days among the BZD group. Similarly, Tidwell et al. (2018) found the PHB group had an average of 4.3 ICU admission days compared to 6.9 days among the BZD group. A retrospective case series from Ammar et al. (2021) also found the average length of ICU stay among patients being treated with PHB was two days, which aligned with other literature. A retrospective chart review conducted by Ibarra (2020) found a statistically significant reduction in length of stay among those within the PHB treatment group compared to the non-PHB group. In addition, there appeared to be a decreased admission rate from the emergency department to the ICU when patients were given one dose of PHB followed by BZDs in that setting (Hendey et al., 2011; Rosenson et al., 2013). However, Nelson et al. (2019) compared emergency department length of stay in hours among PHB and BZD groups and found no statistical difference. In a retrospective review, Nisavic et al. (2019) compared the effectiveness of PHB versus BZD in the management of AWS and found comparable outcomes. Of note, a small group of patients in this review who were initially given BZDs did not show improvement in AWS symptoms until they were transitioned to PHB. Overall, the literature demonstrated that use of PHB could reduce inpatient length of stay and

admission rates to the ICU when compared to BZDs, although more research is needed to extend these claims to the emergency department setting.

Efficacy of Phenobarbital

Three systematic reviews (Hammond et al., 2017; Martin & Katz, 2016; Mo et al., 2016) reviewed the use of PHB versus BZDs in the clinical management of AWS. Hammond et al. (2017) suggested that front-loading (early administration) of PHB might help reduce the progression of AWS symptoms. Martin and Katz (2016) concluded that PHB is more efficacious than BZDs in the management of severe alcohol withdrawal. Similarly, two case reports evaluated the efficacy of PHB in patients with severe AWS (Fujimoto et al., 2017; Hayner et al., 2009). Both reports found BZDs to be ineffective with these patients and once cessation of BZDs with initiation of PHB was implemented, the patients' AWS symptoms improved and neither required mechanical intubation. Although case studies should be interpreted with caution, there was tentative evidence that patients experiencing severe AWS might benefit from PHB titration. A retrospective review by Nejad et al. (2020) revealed a significant difference in alcohol withdrawal delirium among those treated with a PHB-based protocol compared to a BZD-based protocol for AWS. Most notably, the authors reported that those treated with a PHB-based protocol experienced fewer complications and medication-related adverse events when compared to the BZD-based protocol group (Nejad et al., 2020). Phan (2018) reviewed primary literature pertaining to monotherapy PHB use for AWS in the non-ICU inpatient setting and found it to be both efficacious and highly safe. Considering the above research findings, PHB appeared to be just as efficacious in the management of mild AWS and potentially more efficacious in the management of moderate to severe AWS when compared to BZD.

Alcohol Withdrawal Syndrome
Practice Trends

Facility Practices. Using a survey questionnaire, Mo et al. (2018) evaluated current practice trends in the management of AWS among northeastern hospitals in the United States, specifically those with greater than 100 bed capacity. Most hospitals (n = 90) were found to use protocols that followed a dosing algorithm based upon AWS symptom severity. Benzodiazepines were more commonly used in the treatment of mild (74%) to moderate (54%) AWS cases. However, among cases with severe or BZD refractory AWS, an adjunct agent such as PHB was administered at 28% of the facilities. This questionnaire did not evaluate medication efficacy or patient outcomes. While BZDs seemed to be more utilized among these facilities, PHB was utilized in the treatment of severe AWS in almost one-third of the facilities surveyed. Given the above information, it appeared PHB was underutilized except in the case of severe AWS. However, this study was limited to a single region of the United States and at hospitals with more than 100 beds. It should be noted that the use of PHB might also be beneficial for mild-to-moderate AWS by reducing progression of symptoms and avoiding a potential ICU admission (Nejad et al., 2020; Phan, 2018).

Physician Practice Trends. Using a survey, Buell et al. (2020) examined practice patterns and knowledge of the use of PHB in the management of AWS among physicians. The surveyed staff physicians (n = 105) represented various specialties including internal medicine, psychiatry, critical care, emergency medicine, general surgery, and anesthesiology. The physicians reported they treated patients with AWS an average of once per week. Sixty percent admitted to not using PHB in practice and additional analysis revealed knowledge deficits among the participants related to the safety and pharmacodynamics of PHB including fear of respiratory depression (49%) and fear of decreased level of consciousness (43%). Only 5% of participants

were aware of a recent systematic review endorsing the use of PHB in the management of AWS. Of note, 43% of the physicians in the sample were unfamiliar with PHB contraindications and 58% were unaware of the peak onset of PHB. This study demonstrated a knowledge deficit regarding the use of PHB in AWS among physicians. With APPs such as nurse practitioners also treating AWS, it was likely PHB knowledge deficits existed among this group of providers as well, although there is a lack of research in this area.

Summary

Overall, the literature suggested that PHB is a safe and effective pharmacological agent in the treatment of AWS. Risks such as respiratory depression and mechanical ventilation with the use of PHB were minimal. On the contrary, the evidence suggested the use of PHB could reduce length of hospital stay and the rate of mechanical ventilation when compared to BZD among the inpatient population, especially when given early in treatment. Although the research was limited to a single study evaluating larger hospitals in the northeastern United States, BZD appeared to be used most often by providers in AWS management but the use of PHB increased in cases of severe AWS. Across the literature, earlier use of PHB appeared to reduce the progression of AWS from mild or moderate to severe with low rates of adverse outcomes. In addition, the evidence indicated a knowledge deficit among physicians concerning PHB safety and pharmacodynamics. However, there was an identified gap in the literature concerning AWS treatment trends among APPs such as nurse practitioners.

Theoretical Framework

This project used the knowledge attitude practice (KAP) model to guide the development and delivery of the educational intervention and all other components of the project. An overview of the model and its application to this project are described below.

Background and Description

The KAP model is a health behavioral model used to assess an individual's knowledge, attitude, and behavior regarding a specific topic. Ramsey and Rickson (1976) developed the KAP model and proposed that knowledge influenced attitude and attitude impacted practices (behaviors). Initially, the KAP model was used in public health to determine health behaviors among the general population. However, it has since been adopted by and utilized extensively in the medical field to assess healthcare providers' knowledge, attitude, and practices regarding a multitude of topics including alcohol withdrawal (Kumar et al., 2021), post operative pain management (Basak, 2010), universal precautions among nurses (Kaur et al., 2008), general practitioners' attitudes regarding sexually transmitted diseases (Hussain et al., 2011), and the use of antimicrobials, control of antimicrobial resistance, and infection prevention stewardship (Balliram et al., 2021).

According to Alzghoul and Abdullah (2015), practices (behaviors) are determined by attitude, which are in turn based on knowledge about the practice. Knowledge was defined by Kaliyaperumal (2004) as understanding a topic. Attitude was defined as a person's point of view or feelings about a topic (Launiala, 2009). Practice was defined as a way of doing something or performance of a certain behavior (Merriam-Webster, 2022). According to Ramsey and Rickson (1976), since knowledge impacts attitude and attitude impacts practices, the KAP model is unidirectional.

The theoretical underpinning of the KAP model is the theory of planned behavior (TPB), which was developed by Ajzen in 1985 as an extension of the theory of reasoned action (TRA), which had been created earlier by Ajzen and Fishbein (Madden et al., 1992). The TPB provides a framework for predicting human behavior and suggests that an individual's intention to engage

in a behavior is impacted by their attitude, subjective norms, and perceived control of that behavior (Knowles et al., 2015). According to the TPB, intention is the best predictor of behavior (Ajzen, 1985, 1991). The relationship between attitudes and practices is further explained by the TPB (De Pretto et al., 2015). The TPB has been used in healthcare studies to evaluate both patient behaviors as well as the clinical practices of healthcare providers such as nurses and physicians. Likewise, the KAP model is commonly used to analyze patient and healthcare providers' responses to a particular topic.

Rationale for Selecting This Model

The KAP model is a practical and well-established framework for influencing healthcare provider behavior (Alzghoul & Abdullah, 2015). This model was appropriate for this scholarly project as the aim was to provide a PHB educational intervention to APPs and physicians to evaluate if their knowledge, attitudes, and intention to change their practice in the management of AWS were impacted. Without a clear understanding of the reasoning behind a protocol or clinical practice (knowledge), a healthcare provider's attitude about that practice could be negatively impacted and therefore hinder their practice. The KAP model suggested that providing evidence-based knowledge about a protocol or clinical practice could influence attitude and practice behaviors. When new evidence regarding best clinical practice and protocols are introduced, it presents an opportunity for a clinician to change both their attitude and their clinical practice.

Application

This study provided an educational intervention surrounding the use of phenobarbital in the management of AWS among physicians and advance practice providers (nurse practitioners). The KAP model provided a framework for explaining how the intention to change clinical

practice behavior was impacted by knowledge and attitude as measured by the Continuing Professional Development (CPD)-Reaction Questionnaire. As described in further detail in Chapter III of this written project, the CPD-Reaction Questionnaire is a reliable and valid tool for detecting behavioral intentions of healthcare providers as it addresses knowledge, attitude, perceived control, subjective norm, and behavioral intention (Legare et al., 2017). A pretest and posttest design using the CPD-Reaction Questionnaire was utilized to determine if the educational intervention impacted the knowledge, attitude, and intention to change practice among providers in the sample. These components were congruent with the KAP model.

Summary

Knowledge is influenced by belief; attitude is influenced by perception and norms; and practice is underpinned by intention and behavior. Since this study would not follow participants long term, the CPD-Reaction Questionnaire initially evaluated the practitioners at baseline followed by their intention to change their practice after participating in a virtual and asynchronous educational intervention about the superiority of PHB for managing AWS. In essence, by exposing a group of inpatient advanced practice providers and physicians to the current PHB literature as well as to an existing evidence based PHB practice protocol at the project site, the KAP model supported the assumption that a shift in their attitude and intention to change their clinical practice would be detected using the CPD-Reaction Questionnaire.

CHAPTER III

METHODOLOGY

This chapter describes the methods and steps used to execute this DNP scholarly project. The project design, setting, sample, and data collection procedures are detailed. Additionally, data analysis, duration, and ethical considerations are discussed. The purpose of this DNP scholarly project was to evaluate if an evidence-based educational intervention delivered to advanced practice providers (APPs) and physicians in the trauma department of a level one trauma center would influence their knowledge, attitudes, and intention to use an existing phenobarbital (PHB) order set for the management of alcohol withdrawal syndrome (AWS) among the adult inpatient population.

Design

This quantitative quality improvement project used a one-group pretest and posttest design to collect data regarding APP and physician knowledge, attitudes, and intention to change practice regarding the use of PHB in the management of AWS. An evidence-based educational intervention emergent from the integrated literature review was developed and asynchronously delivered to APPs and physicians. The educational intervention was developed following the Guideline for Reporting Evidence-Based Practice Educational Interventions and Teaching (GREET) checklist (see Appendix D). This checklist provided a quality control framework for reporting evidence-based practice educational interventions and is discussed in more detail later in this chapter (Phillips et al., 2016).

Setting

The evidence-based educational intervention and pretest/posttest surveys were delivered virtually to APPs (nurse practitioners) and trauma surgeons credentialed to practice within the trauma step down unit (TSDU) at the project site. The facility, Cooper University Hospital, is a regional level-one trauma center located in Camden, New Jersey. The TSDU provides an intermediate level of care for trauma patients between the trauma intensive care unit and the general medical-surgical unit. Patients within this unit are stable enough to avoid the trauma intensive care unit but still require monitoring a general-medical surgical unit cannot provide.

Sample

The sample was purposive and consisted of APPs and physicians (Medical Doctors or Doctors of Osteopathy) who worked within the TSDU at the project site. There are 17 nurse practitioners and 10 trauma physicians within the trauma division. Based on the inclusion criteria and an expressed interest in the project, a sample size of 20-25 participants was anticipated. After obtaining written permission from trauma division leadership, recruitment consisted of e-mailing potential candidates to introduce the project and inform them of the voluntary basis for participation. Inclusion criteria were as follows:

- Advanced practice provider (nurse practitioner) or trauma surgeon currently employed at Cooper University Hospital in the TSDU and
- At least one year of experience in their current role.

Exclusion criteria were as follows:

- Other clinical staff on the trauma step-down unit (such as registered nurses, licensed practical nurses, certified nursing assistants, pharmacists, or respiratory therapists);

- Advanced practice providers or physicians from outside the trauma division;
- Less than one year of experience in their current role.

Project Mission, Vision, and Objectives

The mission was to develop and deliver an educational intervention regarding best practice evidence in the use of PHB in AWS for the adult population on an inpatient trauma unit.

The vision was to positively influence advanced practice provider and physician knowledge, attitudes, and intention to use the PHB order set when managing AWS in an effort to improve patient outcomes.

This study had the following objectives:

1. Utilize the current literature to develop an educational intervention regarding the use of phenobarbital in the management of AWS.
    - From the literature, identify the benefits of using PHB in AWS and how it relates to the trauma step down patient population;
    - Develop an educational intervention following the GREET guidelines and in collaboration with the project advisor/chair and other committee members as needed;
    - Create and record the educational intervention using Microsoft PowerPoint and Zoom software.
2. Recruit a sample of currently practicing APPs and physicians in the trauma step down unit and deliver a virtual and asynchronous evidence-based educational intervention regarding the safety, efficacy, and use of phenobarbital in the management of AWS.

- After obtaining permission from the project site (see Appendix E) and Institutional Review Board (IRB) of the University of Northern Colorado (see Appendix F), send an email to the APPs and physicians in the trauma step-down unit inviting them to participate in the project (see Appendix G);
- After assembling a group of potential participants meeting the inclusion criteria, distribute the educational intervention and data collection surveys as described below.

3. Administer pre-and post-intervention surveys to participants evaluating their knowledge, attitudes, and intention to change clinical practice related to using phenobarbital in the management of AWS.
    - Using Qualtrics survey software, develop and administer pre- and post-educational intervention survey questions based upon the CPD-Reaction Questionnaire;
    - Obtain basic demographic information about the sample with the pre-intervention survey.
4. Analyze the pre- and post-intervention survey data using descriptive statistics and make recommendations to the practice site based on the findings.
    - Complete statistical analyses of the pre-and post-survey responses (most likely a paired samples *t*-test) under the direction of the Social Research Lab at the University of Northern Colorado.
    - Based on the findings, recommendations to the practice site are articulated in Chapter V of this scholarly project.

Project Plan

Key components to this DNP scholarly project included:

- Obtainment of written permission from the project site to conduct the project virtually and asynchronously with the relevant employees;
- Submission of the IRB application to receive project approval (presumed to be 'exempt');
- Development of an evidence based educational program about the use of PHB in AWS using the integrated literature review (see Chapter II and the Table of Evidence in Appendix C) that were delivered via recorded PowerPoint using Zoom technology;
- Recruitment of voluntary participants using institutional e-mail to disclose the purpose, risks, and benefits of the project and ascertaining their interest in participating (see Appendix G);
- Electronically distribute the evidence-based educational program and pre- and post-intervention surveys to voluntary participants;
- Collect data from the surveys and interpret the findings via basic descriptive statistical analysis using SPSS software under the direction of the Social Research Lab and apply the GREET guidelines to evaluate intervention fidelity;
- Write up the project findings including making recommendations to the project site about increasing the utilization of PHB in the management of AWS among advanced practice and physician providers;
- Present and disseminate the DNP project to the scholarly project committee and the University of Northern Colorado Graduate School.

Instrumentation

The pre- and post-surveys were based on the CPD-Reaction Questionnaire and were administered using Qualtrics Survey Software. Written permission to use this instrument for this scholarly project was obtained from the survey developer (see Appendix H). The CPD-Reaction Questionnaire was established in 2011 by Legare et al. (2011). The purpose of the instrument is to assess the impact of continuing professional development activities on professional clinical practice. It is specifically designed to assess for individual providers' intention to change their clinical behavior (Legare et al., 2011). Validity and reliability findings of the CPD-Reaction Questionnaire were published by Legare et al. (2014), both of which were found to be adequate. Validity was established with the use of the e-Delphi method and reliability was established by the test-retest, which was shown to be moderate with weighted kappa values between 0.4 and 0.6 (Legare et al., 2014). Cronbach's alpha coefficients were within an acceptable range (0.79 to 0.89) and an exploratory factorial analysis was completed for the 12-item final instrument (Legare et al., 2014). Response choices for the questionnaire included *strongly disagree, agree, never, always, harmful, beneficial, useful, useless,* and *percentage*. Example statements in the instrument included (a) I intend to [*behavior*], (b) I am confident that I could [*behavior*] if I wanted to, and (c) It is acceptable to [*behavior*] (Legare et al., 2017). In addition to the CPD-Reaction Questionnaire, basic sample demographics including years of professional experience and level of education/credentialing were collected via Qualtrics Survey Software with the first survey. The pre- and post-test surveys can be found in Appendices I and J.

Development of the Educational Intervention

The virtually delivered educational intervention was constructed based upon the Guideline for Reporting Evidence-Based Practice Educational Interventions and Teaching

(GREET). This guideline was developed to assist educators in developing high quality evidence-based practice learning (Phillips et al., 2016). The GREET provided a checklist that essentially acted as a blueprint for building an evidence-based practice learning activity. Examples of criteria within the GREET checklist included (a) Intervention—providing a brief description of the educational intervention, (b) Delivery—description of the mode of delivery such as face-to-face or virtually, and (c) Learning Objective—describing the learning objectives for all involved groups (Phillips et al., 2016). The complete checklist is provided in Appendix D. Validity and reliability of the GREET guidelines were published by Phillips et al. (2016) with an extremely high criterion validity (intra-class correlation coefficient = 0.73) and inter-rater reliability (intra-class correlation coefficient = 0.96).

Analysis

The following data analysis procedures for this scholarly project were planned:

- The results from the questionnaires (both pre and post) would be compiled through Qualtrics survey software and exported to SPSS statistical software.
- Basic statistical analysis (most likely a paired samples *t*-test) would be completed using expert consultation from the Social Research Lab at the University of Northern Colorado.
- Following completion of data collection, the GREET checklist would be applied to evaluate the fidelity of the educational intervention and the results would be integrated into the final analysis.

Duration

The first phase of this DNP project included development of the pre- and post-questionnaires, development of the educational intervention, defense of the scholarly project

proposal to the committee and obtaining IRB and project site approval. These initial steps were completed over the course of six weeks. The second phase consisted of identifying potential participants, which took one week. The data collection period which consisted of administration of the pre- and post-intervention questionnaires and virtually delivered educational intervention to participants occurred over a 12-day period. The analysis of the collected data took two weeks. The writing up of the findings and completion of a successful oral defense of the DNP project took 10 weeks. The total time for completion of this DNP project was 18 weeks and 12 days.

Ethics

Submission to the University of Northern Colorado IRB and the facility for approval took place prior to instituting this DNP scholarly project. All participant information and responses were kept confidential and stored electronically by the primary researcher on a password protected device. Data were only shared with the project advisor/chair and the statistical staff at the Social Research Lab using the university's secure network. Implied consent to participate was voluntary and electronically obtained with the first survey. Participants could discontinue participation at any time during the project without consequences. Overall, there were minimal risks to participants, but it did require a time commitment for completing the pre and post surveys as well as participating in the self-paced, virtually delivered educational intervention that needed to be completed within a timeframe of 12 days. Participation or refusal to participate did not impact the employment status of those invited to participate, which was clearly articulated in the recruitment email. Potential rewards for participating included increased personal knowledge about the superiority of PHB for AWS and potentially contributing to evidence-based practice science. The primary researcher of this DNP scholarly project is employed as an advanced practice provider and colleague of the anticipated participants. This raises a concern for a

potential conflict of interest in that participants may feel obligated to participate based on their inter-professional relationship with the primary researcher. However, no financial incentive was provided and the primary researcher was not in a supervisory position within the trauma division. In addition, the primary researcher conducted all project activities professionally and separately from regular work hours. Participants were assured their responses would remain confidential and would only be analyzed in aggregated form so the primary researcher had no way of knowing who did/did not participate.

CHAPTER IV

DATA ANLYSIS AND RESULTS

This chapter discusses the data analysis and results of this DNP scholarly project. The purpose of this DNP scholarly project was to evaluate if an evidence-based educational intervention delivered to advanced practice providers (APPs) and physicians in the trauma department of a level one trauma center would influence their knowledge, attitudes, and intention to use an existing phenobarbital (PHB) order set for the management of alcohol withdrawal syndrome (AWS) among the adult inpatient population. An analysis of the project question is also provided.

Results

Objective 1

Objective 1 was to utilize current literature to develop an educational intervention regarding the use of PHB in the management of AWS. An educational intervention was developed using an integrated literature review regarding the use of PHB in the management of AWS. As outlined in Chapter II, the search strategy included literature comparing the use of PHB and BZD in the management of acute AWS among the adult inpatient population. The search yielded 131 articles, and after exclusion criteria were applied and duplicates removed, 18 articles met the inclusion criteria. The findings from the search of the literature included systematic reviews, prospective randomized trials, retrospective cohort studies, a literature review, retrospective case series, a case presentation, non-experimental studies, retrospective chart reviews, and a multidisciplinary cross-sectional study. Synthesis of the published research

informed the development of an educational intervention addressing the safety and efficacy of PHB, length of stay and ICU admission outcomes, and AWS practice trends among physicians. In addition, the current PHB order set designated for use within the trauma step-down unit (TSDU) at the project site was integrated into the educational intervention due to potentially low uptake since becoming available to providers in 2020. The educational intervention was developed using the GREET Guidelines as a blueprint to ensure aspects such as learning objectives, evidence-based practice content, materials, educational strategies, incentives, delivery, environment, schedule, time allotted, adaptation for the learners, unplanned changes, and attendance were addressed during development and implementation (Phillips et al., 2016). Project participants were presented with learning objectives focused on (a) the prevalence, clinical symptoms, and adverse risks of AWS among the adult inpatient population; (b) current practice trends and pharmacological pitfalls in the management of AWS among hospitalized patients; (c) current evidence-based research about the pharmacological management of AWS; (d) review of research from Massachusetts General Hospital that included a PHB protocol; and (e) explanation of the PHB order set and guidelines for use within the TSDU. The primary researcher collaborated with the research advisor/chair in drafting, revising, and finalizing the educational intervention by communicating virtually via multiple Zoom sessions and university email. The final product consisted of a 35-slide PowerPoint presentation guiding a 23-minute Zoom recording by the primary researcher. The completed GREET Checklist for the final draft of the educational intervention can be found in Appendix K.

Objective 2

The second objective was to recruit a sample of currently practicing APPs and physicians in the trauma step down unit and deliver a virtual and asynchronous evidence-based educational

intervention regarding the safety, efficacy, and use of PHB in the management of AWS. After obtaining permission from the project site and IRB of the University of Northern Colorado, currently practicing physicians and APPs within the Division of Trauma were recruited via email. Exclusion criteria included those not practicing within the TSDU and having less than one year of advanced practice experience. A total of 25 potential participants were identified in collaboration with trauma division leadership by use of a catalog listing the physician and advanced practice provider staff. The potential participants were invited and sent details of the research project via facility email with prior permission having been obtained from trauma leadership (see Appendix E). As described in Chapter III, the pre- and post-intervention surveys (see Appendices I and J) were developed using Qualtrics Pro Survey software and the survey questions were based upon the CPD-Reaction Questionnaire. A total of 18 people responded to the initial email, which included the pre-intervention survey. However, one respondent did not currently practice within the TSDU, and three others did not finish the pre-intervention survey in its entirety. A total of 15 participants completed the post-intervention survey but one was incomplete. Data from the three incomplete surveys and from the one participant who did not meet the inclusion criteria were removed prior to analysis. Thus, the final participant count (with completed pre- and post-intervention surveys) was 14 APPs and physicians.

Description of Sample

The demographic information obtained in the pre-intervention survey included current awareness of the PHB order set at the project site, currently practicing within the TSDU, years of practice experience, and credentials. Table 1 provides details of the number and percentage of participants representing each demographic category.

Table 1

Pre-Survey Participant Demographics

Sample Characteristics	*n*	%
Currently aware of PHB order set		
Yes	8	57
No	6	43
Years professional experience		
1-10	11	79
10 or more	3	21
Professional Credential		
MD or DO	4	29
APP	10	71

Note. All 14 participants provided patient care in TDSU. Abbreviations: MD, Doctor of Medicine; DO, Doctor of Osteopathic Medicine; APP: Advanced Practice Provider (Nurse Practitioner)

Summary of Sample Demographics

The sample included 10 APPs (Nurse Practitioners) and four physicians. Most of the sample had 1-10 years of professional experience with just three people having more than a decade. All 14 participants currently provided care within the TSDU and of those, eight were aware of the existing PHB order set at the project site and six were unaware.

Objective 3

The third objective was to administer pre-and post-intervention surveys to participants evaluating their knowledge, attitudes, and intention to change clinical practice related to using phenobarbital in the management of AWS. The pre-intervention survey link included the above demographic information, non-signature electronic consent, the recorded educational intervention, the post-intervention survey link, and instructions for how to participate within a 12-day timeframe were administered to all 25 potential participants via a single recruitment email. No additional follow-up emails were sent to participants but a general reminder was

provided by the primary researcher during a hybrid (both face-to-face and virtual attendance) and mandatory staff meeting that occurred on Day 5 of data collection. All potential participants were present for this meeting and the general verbal reminder did not impact the ability of participants to remain anonymous as participants were not asked to reveal if they intended to participate (or not) in the project during this meeting.

Objective 4

Objective 4 was to analyze the pre-and post-intervention data using descriptive statistics and make recommendations to the practice site based on the findings. Under the supervision of the Social Research Lab at the University of Northern Colorado, the raw data from Qualtrics Pro was exported into Excel and categorized according to the constructs predetermined by the CPD-Reaction Questionnaire. The CPD-Reaction Questionnaire questions are based on the following constructs: intention (questions 1, 7) social influence (questions 2, 6, 9), beliefs about capabilities (questions 3, 5, 11), moral norms (questions 4, 10), and beliefs about consequences (questions 8, 12). Data from the pre- and post-intervention survey responses were compiled and placed into the appropriate construct. Likert scales for each question were pre-set in Excel. After categorizing the data in Excel, it was exported into IBM SPSS Statistical Software (version 29) for statistical analysis. Two-tailed significance was set at .05 for all tests. The null hypothesis stated there was no significant difference between the pre-and-post intervention groups. A paired samples t-test was computed within SPSS revealing a p value of < 0.05 for all constructs (see Table 2 below). The CPD-Reaction Questionnaire does not evaluate knowledge, so to capture this aspect of the project an additional statement measured by a 7-point Likert scale was added to the post-intervention survey based on the recommendations of the project committee. The statement “After participating in this educational in-service my knowledge regarding

Phenobarbital in AWS has changed" was evaluated independently. Table 3 displays the results of this additional statement.

Table 2

Results From the Paired Samples t-*Test*

Construct	Paired 95% Confidence Interval of the Lower Estimate	Paired 95% Confidence Interval of the Upper Estimate	*t*	Df	Sig. (2-tailed)
Intention	-2.31	-.47	-3.26	13	.006
Social influence	-1.78	-.30	-3.04	13	.009
Beliefs about capabilities	-2.16	-.40	-3.16	13	.007
Moral norm	-2.01	-.26	-2.82	13	.014
Beliefs about consequences	-2.35	-.50	-3.33	13	.005

Note. Significance (sig.) level = .05.

Table 3

Post-Intervention Survey Statement Evaluating Change in Knowledge

After participating in this educational in-service, my knowledge regarding Phenobarbital in AWS has changed.	Strongly Agree 7	6	5	4	3	2	Strongly Disagree 1
Response Frequency	12	1	0	0	0	0	1
Central Tendency	Mean		Median			Mode	
	6.5		7			7	

Note: N = 14 post-intervention surveys

Summary of Findings

The null hypothesis was rejected because a statistically significant difference between the pre-and-post intervention scores was found for all five CPD-Reaction Questionnaire constructs as follows: intention to change practice ($p < .006$), social influence ($p < .009$), beliefs about capabilities ($p < .007$), moral norm ($p < .014$), and beliefs about consequences ($p < .005$). Analysis of the additional statement assessing post-intervention knowledge revealed a mean score of 6.5 on a 7-point Likert scale with 13 (92%) of the participants agreeing or strongly agreeing that their knowledge regarding PHB had changed after participating in the educational intervention. Based on these findings, practice site recommendations are discussed in Chapter V.

Scholarly Project Question Summary

This DNP project aimed to answer the following research question

Q1 Will an evidence-based educational intervention delivered to advanced practice providers and physicians at a level one trauma center influence their knowledge, attitudes, and intention to use phenobarbital for the management of Alcohol Withdrawal Syndrome among the adult inpatient population?

This question was answered through an-depth literature review, development and administration of an evidence-based educational intervention, data collection via pre- and post-intervention surveys, and descriptive statistical analysis. The results suggested that an asynchronously delivered educational intervention positively influenced provider knowledge, attitudes, and intention to use phenobarbital in the management of AWS among the adult inpatient population. All constructs of the CPD-Reaction questionnaire were statistically significant and participants reported a change in their knowledge after completing the educational intervention.

CHAPTER V

DISCUSSION

This chapter discusses and interprets the scholarly project including the conclusions, limitations, and recommendations for future practice changes at the project site as part of the fourth objective. Finally, a reflection on how this scholarly project met the criteria established in the American Association of Colleges of Nursing's (AACN, 2021) *The Essentials: Core Competencies for Professional Nursing Education* is provided.

Conclusions

The purpose of this DNP scholarly project was to evaluate if an evidence-based educational intervention delivered to advanced practice providers (APPs) and physicians in the trauma department of a level one trauma center would influence their knowledge, attitudes, and intention to use an existing phenobarbital (PHB) order set for the management of alcohol withdrawal syndrome (AWS) among the adult inpatient population. Overall, the literature suggests that PHB is a safe and effective pharmacological agent in the treatment of AWS. Risks such as respiratory depression and mechanical ventilation with the use of PHB are minimal (Hammond et al., 2017; Martin & Katz, 2016; Mo et al., 2016). The literature review also suggested that the use of PHB could reduce length of hospital stay and the rate of mechanical ventilation when compared to BZD among the inpatient population, especially when given early in treatment (Hammond et al., 2017; Hawa et al., 2021; Tidwell et al., 2018). Earlier use of PHB appears to reduce the progression of AWS from mild or moderate to severe with low rates of adverse outcomes (Hammond et al., 2017; Martin & Katz, 2016; Tidwell et al., 2018). In

addition, the evidence indicates a knowledge deficit among physicians concerning PHB safety and pharmacodynamics (Buell et al., 2020). These findings contributed to the impetus for conducting this project.

The theoretical framework for this project was the knowledge, attitude, and practice (KAP) model, which is a health behavioral model used to assess an individual's knowledge, attitude, and behavior regarding a specific topic (Ramsey & Rickson, 1976). The KAP model is a well-established framework for influencing healthcare provider behavior (Alzghoul & Abdullah, 2015). In addition, the KAP model suggests that providing evidence-based knowledge about a clinical practice can influence attitude and practice behavior. According to the KAP model, knowledge is influence by belief; attitude is influence by perception and norms; and practice is underpinned by intention and behavior. The CPD-Reaction Questionnaire aligned with the KAP model by encapsulating statements into constructs surrounding intention, social influence, beliefs about capabilities, moral norms, and beliefs about consequences.

An evidence-based educational intervention was designed using the GREET guidelines as a quality control checklist (Phillips et al., 2016). Pre- and post-intervention surveys were based on the CPD-Reaction Questionnaire, a reliable and valid instrument designed to assess the impact of continuing professional development activities on clinical practice and individual providers' intention to change their clinical behavior (Legare et al., 2017). It could be tentatively suggested that the delivered evidence-based educational intervention positively influenced the knowledge, attitude, and intention to use PHB among this small sample of APPs and physicians. The results indicated a high level of receptivity to change and an eagerness to improve practice among the sample. Of note, the construct concerning moral norms (indicating that using the PHB order set was the acceptable and ethical thing to do) was statistically significant even with

providers having access to a reasonably safe alternative in the form of the existing benzodiazepine protocol. Nearly all the participants agreed their knowledge had changed after participating in the educational intervention.

Overall, these findings suggested that providing education about new research findings to healthcare providers could influence their knowledge, attitudes, and intention to adopt best practices regarding a clinical topic. The educational approach used within this project appeared to be an effective mechanism for distributing evidence-based information to practicing clinicians and could potentially be used for future continuing education and professional development endeavors. Furthermore, an increased receptivity to and utilization of PHB among participants in the management of AWS could lead to improved patient outcomes and a cost reduction for the patient, insurance provider, and facility.

Limitations

Limitations of this scholarly project included a small, homogenous sample and an inability to ensure complete viewing and comprehension of the evidence-based educational intervention. Although the goal sample size of 25 was based on current staffing in the Trauma Division at the project site, only 14 people meeting the inclusion criteria completed both surveys in their entirety—a 56% participation rate. In addition, these findings should be interpreted with caution as small sample sizes can undermine both internal and external validity. Factors contributing to low participation might have included complex rotating clinical schedules with limited time for participation, disinterest in the topic, and asynchronous delivery. Another limitation was the sample was skewed toward APPs with more than twice as many NPs participating than physicians. This might be partially explained by the APPs having a stronger presence within the TSDU where they assume primary responsibility for most of the patients. In

addition, the existing PHB order set was initiated in the trauma intensive care unit in 2020 where all physicians practiced but fewer APPs practiced, which might have contributed to the latter group being less familiar with this pharmaceutical treatment. Finally, the fact that the participants were all from a single division at a single hospital in the northeastern United States limits generalizability to future research. An additional limitation was that although it was assumed the recorded evidence-based educational intervention was viewed in its entirety and fully comprehended by the participants prior to completion of the post-survey, there was no mechanism for tracking this using the selected mode of delivery (asynchronous Zoom recording). Similarly, there was no opportunity in this study design to have a question-and-answer session between participants and the primary researcher to ensure comprehension or provide clarity on the intervention.

Recommendations

Recommendations to the Practice Site Based on Project Findings

This study revealed an increase among providers in their intention to use PHB in AWS among the adult inpatient population after participating in online education about the safety, efficacy, and use of this pharmaceutical therapy. Based on these results, it could be recommended that structured education be provided to all healthcare providers at the project site regarding new order sets/protocols or changes to existing ones. This is especially pertinent given an existing PHB order set at the project site had been rolled out in 2020 but utilized at low levels among the prescribing staff in the trauma division. As described in Chapter I, this scenario was likely complicated by the onset of the COVID-19 pandemic and a general lack of awareness or knowledge about the new order set. Findings from this project suggested education should be based upon the most current and highest levels of evidence-based research. One recommendation

is a synchronous question-and-answer session or some form of follow-up communication should be provided at the conclusion of the educational session to ensure comprehension of the presented material and to further encourage adoption of the recommended practice change.

Recommendations for Future Research

Given the lack of research found regarding APP (nurse practitioner or physician assistant) practice trends in the use of PHB despite their increased presence within healthcare, future research should include this group of providers as well as physicians. In addition, future research projects evaluating how APPs and physicians receive information regarding new evidence-based practices and their responses to the information may potentially lead to improved educational strategies. Longitudinal studies on whether impacted beliefs, attitudes, and intentions about using PHB among adult inpatients experiencing AWS translate into measurable practice change would be another area of future research. Evaluating barriers and facilitators to implementation of the PHB order set as well as patient outcomes such as intubation rates and length of admission would be important metrics to consider in future investigations.

Reflection

This DNP scholarly project reflected the 10 domains and advanced (level two) competencies outlined within *The Essentials: Core Competencies for Professional Nursing Education* (AACN, 2021) as described below. The *Essentials* describe the necessary curriculum content and expected competencies of graduates from accredited nursing programs and were substantially revised in 2021 as reflected in this project.

Domain 1: Knowledge for Nursing Practice

A level two competency of this domain includes translating nursing science and other science disciplines into practice (AACN, 2021). This scholarly project included an extensive literature search and review of current research regarding the use of PHB in AWS, specifically regarding safety, efficacy, ICU length of stay, patient outcomes, and current practice trends. Current literature suggested PHB is superior to BZD in the management of AWS by reducing length of stay and providing better control of symptoms in moderate to severe AWS. Education surrounding PHB in AWS was provided to advanced practice providers with the intention that this information would be integrated into their future clinical practice.

Domain 2: Person-Centered Care

A level two competency of this domain included developing evidence-based interventions to improve outcomes and safety (AACN, 2021). While this scholarly project did not develop a patient-facing evidence-based intervention, it did provide an intervention to advanced practice providers and physicians designed to improve clinical care. Adoption of the PHB order set at the project site has the potential to improve patient safety and outcomes by reducing admission to the ICU, length of hospital stay, respiratory complications, and other sequelae related to AWD.

Domain 3: Population Health

The population health domain in the *Essentials* pertains to efforts to identify and improve the health of the community (AACN, 2021). Activities can include but are not limited to advocacy, policy change, and development of inter professional relationships to improve the overall health of the population. Although this scholarly project was small and limited to a single division at a single hospital, it did address a clinical problem frequently observed among the

trauma population both locally and nationally. Given that 31% of admitted trauma patients experience AWS (Nejad et al., 2020), findings from this project might contribute to future population-level interventions.

Domain 4: Scholarship for the Nursing Discipline

A level two competency within this domain included participation, collaboration, and dissemination of nursing research (AACN, 2021). The primary researcher led this study including identification of the purpose, design, methods, implementation, statistical analysis, and discussion with the assistance of doctorate prepared faculty and a Medical Doctor on the project team. Through collaboration with professional healthcare providers within the trauma division, the primary researcher identified a target for quality improvement in patient care and developed a subsequent project question. The primary researcher designed and implemented an educational intervention addressing the problem identified in the project question and the results are intended to contribute to nursing science at the advanced-practice level. The future of this project includes identifying opportunities to disseminate this knowledge to a wider audience.

Domain 5: Quality and Safety

After the primary researcher and trauma leadership observed an underutilization of the existing PHB order set by APPs and physicians practicing within the project site, the need for a quality improvement-driven change became evident. Findings from the project revealed a data-driven educational intervention provided to currently practicing APPs and physicians of the TSDU increased their knowledge, attitudes, and intention to use the existing PHB order set in the management of AWS. Given that the project appeared to have positively impacted the intention to use PHB, there is a potential for improved patient safety and outcomes among the AWS population within the TSDU. These project outcomes and findings will be communicated with

trauma leadership at the project site at the conclusion of the project to improve the quality of care delivered and promote future team-based change initiatives.

Domain 6: Interprofessional Partnerships

A level two competency in this domain includes promoting an environment that enhances interprofessional learning (AACN, 2021). During the literature review, the primary researcher found that provider practice trends regarding the use of PHB in AWS among the adult inpatient population were limited to physicians (Buell et al., 2020). As a result of this gap in literature, this scholarly project included both physicians and APPs (nurse practitioners) in the sample, which better reflected the current composition of prescribing providers in the acute care setting. With the potential for increased use of the PHB order set at the practice site, both pharmacy and nursing staff will be impacted as well. Pharmacy and nursing play a major role in verifying dosages, monitoring patient responses to interventions, and communicating with prescribing providers to ensure the delivery of safe patient care. This collaboration could promote an interdisciplinary approach while offering opportunities for teaching to bedside nurses prior to administration of PHB.

Domain 7: Systems-Based Practice

A level two competency within this domain included participation in system-wide initiatives that improve care delivery and/or outcomes and analyzation of system-wide processes to optimize outcomes (AACN, 2021). The project recognized that participating providers' knowledge, attitudes, and intention to use the PHB order set increased after the delivery of an educational intervention. The primary researcher will recommend to the project site that systematic staff education be provided prior to the initiation of any new or updated order sets or protocols to enhance competency and receptivity. This approach could potentially lead to

improved cost-effectiveness throughout the facility by resulting in superior clinical practices with fewer adverse outcomes and reduced healthcare costs.

Domain 8: Informatics and Healthcare Technologies

A level two competency within this domain included identification of best evidence and practices for the application of information and communication technologies to support care (AACN, 2021). The primary researcher compiled the evidence and created and delivered an educational intervention to physicians and APPs using PowerPoint and Zoom technologies. Obtainment and interpretation of project data required additional software technology including Qualtrics XM, Excel, and IBM SPSS. Another level-two competency in this domain entailed interpreting both primary and secondary data to support clinical care (AACN, 2021). Through an emergent literature review of secondary data, current research regarding the superiority in safety and effectiveness of PHB in the management of AWS among the adult inpatient population was identified and synthesized with the primary data from the project to form conclusions and make clinical recommendations with both local and broad implications.

Domain 9: Professionalism

Level two competencies within this domain include participation in implementing policies to improve professional practice and outcomes, advocating for nursing's professional responsibility for ensuring optimal care outcomes, analyzation of current policies and practices in the context of ethical framework, and leading the development of opportunities for professional and interprofessional activities (AACN, 2021). The recommendation that the practice site provide education to all providers regarding any changes or new order sets or protocols aligned with AACN's (2021) recommendation to implement policies to improve professional practice and outcomes. Inclusion of APPs within the project and their positive

response to the intervention demonstrates nursing's professional responsibility for ensuring optimal care outcomes. By analyzing the evidence surrounding the use of PHB in the management of AWS and the results of this project, it appeared that treating patients with PHB is an ethically appropriate practice. Lastly, this project demonstrated an opportunity for professional and interprofessional activities as led by an advanced-practice nurse.

Domain 10: Personal, Professional, and Leadership Development

Level two competencies within this domain included commitment to personal health and well-being, fostering activities that supported a culture of lifelong learning, and advocating for the nursing profession in a manner that was consistent, positive, and relative (AACN, 2021). While completing this scholarly project and DNP course work, the primary researcher practiced self-wellness habits such as mindfulness and exercise. Participation in a Doctor of Nursing practice program as well as the delivery of an evidence based educational intervention regarding the use of PHB in AWS to APPs and physicians displayed an effort to support lifelong learning. Recognition of a lack of literature surrounding APP practice trends, inclusion of APPs in the scholarly project, and recommendations that future research include practice trends of APPs were an effort to advocate for the nursing profession in a consistent and positive manner.

Summary

Phenobarbital is a safe and effective pharmacological agent in the treatment of AWS, especially among those experiencing moderate to severe symptoms. Literature regarding provider practice preferences in the pharmacological management of AWS is limited to physicians with evidence of knowledge deficits regarding the use of PHB. The KAP model suggested that delivery of evidence-based information about a clinical practice could influence provider knowledge, attitudes, and practice behavior. The delivery of an evidence-based

educational intervention as measured by the CPD-Reaction Questionnaire was found to impact APP and physician knowledge, attitudes, and intention to change practice within a trauma step down unit at a regional level-one trauma center. Based on these findings and the existing limited research regarding APP practice trends in the use of PHB, the primary researcher recommends an organized educational intervention regarding any future changes to existing order sets/protocols or adoption of new ones as well as the inclusion of APPs in future research projects aimed at evaluating practice trends. Finally, the 10 domains and multiple advanced (level) two competencies outlined within the AACN *Essentials* (2021) were reflected throughout this scholarly project, representing a culmination of advanced practice nursing scholarship.

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APPENDIX A

PHENOBARBITAL ORDER SET

Phenobarbital for Alcohol Withdrawal Syndrome

Description

- Management of alcohol withdrawal syndrome (AWS) utilizing phenobarbital in adult critically ill patients
- **Note: Discontinue all benzodiazepine orders prior to initiation of phenobarbital**

Included Patients

Adults with **medium or high risk of AWS** admitted to critical care areas

- Medium Risk: Active alcohol use disorder plus TWO or more of the following:
    - 2 or more days since last drink
    - Positive blood alcohol level on admit
    - Autonomic dysfunction with blood alcohol level >100 mg/dL
    - Elevated MCV and/or AST:ALT ratio
    - History of significant alcohol use
    - Age > 35
    - Burn-related injuries
    - Long bone fractures

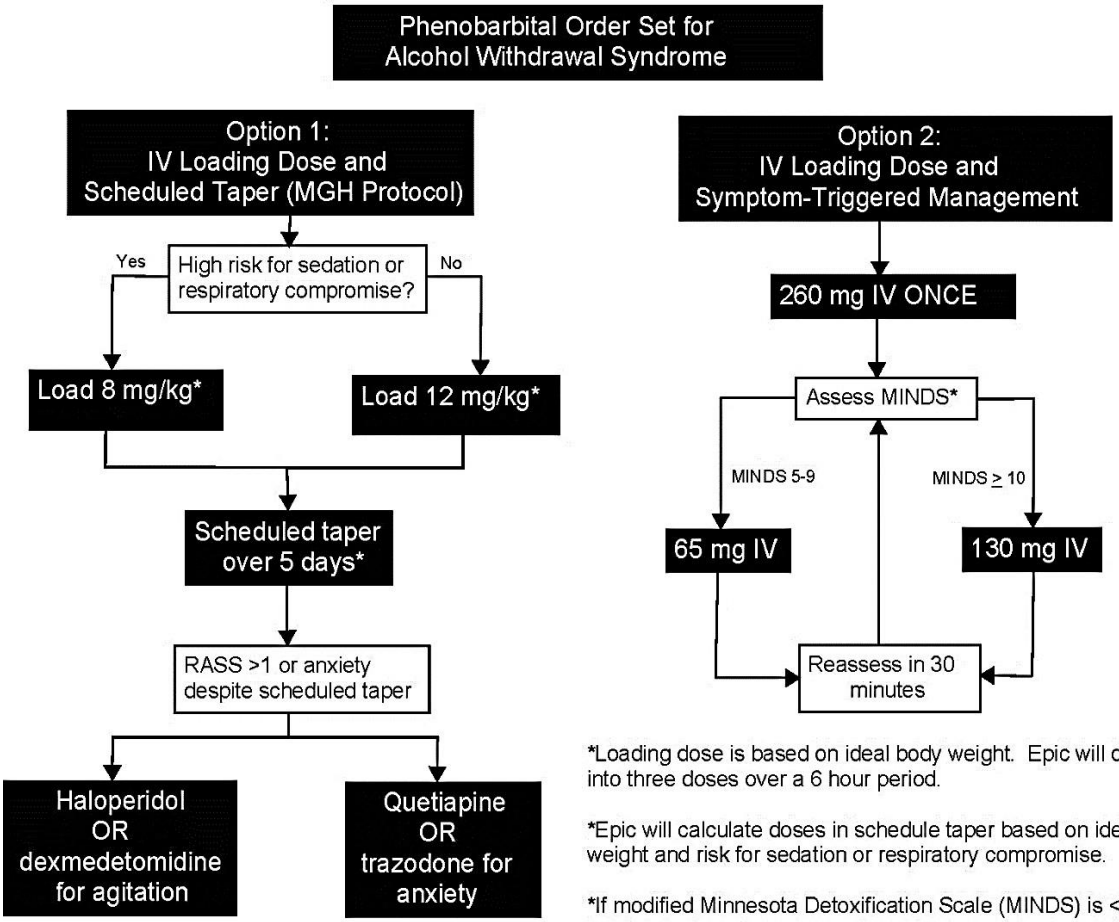
  High Risk: History of alcohol withdrawal delirium and/or alcohol withdrawal seizures AND
    - Recent alcohol use (>2 weeks in duration) OR
    - Active symptoms of AWS OR
    - Recent alcohol use, positive blood alcohol level, elevated MCV, elevated AST:ALT ratio

Requirements

- Discontinue all benzodiazepine orders prior to initiation
- Patient height must be documented in medical record prior to ordering to ensure ideal body weight is used as dosing weight
- Determine if patient is at high risk for sedation or respiratory compromise which may necessitate dose adjustments per algorithm
    - Age > 65 years old
    - Hepatic dysfunction
    - Narcotic use
    - Head injury
    - Recent administration of benzodiazepines
    - Current administration of sedatives
    - Pneumonia
    - Rib fractures
    - Chest tube(s)
    - Pulmonary contusions
    - C-collar/brace

  Upon patient transfer out of critical care area:
    - Consider discontinuing phenobarbital taper early if patient rapidly improves
    - Any remaining phenobarbital orders should be discontinued prior to discharge

Phenobarbital for Alcohol Withdrawal Syndrome



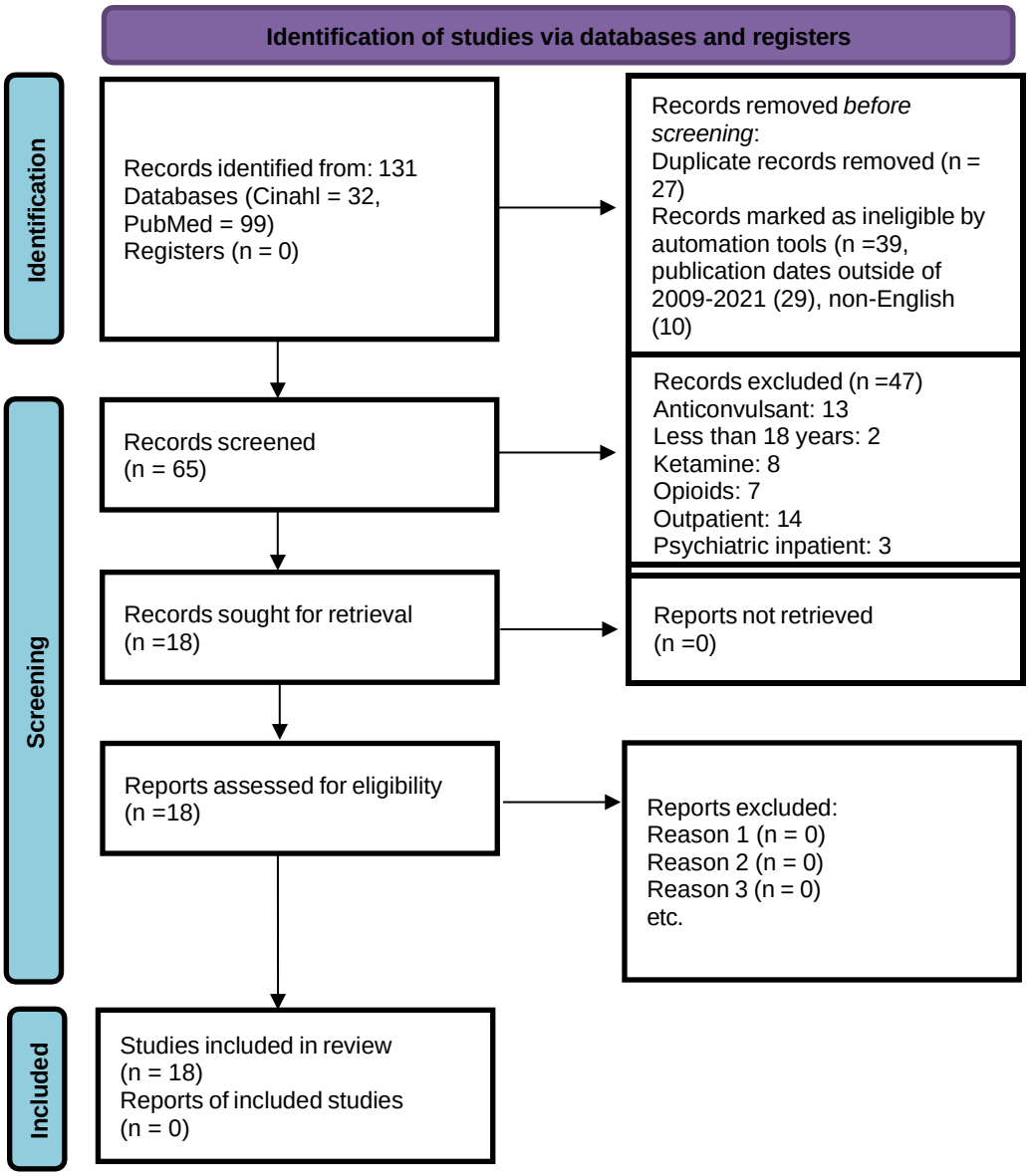
*Loading dose is based on ideal body weight. Epic will divide load into three doses over a 6 hour period.

*Epic will calculate doses in schedule taper based on ideal body weight and risk for sedation or respiratory compromise.

*If modified Minnesota Detoxification Scale (MINDS) is <5, administration of medication is not indicated. If MINDS is <5 on two consecutive occurrences then frequency of reassessment can be extended with provider discretion.

APPENDIX B

PREFERRED REPORTING ITEMS FOR SYSTEMATIC REVIEWS AND META-ANALYSES DIAGRAM


Identification of studies via databases and registers
Identification
Records identified from: 131
Databases (Cinahl = 32,
PubMed = 99)
Registers (n = 0)
Records removed *before screening*:
Duplicate records removed (n = 27)
Records marked as ineligible by automation tools (n =39, publication dates outside of 2009-2021 (29), non-English (10)
Screening
Records screened
(n = 65)
Records excluded (n =47)
Anticonvulsant: 13
Less than 18 years: 2
Ketamine: 8
Opioids: 7
Outpatient: 14
Psychiatric inpatient: 3
Records sought for retrieval
(n =18)
Reports not retrieved
(n =0)
Reports assessed for eligibility
(n =18)
Reports excluded:
Reason 1 (n = 0)
Reason 2 (n = 0)
Reason 3 (n = 0)
etc.
Included
Studies included in review
(n = 18)
Reports of included studies
(n = 0)

APPENDIX C

TABLE OF EVIDENCE

Table C.1

Table of Evidence

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Ammar et al., 2021	Explore use of Phenobarbital (PHB) monotherapy for AWS within the surgical-trauma ICU	Retrospective case series Level: IV: No theory/ framework identified	Setting: Large academic tertiary center in surgical/trauma ICU from 8/1/18 thru 3/1/20. Sample: ≥18 years of age, admitted to the STICU & given PHB monotherapy for prevention of worsening AWS symptoms. Outcomes Primary: failure of PHB to prevent worsening of AWS Secondary: ICU & hospital days (LOS)	Interventions: PHB dosing based on ideal body weight and moderate vs. high-risk AWS plus taper Instruments: CIWA-Ar & RASS Reliability & validity: not reported	Results: Zero AWS related complications such as seizures & hallucinations. Zero mortality, zero respiratory depression (LOS): Hospital 6 (4-15) days ICU LOS 2 (1-4) days ICU mortality 0 RASS scores: 6 hours post-PHB Compare RASS scores with positive result post- admin PHB	While this a small study, it demonstrates efficacy in the use of Phenobarbital in preventing worsening AWS and safety in regard to sedation & ventilation needs.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Buell et al., 2020	Evaluate physician treatment practices for severe AWS and use of IV PHB for severe AWS	Multidisciplinary cross-sectional survey Level: VI No theory/framework identified	Setting: 2 large academic centers over 6 month period Sample: N = 105 self- administered questionnaires N = 105 physicians Male = 64; female = 39 Outcomes: Rate of treating severe and non-severe AWS Rate of using PHB for severe AWS	Questionnaire with 4 domains: experience with AWS, attitudes toward and beliefs about treatment, safety, and knowledge about treatments. Reliability & validity: pilot tested but no other information	Mean (SD) number of patients managed with severe AWS 6.8 Number managed with AWS 31.6 Does not use PHB 63.1%; Uses at ICU admission 7.6%; use if AWS refractory to BZD 21.9%. Knowledge Unaware of time to peak onset 38% systematic review 5%; Unfamiliar with PHB contraindications of use: 43%; Fear of respiratory depression 49%	Several cohort and RCT's have demonstrated safety and efficacy for severe and non-severe AWS. Since BZD's have been the mainstay of treatment for AWS, the evaluation of practitioner knowledge about PHB & treatment preferences of AWS may help identify a need for advance practice provider education.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Fujimoto et al., 2017	Teaching and learning activity	Case presentation Level: VII No theory/framework identified	37-year-old male with history of chronic ETOH use admitted with BZD refractory AWS who was transferred to ICU and received PHB.	Admission to general medical unit with BZD-based protocol for AWS followed by transfer to ICU with loading dose of IV PHB on day 4 of admission after escalating doses of BZD were ineffective in managing AWS followed by taper.	AWS symptoms improved with administration of PHB without need for any further BZD's or mechanical ventilation. No adverse outcomes were identified and the patient was discharged to home upon completing PHB taper.	Escalating BZD doses can result in a need for ICU transfer, mechanical ventilation and/or over sedation which can lead to adverse events. Use of PHB may help improve AWS symptoms and avoid adverse outcomes.
Hammond et al., 2017	Evaluate outcomes with PHB for AWS with or without BZDs	Systematic Review Level: I No theory/framework identified	Setting: 4 controlled trials; 5 observational studies, 5 (PHB monotherapy) & 4 (BZD + PHB). Sample: N = 720 Outcomes: ICU admission, mechanical ventilation, continuous BZD, prn BZD or PHB use Duration of ICU, hospital, ED admission Severity if AWS symptoms	Escalating doses of BZD + PHB or PHB monotherapy based upon AWS protocol. Tools: RASS & CIWA-Ar scores.	Use of PHB + BZD resulted in a significant decrease ICU LOS & mechanical ventilation. PHB reduced the need for ICU admission from ER PHB (either oral or IV) is effective in management of AWS	Use of PHB in those with severe AWS may help reduce LOS and need for mechanical ventilation.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Hawa et al., 2021	Compare hospital LOS for AWS using PHB vs. BZD AWS protocol	Retrospective cohort study Level: IV No theory/framework identified	Setting: 3 hospitals (within 1 healthcare system) from 3/2016 to 3/2018 in general medical units. Sample: age 18-100 years with AWS or alcohol intoxication Outcomes: Primary: LOS Secondary: 30-day readmission, 30-day ED visit after discharge, ICU transfer during initial hospitalization.	Lorazepam & PHB based protocol using CIWA scores	LOS: BZD group: 3.664 days PHB group: 2.805 days $P < 0.001$. Secondary outcomes revealed no statistical significance	PHB could lead to a reduction in LOS and therefore lower healthcare costs and prevent adverse events for patients.
Hayner et al., 2009	Demonstrate utility in PHB for BZD refractory AWS	Case Report Level: VII No theory/framework identified	Setting: hospital (ED to ICU) Sample: 28-year-old Hispanic man with history of alcohol abuse who presented with delirium tremens, ETOH level 320 mg/dl	Scheduled PHB	Within 24 hours of initiation of PHB regimen the BZD and all other adjuncts were able to be weaned safely without the need for mechanical ventilation.	Use of PHB in those with refractory BZD AWS may help improve symptoms of AWS and avoid adverse events such as mechanical ventilation.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Hendey et al., 2011	Compare PHB vs. LZ in AWS in the ED and at 48 hours	Prospective, randomized trial Level: II No theory/framework identified	Setting: University Medical Center, Fresno, CA. Sample: adults ≥ 18 years presenting to ED with known or suspected AWS N = 44. Outcomes: change in AW scores from baseline ED to discharge or baseline ED to admission.	Instruments: RASS & CIWA-Ar Interventions: PHB (25) vs. LZ (19) administration Instruments: CIWA-Ar scores (baseline, q30minutes, and at admission or discharge from ED).	PHB decreased CIWA score from baseline to ED d/c ($P < 0.0001$). no difference between groups. PHB & LZ were found to effective in lowering CIWA scores.	PHB can effective pharmacological agent in the management of AWS.
Ibarra, 2020	Evaluate outcomes between single-dose PHB on hospital day 1 vs. no PHB	Retrospective Chart Review Level IV No Theory/framework identified	Setting: Academic Medical Center, Fresno, CA. from Sept 2015 to December 2017. Sample: patients presented to ED with AWS, ≥ 18 years, N=78 Outcomes: Primary: Measure total daily lorazepam dose (milligrams). Secondary: rate of intubation, seizures, DT's, disposition.	Instruments: none identified Interventions: Group 1: single-dose PHB on day 1 of hospitalization plus lorazepam dosing per AWS protocol Group 2: lorazepam dosing per AWS protocol only	Significance ($P<0.05$) PHB group d/c within 3 days from ED compared to lorazepam group. No other significance in outcomes among groups.	PHB with BZD may lead to quicker discharge from admission.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Martin & Katz, 2016	Systematic review of literature pertaining to use of barbiturates in AWS	Systematic Review Level: I No theory/framework identified	15 articles. 1 case study, 3 protocols, 3 retrospective chart reviews, 1 retrospective cohort study, 1 uncontrolled study, 1 controlled study, 5 randomized controlled studies. Setting: inpatient setting (ICU, ED, general medical floors, psychiatric) Sample: patients at risk for or experiencing AWS Outcomes: LOS, mortality, adverse events such as pneumonia and respiratory depression, difference in CIWA scores.	- PHB monotherapy - PHB (+) BZD for AWS	PHB may be beneficial in BZD resistant AWS. Use of PHB with BZD can reduce need for mechanical ventilation.	PHB should be considered for AWS especially in those who are refractory to escalating BZD doses.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Mo et al., 2016	Review of the use of barbiturates in the management of AWS	Systematic Review Level: I No theory/framework identified	4 prospective controlled and 3 retrospective trials, (7 total). Databases: MEDLINE, EMBASE, Cochrane Library, Years: 1946-2015, Exclusions: case reports & series. **Outcomes:** Primary: total doses of barbiturates and BZD, length of delirium, rate of seizures, cardiopulmonary complications. Secondary: ICU and hospital LOS	Tools: CIWA Interventions: - PHB dosing - BZD dosing - PHB + BZD dosing	Safety & efficacy of PHB were equal to BZD. Many studies supported PHB alone or with BZD in treatment of severe AWS. PHB may be better choice for DT's.	Use of PHB and BZD have same efficacy in treatment of AWS.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Mo et al., 2018	Evaluate current practices in management of AWS in inpatient settings	Survey questionnaire Level: VII No theory/framework identified	Setting: Hospitals with 100 beds or more within the states of CT, MA, MN, NH, NJ, NY, PA, RI, VT Sample: 90 surveys received from hospitals n = 90, questionnaires completed by clinical pharmacists (50%) and pharmacy directors (45%). Outcomes: Treatment of AWS, protocol vs. non protocol, types of drugs used for AWS	Survey questionnaire, questionnaire not listed No reliability, validity reported	Most commonly used tools included CIWA, RASS & MINDS - 72% of hospitals had protocols for AWS -74% used BZD-based protocol for mild & moderate AWS - 74% used BZD plus non-BZD meds for severe AWS -78% used non-BZD meds for BZD refractory AWS - 53 hospitals used PHB as first-line agent for non-BZD management of AWS	PHB appears to be a common option for non-BZD based AWS management, particularly in BZD-refractory AWS

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Nejad, et al., 2020	Review effectiveness of Phenobarbital for alcohol withdrawal management among the surgical trauma population.	Retrospective Chart Review Level: IV No theory/framework identified	Setting: Single medical center Sample: adult (≥ 18 years of age) patients admitted with acute surgical trauma who received pharmacologic management (PHB and /or BZD for AWS between July 2007 and July 2011. n = 85 Outcomes: Primary: development of AWS (uncomplicated vs. complicated). Secondary: hospital LOS, mortality, medication events.	Intervention: Benzodiazepine based protocol and Phenobarbital based protocol for management of AWS Instruments: none identified	Development AWD among PHB n = 0, BZD n = 25 (p = 0.0001) Uncomplicated AWS PHB n = 0, BZD n=38 (p = 0.0001). Medication adverse events PHB n = 0, BZD n = 10 (p = 0.006). no significant difference in LOS, mortality, ICU admission, or seizures.	PHB appears to be an effective pharmacological agent in the management of AWS when compared to BZD protocol.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Nelson et al., 2019	Review effectiveness of three different alcohol withdrawal protocols during three time periods.	Retrospective Observational Cohort Level: IV No theory/framework identified	Setting: Single medical center Sample: ER patients with diagnosis AWS (≥ 18years), April 1, 2016 to January 31, 2018. n = 300 (convenience sample 100/time period of each protocol). Outcomes: Primary: rate of ED to ICU admissions Secondary: rate of mechanical ventilation, LOS, LOS of ICU, total dose BZD, total dose PHB, protocol violations.	Intervention: ED Alcohol Withdrawal SEWS protocol (symptoms-triggered treatment). 3 different protocols were included: 1. IV diazepam alone, 2. IV lorazepam & IV PHB, 3. IV PHB alone Instruments: SEWS protocol, no validity or reliability reported.	No difference in severity of AWS or rate of ICU admissions & mechanical ventilation among groups. Phenobarbital is safe & effective in ED for AWS. Use of PHB monotherapy led showed similar rates of ICU admissions, LOS, and need for mechanical ventilation among groups.	Use of PHB monotherapy appears at least as effective as BZD and can be used for AWS.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Nisavic et al., 2019	Compare safety & effectiveness of PHB to BZD in AWS	Retrospective review/comparison Level: IV No theory/framework identified	Setting: Massachusetts hospital Sample: Adults (≥ 18 years), admitted & treated with PHB or BZD for AWS between July 2007and July 2011. BZD group (n= 419), PHB group (n = 143) Outcomes: Primary: development of AWS related complications after initiation of PHB or BZD. complications included seizures, hallucinations/deliriu m and ICU admission. Secondary: LOS, ICU LOS, AMA, mortality, medication-adverse events.	Instruments: RASS Interventions: BZD dosing protocol or PHB dosing protocol	PHB group had higher history of AWS and seizure history related to AWS ($p < 0.001$). No significant difference between outcomes among groups.	PHB group had a higher rate of history of AWS And seizures related to AWS, PHB has been shown to be effective without adverse events in those who are BZD-resistant. PHB may be a better option for those with a history of severe AWS

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Oks, et al., 2020	Evaluate the safety & utility of PHB to treat severe AWS in MICU	Retrospective observational study Level: IV No theory/framework identified	Setting: Medical ICU of a single tertiary care hospital in New York from 2011 - 2015. Sample: MICU patients with CIWA-Ar scores ≥ 15 who received Phenobarbital for AWS. N = 81, male = 79, female =2, Initial mean CIWA-Ar score 19(9,SD) Outcomes measured: RASS of 0 to -1 was defined efficacy of PHB for treatment of AWS. PHB dose administered, duration of PHB (days), mechanical ventilation rates & reasons for mechanical ventilation	Interventions: Regular dosing of PHB q15 mins until (IV), until RASS score of 0 to -1 achieved. Instruments: CIWA-Ar & RASS Reliability & validity: not addressed	-PHB can be used to treat severe AWS (CIWA-Ar ≥ 15) -(19.8%) required mechanical ventilator support -Mean PHB dose 1978 (1532) (SD), Mean PHB dose given who required mechanical ventilation = 2075 ± 2184 mg/kg and 1954 ± 1344 (P < .9654) who did not require mechanical ventilation. -Mean MICU days was 5. Mean duration of PHB treatment 5.2 ± 2.9 days. 100% success rate AWS in MICU with PHB	BZDs are the gold standard for AWS but this study concludes PHB was used to successfully treat severe AWS. PHB may be a good option in the management of those with severe AWS but this is a small study and further studies should be conducted.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Phan, 2018	Summarize evidence for safety of Phenobarbital in AWS	Literature Review Level: IV No theory/framework identified	Case studies (3), retrospective studies (4), prospective (2), primary literature (4). PubMed search using keywords, "phenobarbital" and " alcohol withdrawal syndrome." Inclusions: PHB monotherapy in AWS, English, non-ICU setting.	PHB protocols with or without BZD dosing	PHB monotherapy in non-severe AWS is tolerated and effective. This review suggests PHB should not be avoided due to safety or adverse events concerns but should be used after a risk vs. benefit evaluation by treating provider.	Successful use of PHB monotherapy in treating AWS provides another option for healthcare providers.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Rosensen, et al., 2013	Evaluate if a single-dose of IV PHB, with concurrent use of BZD-based alcohol protocol decreases the ICU admission rate from ED among AWS patients.	Prospective, randomized, double blind, placebo-controlled study Level: II No theory/framework identified	Setting: Urban ED between January 2009 and March 2010. Sample: ≥ 18 years of age in the ED with suspected AWS N = 102, PHB n = 51, placebo n = 51. Male: PHB 90%, placebo 88%. Initial AWCA score PHB n=6, placebo n=7 Outcomes: Admission level	Symptom-guided lorazepam-based alcohol withdrawal protocol. PHB group received single dose IV PHB @ 10mg/kg in 100 mL NSS). Placebo received single dose IV 100 mL NSS. Both were clear colored and in identical packaging. **Instruments:** AWCA Reliability & validity: not reported	ICU admissions: Phenobarb 8%; Placebo 25%; Floor admissions: Phenobarb 47%; placebo 35% LOS (hours): Phenobarb (76); Placebo (118) ICU LOS (hours): PHB (34); Placebo (94); Intubation: PHB (2%); Placebo (2%) Max AWCA score: PHB (8); Placebo (10); Mortality: 0%	This study reveals a clear difference in ICU admission rates among those treated with a single dose IV PHB and concurrent use of lorazepam as well as a reduction in the amount of BZD used among those who received single-dose PBH. This reduction in BZD dosing, lower AWCA score, and a lower ICU admission rate offers statistical differences and potential benefits to using PHB in managing those with AWS.

Table C.1 Continued

Author/Year	Purpose	Design	Setting, Sample, Outcomes Measured	Interventions/Instruments	Findings	Implications practice DNP
Tidwell, et al., 2018	Compare a symptom-triggered BZD protocol with use of CIAW-AR and a PHB-based protocol for those with AWS.	Retrospective cohort study Level: IV No theory identified	Setting: 43-bed medical intensive care unit (MICU) from January 2016 - June 2017. Private teaching hospital in Nashville, TN. Sample: MICU patients treated for AWS, n=60 in CIWA-Ar group and n=60 in PHB group Mean age: CIWA-Ar group (52); PHB group (45). Outcomes: Primary: Difference of ICU LOS (days) between both groups Secondary: hospital LOS, rate of mechanical ventilation, and use of adjunctive pharmacotherapy	Interventions: CIWA-Ar BZD protocol dosing. PHB loading dose plus 6 dose taper. Instruments: CIWA-Ar, Reliability & validity: not reported.	ICU LOS: CIWA-Ar = 4.4; PHB = 2.4 (P < .001) Hospital LOS: CIWA-Ar = 6.9; PHB = 4.3, (P = .004) Ventilator Use: CIWA-AR = 14; PHB = 1 P = < .001 Use of adjunctive meds: CIWA-AR = 14 PHB = 4 P=.002	This study reveals a significant reduction in ICU & hospital LOS and ventilator use among the PHB protocol group. These findings suggest PHB could be a safer option for managing patients experiencing AWS.

APPENDIX D

GUIDELINE FOR REPORTING EVIDENCE-BASED PRACTICE EDUCATIONAL INTERVENTIONS AND TEACHING CHECKLIST

BRIEF NAME
1. INTERVENTION: Provide a brief description of the educational intervention for all groups involved [e.g. control and comparator(s)].
WHY - this educational process
2. THEORY: Describe the educational theory (ies), concept or approach used in the intervention.
3. LEARNING OBJECTIVES: Describe the learning objectives for all groups involved in the educational intervention.
4. EBP CONTENT: List the foundation steps of EBP (ask, acquire, appraise, apply, assess) included in the educational intervention.
WHAT
5. MATERIALS: Describe the specific educational materials used in the educational intervention. Include materials provided to the learners and those used in the training of educational intervention providers
6. EDUCATIONAL STRATEGIES: Describe the teaching/learning strategies (e.g. tutorials, lectures, online modules) used in the educational intervention.
7. INCENTIVES: Describe any incentives or reimbursements provided to the learners.
WHO PROVIDED
8. INSTRUCTORS: For each instructor(s) involved in the educational intervention describe their professional discipline, teaching experience/expertise. Include any specific training related to the educational intervention provided for the instructor(s).
HOW
9. DELIVERY: Describe the modes of delivery (e.g. face-to-face, internet or independent study package) of the educational intervention. Include whether the intervention was provided individually or in a group and the ratio of learners to instructors.
WHERE
10. ENVIRONMENT: Describe the relevant physical learning spaces (e.g. conference, university lecture theatre, hospital ward, community) where the teaching/learning occurred.
WHEN and HOW MUCH
11. SCHEDULE: Describe the scheduling of the educational intervention including the number of sessions, their frequency, timing and duration.
12. Describe the amount of time learners spent in face to face contact with instructors and any designated time spent in self-directed learning activities.
PLANNED CHANGES
13. Did the educational intervention require specific adaptation for the learners? If yes, please describe the adaptations made for the learner(s) or group(s).

UNPLANNED CHANGES
14. Was the educational intervention modified during the course of the study? If yes, describe the changes (what, why, when, and how).
HOW WELL
15. ATTENDANCE: Describe the learner attendance, including how this was assessed and by whom. Describe any strategies that were used to facilitate attendance.
16. Describe any processes used to determine whether the materials (item 5) and the educational strategies (item 6) used in the educational intervention were delivered as originally planned.
17. Describe the extent to which the number of sessions, their frequency, timing and duration for the educational intervention were delivered as scheduled (item 11).

Note. From "Development and validation of the guideline for reporting evidence-based practice educational interventions and teaching (GREET)" by Phillips et al. (2016), *BMC Medical Education*, *16*(237), p. 27 (https://doi.org/10.1186/s12909-016-0759-1).

APPENDIX E

TRAUMA DIVISION HEAD SITE APPROVAL

Cooper
University Physicians

Department of Surgery
Division of Trauma & Surgical Critical Care

Three Cooper Plaza
Suite 411
Camden, NJ 08103

ph. 856-342-3341
fax 856-342-2817
appt. 856-342-3341

CooperHealth.org

July 20, 2022

To Whom It May Concern,

Kimberly J. Twaddell, DNP candidate, has permission to conduct her scholarly project within the Division of Trauma at Cooper University Hospital. In addition, she has permission to use the Cooper email addresses of the Trauma Advanced Practice Providers and attending Physicians and use a copy or image of the complete Phenobarbital Order Set.

Thank you,

John M. Porter, MD
Director, Center for Trauma Services
Chief, Division of Trauma, Surgical Critical Care and Acute Care Surgery
Trauma Medical Director
Professor of Surgery
Assistant Dean for Clinical Affairs
Cooper Medical School of Rowan University

APPENDIX F

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

Date:	10/07/2022
Principal Investigator:	Kimberly Twaddell
Committee Action:	**IRB EXEMPT DETERMINATION – New Protocol**
Action Date:	10/07/2022
Protocol Number:	2208042320
Protocol Title:	PHB in AWS Exempt IRB Request - Twaddell
Expiration Date:	

The University of Northern Colorado Institutional Review Board has reviewed your protocol and determined your project to be exempt under 45 CFR 46.104(d)(702) for research involving

Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

You may begin conducting your research as outlined in your protocol. Your study does not require further review from the IRB, unless changes need to be made to your approved protocol.

As the Principal Investigator (PI), you are still responsible for contacting the UNC IRB office if and when:

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

- You wish to deviate from the described protocol and would like to formally submit a modification request. Prior IRB approval must be obtained before any changes can be implemented (except to eliminate an immediate hazard to research participants).
- You make changes to the research personnel working on this study (add or drop research staff on this protocol).
- At the end of the study or before you leave The University of Northern Colorado and are no longer a student or employee, to request your protocol be closed. *You cannot continue to reference UNC on any documents (including the informed consent form) or conduct the study under the auspices of UNC if you are no longer a student/employee of this university.
- You have received or have been made aware of any complaints, problems, or adverse events that are related or possibly related to participation in the research.

If you have any questions, please contact the Research Compliance Manager, Nicole Morse, at 970-351-1910 or via e-mail at nicole.morse@unco.edu. Additional information concerning the requirements for the protection of human subjects may be found at the Office of Human Research Protection website - http://hhs.gov/ohrp/ and https://www.unco.edu/research/research-integrity-and-compliance/institutional-review-board/.

Sincerely,

Nicole Morse
Research Compliance Manager

University of Northern Colorado: FWA00000784

APPENDIX G

RECRUITMENT LETTER

Dear Healthcare Provider,

My name is Kimberly Twaddell, and I am a candidate for the Doctor of Nursing Practice (DNP) degree at the University of Northern Colorado School of Nursing. I would like to invite you to participate in a project aimed at evaluating if an educational intervention can impact advanced practice provider (nurse practitioner) and physician knowledge, attitude, and intention to change practice regarding the use of Phenobarbital (PHB) in the management of Acute Alcohol Withdrawal Syndrome (AWS) among the inpatient trauma population. Historically, the management of AWS has included the use of benzodiazepines, but recent research suggests PHB may be superior in reducing length of hospital days and rates of mechanical intubation when compared to benzodiazepines. Due to the recent pandemic, a formal educational intervention about the PHB order set currently available within the trauma division was not implemented.

Therefore, healthcare providers may be unaware of emergent evidence-based practice regarding the use of PHB in the management of AWS.

Should you agree to participate, you will be asked to complete an independent, virtually delivered educational intervention with a pre- and post- intervention questionnaire. The time commitment for participating in this project I estimate to be 25 minutes. Your feedback will be completely anonymous and will only be analyzed with other's responses. Your responses will be kept completely confidential, and your participation is completely voluntary. Participation will not impact your current employment with Cooper University Hospital.

If you have any questions about this project, you may contact me via email at ktwad2152@bears.unco.edu. If you are interested in participating, please respond access the links provided before October 29, 2022. Thank you for your consideration and support of this scholarly project.

Sincerely,
Kimberly Twaddell, DNP Candidate, MSN, ACNP-C, CCRN, TCRN

APPENDIX H

PERMISSION TO USE CONTINUING PROFESSIONAL DEVELOPMENT-REACTION QUESTIONNAIRE

RE: 12-Item Theory Based Instrument: Continuing Professional Development-Reaction Questionniare
France Légaré [redacted]
Fri 5/27/2022 2:53 PM
To:

- Twaddell,Kimberly [redacted]

Cc:

- France Légaré [redacted]
- Sabrina Guay-Belanger [redacted]
- Diane Paquet (CIUSSSCN-2) [redacted]
- Gloria Elodie Dédé Ayivi-Vinz [redacted]
- Felly Kanyinga Bakwa [redacted]

EXTERNAL.

Dear Kimberly
I am pleased that you intend to use the CPD Reaction
Gloria and Felly , cc, have just published a systematic review; see below; I also added a study by L Bergeron recently published
A question of beliefs: factors associated with specialists' intention to adopt new behaviors after taking web-based continuing professional development courses.
Bergeron L, Décary S, Djade CD, Daniel SJ, Tremblay M, Rivest LP, **Légaré F.**JMIR Med Educ. 2022 Apr 26. doi: 10.2196/34299. Online ahead of print.PMID: 35476039 **Free article.**
Use of the CPD-REACTION Questionnaire to Evaluate Continuing Professional Development Activities for Health Professionals: Systematic Review.
Ayivi-Vinz G, Bakwa Kanyinga F, Bergeron L, Décary S, Adisso ÉL, Zomahoun HTV, Daniel SJ, Tremblay M, Plourde KV, Guay-Bélanger S, **Légaré F.**JMIR Med Educ. 2022 May 2;8(2):e36948. doi: 10.2196/36948.PMID: 35318188 **Free PMC article.** Review.

I see no issue with you adding one item; however, as you know, the CPD REACTION is not to be computed as a single total score but rather includes 5 constructs. Each are to be respectful of the target behavior to be studied

Target:
Action:
Context:
Time:
In other words, your proposed item will stand alone as it may not be computable with one of the 5 scores (one per construct)
Please find the user manual attached

More on our work on the tool at: http://www.decision.chaire.fmed.ulaval.ca/recherche-en/5d8a3c8fb4956133050a2bad

Measurement Tool

The lack of a widely accepted instrument to evaluate the impact of CPD on clinical practice makes it almost impossible to compare the efficiency of CPD activities. Using an integrated model to study the behaviour of health professionals, a project on CPD in partnership with knowledge translation has allowed for the development of an all-encompassing, broad based, instrument based on theory, validity, and reliability in order to evaluate the impact of CPD activities on clinical practice. This tool, titled *DPC-Reaction Questionnaire*, is

available in French and English.

- Instrument for Evaluating the Impact of CPD Activities
- User's Manual

Publications

- Légaré F, Borduas F, Jacques A, Laprise R, Voyer G, Boucher A, Luconi F, Rousseau M, Labrecque M, Sargeant J, Grimshaw J, Godin G. Developing a theory-based instrument to assess the impact of continuing professional development activities on clinical practice: a study protocol. Implement Sci. 2011 Mar 7;6:17. doi: 10.1186/1748-5908-6-17.
- Légaré F, Borduas F, MacLeod T, Sketris I, Campbell B, Jacques A. Partnerships for knowledge translation and exchange in the context of continuing professional development. J Contin Educ Health Prof. 2011 Summer;31(3):181-7. doi: 10.1002/chp.20125.
- Légaré F, Borduas F, Freitas A, Jacques A, Godin G, Luconi F, Grimshaw J; CPD-KT team. Development of a simple 12-item theory-based instrument to assess the impact of continuing professional development on clinical behavioral intentions. PLoS One. 2014 Mar 18;9(3):e91013. doi: 10.1371/journal.pone.0091013. eCollection 2014.
- Légaré F, Freitas A, Thompson-Leduc P, Borduas F, Luconi F, Boucher A, Witteman HO, Jacques A. The majority of accredited continuing professional development activities do not target clinical behavior change. Acad Med. 2015 Feb;90(2):197-202. doi: 10.1097/ACM.0000000000000543.
- Légaré F, Freitas A, Turcotte S, Borduas F, Jacques A, Luconi F, Godin G, Boucher A, Sargeant J, Labrecque M. Responsiveness of a simple tool for assessing change in behavioral intention after continuing professional development activities. PLoS One. 2017 May 1;12(5):e0176678. doi: 10.1371/journal.pone.0176678. eCollection 2017.

If you agree, we will add you to our CPD Reaction community of practice

Hope this help
With best regards,

[redacted]

France Légaré, B. Sc. Arch, MD, MSc, PhD, CCMF, FCMF
Tier 1 Canada Research Chair in Shared Decision Making
and Knowledge Translation
http://decision.chaire.fmed.ulaval.ca/

«Deo favente haud pluribus impar»

De : Twaddell,Kimberly [redacted]
Envoyé : 26 mai 2022 19:22
À : France Légaré [redacted]
Objet : 12-Item Theory Based Instrument: Continuing Professional Development-Reaction Questionniare

Dear Dr. Legare,

My name is Kim Twaddell and I am a Doctor of Nursing Practice (DNP) candidate at The University of Northern Colorado in the United States. I am planning to use the CPD-Reaction Questionnaire within my quality

improvement project, which explores the use of Phenobarbital in the management of Alcohol Withdrawal Syndrome among the inpatient population. The purpose of this DNP scholarly project is to evaluate if an evidence-based educational intervention delivered to advanced practice nurses and physicians at a level one trauma center will influence their knowledge, attitude, and intention to use an existing Phenobarbital order set for the management of Alcohol Withdrawal Syndrome (AWS) among the adult inpatient population.

I am writing to seek permission in adding one additional question to the survey which would be, "Since participating in the educational in-service, my knowledge regarding PHB in the management of AWS has changed" with an answer option of "disagree/agree."

Thank you for your time regarding this matter and I hope to hear from you soon. If you have any questions, please feel free to contact me.

Sincerely,

Kimberly J. Twaddell, DNP Candidate, MSN, ACNP-BC

[redacted]

APPENDIX I

MODIFIED CONTINUING PROFESSIONAL DEVELOPMENT-REACTION QUESTIONNAIRE (PRE)

Please answer the following questions **before** completing the educational intervention.

Demographics							
Currently provide patient care in the trauma step down unit (TSDU) at Cooper University Medical Center	Yes	No					
Years of experience as an Advanced Practice Provider (Nurse Practitioner) or physician	Less than 1	1-10	10 or more				
Professional credentials	APP	MD or DO					

Item	Scale						
1. I intend to order the Phenobarbital order set	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
2. To the best of my knowledge, the percent of colleagues who use the Phenobarbital order set is:	0-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5		
3. I am confident that I could order the Phenobarbital order set if I wanted to	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
4. Using a Phenobarbital order set is the ethical thing to do	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
5. For me, ordering a Phenobarbital order set would be	Extremely difficult 1	2	3	4	5	6	Extremely easy 7
6. Now think about a co-worker whom you respect as a professional. In your opinion, does he/she order the Phenobarbital order set?	Never 1	2	3	4	5	6	Always 7
7. I plan to order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
8. Overall, I think that for me ordering the Phenobarbital order set would be	Useless 1	2	3	4	5	6	Useful 7
9. Most people who are important to me in my profession order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
10. It is acceptable to order the Phenobarbital order Set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
11. I have the ability to order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
12. Overall, I think that for me ordering the Phenobarbital order set would be	Harmful 1	2	3	4	5	6	Beneficial 7

APPENDIX J

MODIFIED CONTINUING PROFESSIONAL DEVELOPMENT-REACTION QUESTIONNAIRE (POST)

Please answer the following questions **after** completing the educational intervention.

Item	Scale						
1. I intend to order the Phenobarbital order set	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
2. To the best of my knowledge, the percent of colleagues who use the Phenobarbital order set is:	0-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5		
3. I am confident that I could order the Phenobarbital order set if I wanted to	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
4. Using a Phenobarbital order set is the ethical thing to do	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
5. For me, ordering a Phenobarbital order set would be	Extremely difficult 1	2	3	4	5	6	Extremely easy 7
6. Now think about a co-worker whom you respect as a professional. In your opinion, does he/she order the Phenobarbital order set?	Never 1	2	3	4	5	6	Always 7
7. I plan to order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
8. Overall, I think that for me ordering the Phenobarbital order set would be	Useless 1	2	3	4	5	6	Useful 7
9. Most people who are important to me in my profession order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
10. It is acceptable to order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
11. I have the ability to order the Phenobarbital order set	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7
12. Overall, I think that for me ordering the Phenobarbital order set would be	Harmful 1	2	3	4	5	6	Beneficial 7

13. After participating in this educational in-service my knowledge regarding Phenobarbital in AWS has changed	Strongly disagree (1)	2	3	4	5	6	Strongly agree 7

APPENDIX K

COMPLETED GREET CHECKLIST FOR EDUCATIONAL INTERVENTION

BRIEF NAME: "Use of Phenobarbital in the Management of Alcohol Withdrawal Among the Inpatient Population"

1. INTERVENTION: An educational intervention using an integrated literature review regarding the use of PHB in the management of AWS with introduction and orientation to an existing PHB order set

WHY

2. THEORY: A cognitive learning approach will be used by presenting to an adult audience consisting of professional medical professionals who have an existing knowledge base with at least one year of experience. This approach will build upon their current experience.
3. LEARNING OBJECTIVES: 1) description describe the prevalence, clinical symptoms, and adverse risks of AWS among the adult inpatient population; 2) describe current practice trends and pharmacological pitfalls in the management of AWS among hospitalized patients; 3) provide an overview of current evidence-based research about the pharmacological management of AWS; 4) describe the efficacy and safety of PHB in the management of AWS; 5) review research from Massachusetts's General Hospital and the resulting PHB protocol; and, 6) explain the CUH PHB order set and guidelines for use within the TSDU.
4. EBP CONTENT (foundation steps of EBP):

   Assess: Choosing which pharmacological agent to use in the management of AWS is often at the discretion of the APP or physician caring for the patient. Despite evidence showing the superiority of PHB in the management of AWS, the use of benzodiazepines remains prevalent in clinical practice at the clinical site of focus for

this scholarly project.

Ask: If APPs and physicians are provided current evidence-based research regarding the use of PHB in the management of AWS, can it influence their knowledge, attitudes, and intention to change practice?

Acquire: A search strategy included literature comparing the use of PHB and BZD in the management of acute AWS among the adult inpatient population. The search yielded 131 articles and after exclusion criteria were applied and duplicates removed, 18 articles met the inclusion criteria. Additionally, the Cooper University Healthcare PHB order set and Massachusetts General Hospital PHB protocol were acquired.

Appraise: Findings from the search of the literature included systematic reviews, prospective randomized trials, retrospective cohort studies, literature review, retrospective case series, case presentation, non-experimental studies, retrospective chart reviews, and a multidisciplinary cross-sectional study.

Apply: Provide a brief overview of AWS symptomology and the history of management. Introduced current evidence-based research based upon the literature results comparing the use of PHB and BZD in the management of AWS among the adult inpatient population, the MGH PHB protocol, and the CUH PHB order set.

WHAT

5. MATERIALS: Power Point presentation with use of tables, photos, and PHB order set for use within the TSDU as well as a computer with camera, microphone, and Zoom software capabilities.
6. EDUCATIONAL STRATEGIES: Recorded lecture with Power Point presentation.

7. INCENTIVES: No incentives other than a potential gain in knowledge regarding PHB use in AWS was provided to participants.

WHO PROVIDED

8. INSTRUCTORS: The instructor of the educational intervention was the primary investigator of this scholarly project. The investigator is an advanced practice provider for the trauma department at the project site and a non-supervisory colleague of the participants.

HOW

9. DELIVERY: Self-paced, individual, pre-recorded, asynchronous, virtually delivered Power Point presentation delivered using Zoom technology.

WHERE

10. ENVIRONMENT: Asynchronous, pre-recorded, and virtually delivered. Participants could complete the intervention in either a work or home setting via a smart phone or computer with speaker capability. Remote access to their work email (which is how the intervention and surveys were distributed) is permitted for employees at Cooper University Healthcare

WHEN AND HOW MUCH

11. SCHEDULE: Self-paced and asynchronous with viewing of one recording totaling 22 minutes, 45 seconds.
12. No face-to-face contact with instructors with total of 22 minutes, 45 seconds in self-directed learning activity.

PLANNED CHANGES

13. No specific adaptation for learners was required.

UNPLANNED CHANGES

14. No modifications were made during the delivery of the educational intervention.

HOW WELL

15. ATTENDANCE: There were a total of 14 participants out of a total of 25 identified potential participants. Overall, the response rate for this intervention was average (56%).
16. Anticipated materials (item 5) and educational strategies (item 6) were delivered as originally planned.
17. The session was delivered as outlined in item 11.