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The Impact of Early Screening for Severe Alcohol Withdrawal Syndrome on Delirium Tremens and Hospital Length of Stay

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The Impact of Early Screening for Severe Alcohol Withdrawal Syndrome on Delirium

Tremens and Hospital Length of Stay

A DNP Project

Presented to the Faculty of the

Department of Health Sciences

West Chester University

West Chester, Pennsylvania

In Partial Fulfillment of the Requirements for

the Degree of

Doctor of Nursing Practice

By

Erin Lopes

April, 2024

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Dedication

This work is dedicated to the courageous team of nurses and direct care clinical staff in Bryn Mawr Hospital Emergency Department. Their commitment to providing high quality, safe and accessible patient care positively impacts not only their patients, but the broader population of all those touched by their passion to work in healthcare. They make our community a better, safer place for everyone.

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Abstract

Alcohol use disorder (AUD) is a prevalent condition and is a leading cause of death for adults aged 20 to 64 (Esser et al., 2022). Patients with AUD who present to acute care hospitals seeking medical treatment are at risk for alcohol withdrawal. Undertreated alcohol withdrawal can progress to delirium tremens, which can result in increased transfers to ICU level of care, increased need for sedative medications, and has been shown to prolong hospital length of stay. Early screening with the validated Predictors of Alcohol Withdrawal Severity Scale (PAWSS) tool has been shown to be both reliable and effective for identifying patients at risk for developing severe alcohol withdrawal syndrome (Maldonado et al., 2015). Therefore, this quality improvement project evaluated the impact of early screening for severe alcohol withdrawal on patient centered outcomes including delirium tremens and hospital length of stay. The quality improvement project utilized a retrospective chart review design. The population included adults aged 18 and older who were medically admitted to a large urban hospital with crisis services embedded in the ED. There were no statistically significant differences in demographic variables between the control and intervention groups with the exception of two co-morbidities, hypertension ($p = 0.007$) and mood disorder ($p = 0.002$). Early screening using the PAWSS tool in the ED was shown to reduce average hospital LOS from 5.3 days to 3.8 days. The difference between median hospital LOS in days between the control (4.5) and intervention group (3) was statistically significant ($p = 0.042$).

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Chapter 1

Introduction and Background

Alcohol use disorder is a prevalent condition that contributes to 178,000 premature deaths annually (488 deaths daily) in the United States (Centers for Disease Control and Prevention, 2024). Alcohol use disorder prevalence has increased over the last decade and is now a leading cause of death for adults aged 20 to 64 (Esser et al., 2022). Surveillance through the National Institute on Alcohol Abuse and Alcoholism estimated the prevalence of alcohol use disorder at 10.8% of the population aged 12 and older in the United States (National Institute on Alcohol Abuse and Alcoholism, 2023).

Background

The U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion established national health goals for the decade 2020 to 2030. Healthy People 2030, identifies effective treatment for alcohol use disorder as an area of focus for interventions to reduce morbidity and mortality. One of the goals specified in Healthy People 2030 is to reduce the proportion of people who had Alcohol Use Disorder (AUD) in the past year (Healthy People, n.d.). Currently, enrollment in a residential or outpatient drug and alcohol treatment program is the recommended treatment for AUD (Carvalho et al., 2019). One of the specific objectives of Healthy People 2030 is to increase enrollment in drug and alcohol treatment programs to reduce AUD prevalence (Healthy People, n.d.).

Local Impact of Alcohol Use Disorder

The state of Pennsylvania maintains alcohol use-related surveillance data through its Department of Drug and Alcohol Programs Data Dashboards (Data Dashboards, n.d.). Information regarding alcohol consumption, as well as related illness and legal consequences,

is reported at both the state and county level. Pennsylvania surveillance of alcohol use disorder tracks trends in binge and chronic drinking for adults aged 18 and older. In the years 2019-2021, the prevalence of binge drinking impacted 16% of the adult population. Chronic drinking impacted roughly 7% of the adult population. The state tracked alcohol associated morbidity of alcohol related liver disease which was estimated to impact 3.7% of the adult population in Pennsylvania in 2019. Additionally, the state tracks the number of alcohol related motor vehicle collisions which accounted for roughly 10,000 accidents in 2019.

Montgomery County is one of the largest and most densely populated counties in Pennsylvania. Montgomery County had one of the highest prevalences of alcohol use disorder in the state, with binge and chronic drinking estimated to impact roughly 20% of the population between the years 2017 and 2019 (Data Dashboards, n.d.). The pilot hospital for this project is part of a multihospital health system in Montgomery County, Pennsylvania and is associated with crisis services within the ED. In 2022, there were 73,959 patient admissions to the pilot hospital. Of those admissions, 1,292 were admissions for alcohol abuse. (Saini et al., 2021)

Morbidity Associated with Chronic Alcohol Use Disorder

Under treated alcohol withdrawal may contribute to increased risk for delirium tremens, seizure and progress to potentially life-threatening severe alcohol withdrawal syndrome (Goodson et al., 2014). Despite the high morbidity and mortality, alcohol use disorder is a largely undertreated condition (Carvalho et al., 2019). Thus, the progression of alcohol addiction can lead to hospitalization for medically managed detox for alcohol withdrawal. An important component of the medical management of patients admitted for alcohol withdrawal is to connect these patients to drug and alcohol treatment programs in the

community. However, failure to recognize patients at risk for severe alcohol withdrawal can contribute to delays in treatment with medications such as benzodiazepines (Day & Daly, 2021).

Treatment delays for patients at risk for severe alcohol withdrawal syndrome (SAWS) have been associated with worse health outcomes, including delirium tremens, ICU transfer and prolonged hospitalizations (Lappin et al., 2018). Patients who develop delirium tremens may require intubation and have longer hospitalizations. Prolonged hospitalization is more likely to contribute to physical debility which can be a barrier to transfer to a residential drug and alcohol rehab program (Day & Daly, 2021).

Economic Impact of Alcohol Use Disorder

The Centers for Disease Control and Prevention (CDC) recognize the significant economic impact of alcohol use disorder. In 2019, the CDC estimated that the cost of excessive alcohol use to healthcare in the United States was 28 billion dollars annually. When combined with revenue loss associated with alcohol associated arrests, motor vehicle collisions and lost wages due to missed work, the annual cost to the economy was estimated to be 249 billion dollars (CDC, 2019). Alcohol abuse has been shown to pose the highest cost burden to U.S. hospitals when compared to other types of substance abuse disorders. A study that evaluated a large hospital admission and cost of service database determined that alcohol use disorders contributed to the highest cost burden to U.S. hospitals in 2017, more than any other substance use disorder (Peterson et al., 2021).

Significance

Early screening for SAWS has the potential to improve patient centered outcomes for medically admitted patients. Early treatment of alcohol withdrawal has been associated with

decreased risk of delirium tremens, ICU transfers and improved patient centered outcomes. Reducing hospital LOS and ICU transfers can offer significant cost savings to the healthcare organization (KFF, 2022). Finally, decreased hospital LOS has been associated with better clinical outcomes and an increased likelihood of patients seeking treatment in a residential or outpatient drug and alcohol treatment program (Pace et al., 2018).

Clinical Question and Project Goals

Early screening can reduce morbidity and mortality associated with SAWS and can facilitate earlier transfers to drug and alcohol rehab programs (Maldonado et al., 2015). A quality improvement (QI) project that addresses the impact of early screening on outcomes such as hospital length of stay, ICU transfer and delirium tremens can provide a rationale for a practice change that includes screening every patient with AUD in the emergency department setting. Utilizing a validated screening tool to identify patients at risk for severe alcohol withdrawal syndrome in the emergency department setting triggers early treatment intervention and reduces lengthy hospitalizations (Maldonado et al., 2015). One goal is to reduce hospital LOS. Another goal is to reduce the number of patients who develop delirium tremens and require ICU transfer and use of sedative medication such as dexmedetomidine (Precedex). This QI project will utilize Lewin's Change Theory to answer the clinical question, "Does early screening for severe alcohol withdrawal syndrome improve clinical outcomes for patients with alcohol use disorder who are medically admitted?"

Summary of Chapter

In summary, early screening using the PAWSS tool in the emergency department has identified those patients at risk for the most serious outcomes of severe alcohol withdrawal and can prompt initiation of early treatment. This QI project examined the impact

of early screening for severe alcohol withdrawal on relevant outcomes such as hospital length of stay, ICU transfers, delirium tremens and use of the sedative medication Precedex. Early intervention can lead to improved clinical outcomes and thus is consistent with Healthy People 2030 goals (Healthy People, n.d.).

Chapter 2

Literature Review

Alcohol use disorder is a prevalent condition contributing to 488 premature deaths daily in the United States (Centers for Disease Control, 2024). Abrupt cessation of alcohol for medically ill patients admitted to acute care hospitals can result in alcohol withdrawal syndrome. Under treated alcohol withdrawal may contribute to increased risk for delirium tremens, seizure and development of potentially life-threatening severe alcohol withdrawal syndrome (Goodson et al., 2014). The primary question associated with the following literature search examined whether early screening to assess alcohol use disorder history, the risk for delirium tremens and autonomic instability can assist early identification of patients at risk for developing severe alcohol withdrawal syndrome (SAWS). The clinical relevance is that early identification of patients at risk for SAWS can facilitate early treatment and improve patient outcomes.

Key Terms and Definitions

The Centers for Disease Control and Prevention’s definition of alcohol use disorder and alcohol withdrawal were used for the purposes of this project ([CDC, 2019](#)). Severe alcohol withdrawal syndrome (SAWS) is defined as the presence of alcohol withdrawal seizure and, or the presence of delirium tremens (Gover & Ghosh, 2018; Laswi et al., 2022).

Literature Search

A search of the PubMed database for alcohol withdrawal screening tools used the terms “screen” and “alcohol” and “withdrawal” and “tool” yielded 98 results. The PubMed search was narrowed to include the terms “PAWSS” and “alcohol,” and this yielded four results including two studies that validated the Predictors of Alcohol Withdrawal Severity Screening

(PAWSS) tool. The CINAHL database search using the terms “alcohol” and “withdrawal” and “early screening” and “hospital length of stay” yielded 40 results. When filtering for the past five years, 24 results remained. The CINAHL database was searched for the terms “early” and “management” and “alcohol withdrawal” and “hospital length of stay” which yielded 19 results. When filtered for the last five years, nine results remained.

An additional search about the clinical management of alcohol withdrawal was included. A PubMed database search for the terms “front loading” and “alcohol” and “withdrawal” yielded 153 results. When filtered for the past five years, 93 results remained. Studies that specifically evaluated evidence-based clinical strategies for early treatment of alcohol withdrawal were included as the purpose of early screening is to identify patients at risk for severe alcohol withdrawal syndrome and initiate treatment early in the hospital stay. Studies published greater than five years from the date of the search were excluded from the review except for relevant meta-analyses that provided information and insight not identified in more recent studies. Studies that did not address predictors of severe alcohol withdrawal syndrome were also excluded. Citations for clinical commentary or expert opinion were excluded. Individual case studies, case reports or case series were excluded.

Clinical Markers Associated with Severe Alcohol Withdrawal Syndrome

An effective screening tool for early identification of patients at risk for developing severe alcohol withdrawal should capture relevant clinical markers and patient history. A noted concern with tools that rely solely on subjective history is that patients often underreport symptoms of alcohol withdrawal (Wood et al., 2019). Clinical markers including blood pressure, heart rate, elevated GGT, elevated AST, elevated ALT, hypokalemia and low platelets, and a history of seizure and delirium tremens have been demonstrated to be

associated with SAWS. Eight independent predictors of severe alcohol withdrawal were identified including a history of seizure, elevated serum bilirubin, elevated serum AST, tachycardia, and hypokalemia. In particular, low platelet count and hypokalemia are two clinical markers that have been strongly associated with increased risk for developing SAWS (Benson et al., 2019; Goodson et al., 2014). Of interest, comorbidities of alcohol dependence such as cirrhosis and pancreatitis, are not predictive of SAWS (Benson et al., 2019).

Screening tools that rely more heavily on objective data have been recommended for identifying patients at risk for severe alcohol withdrawal (Mahabir et al., 2020). Screening tools that assessed for the objective clinical markers described above and that could be implemented early in a hospital admission have also been recommended (Wood et al., 2018).

Predictors of Alcohol Withdrawal Severity Screening Tools

Patients who develop severe alcohol withdrawal are at risk for rapid clinical deterioration if strategies to manage acute alcohol withdrawal symptoms are not implemented early in their treatment course. Therefore, screening tools that can be implemented early, such as at the time of hospital admission, and incorporate objective clinical markers predictive of SAWS offer the highest clinical value (Wood et al., 2019).

Predictors of Alcohol Withdrawal Severity Screening (PAWSS)

The Predictors of Alcohol Withdrawal Severity Screening (PAWSS) tool was developed to identify SAWS for medically ill patients in the acute care hospital setting. Maldonado et al., (2014) utilized a systematic review and pilot study to develop and evaluate the PAWSS screening tool. History of delirium tremens, history of seizure, recent drinking patterns, blood alcohol level on admission, and substance abuse history were shown to be associated with SAWS. Clinical data that reflected autonomic instability such as tachycardia,

elevated blood pressure, agitation, and tremulousness were also associated with increased risk for SAWS. The study findings indicated the PAWSS tool had high sensitivity and specificity (>95%) and was a valid tool for predicting SAWS risk for medically ill patients (Maldonado et al., 2014; Maldonado et al., 2015).

Alcohol Withdrawal Triage Guide (AWTG)

The Alcohol Withdrawal Triage Guide (AWTG) was developed to screen for alcohol withdrawal syndrome in an emergency department. The first category of the AWTG tool utilizes Clinical Alcohol Withdrawal Assessment (CIWA) scores (Higgins et al., 2019). Thus, an entirely different screening tool is needed to complete the AWTG screening tool introduced in the study. The AWTG tool categorized patient information into three separate sections; at least half of the tool's items were derived from subjective information provided by patient history. (Lappin et al., 2018). Of concern, any screening tool that relies on data from another validated screening tool is unlikely to offer robust clinical value in an emergency department setting as clinician time is typically limited.

Clinical Management of Severe Alcohol Withdrawal Syndrome

A benefit of screening for alcohol withdrawal in the acute care setting is to identify patients early in their hospital course, initiate symptom management and decrease their risk for development of SAWS. The literature review included studies that evaluated best practices for clinical management of severe alcohol withdrawal, as the primary objective of early screening for SAWS is to identify at risk patients and start treatment (Wood et al., 2019).

Benzodiazepines

Benzodiazepines and barbiturates are clinically accepted as the pharmacologic standard of care for the treatment of acute alcohol withdrawal syndrome (Bhaji et al., 2022;

Kattimani & Bharadwaj, 2013). However, there is no clear accepted standard for how clinicians should administer these medications (Nelson et al., 2019). Several studies have examined the efficacy of a symptom triggered (STT) approach versus a fixed dose regimen of benzodiazepines for the treatment of alcohol withdrawal symptoms. There is limited evidence to suggest whether STT or fixed dose regimen approach offered a statistically significant benefit over the other for mitigating more severe outcomes of SAWS including seizure, delirium tremens or death (Holleck et al., 2019; Steel et al., 2022). The STT approach has been shown to be ineffective for patients admitted to an ICU level of care (Steel et al., 2021).

Another strategy, referred to as front-loading involves early, aggressive treatment with benzodiazepines for the treatment of alcohol withdrawal syndrome. Front-loading with benzodiazepines has been shown to offer a benefit for maintaining lower CIWA scores throughout medical hospitalization. Both diazepam and lorazepam have been evaluated for efficacy using the front-loading strategy. There was no clear difference between lorazepam and diazepam in terms of efficacy or adverse events such as respiratory depression (Levine et al., 2019).

Potential Institutional Benefits of Early Screening for Severe Alcohol Withdrawal Syndrome

Early identification of patients at risk for SAWS allows clinicians to intervene before patients develop escalating symptoms of alcohol withdrawal and may decrease the risk of morbidity and mortality associated with SAWS. From a healthcare organization perspective, early treatment of patients with higher PAWSS scores may contribute to fewer ICU transfers and decreased hospital lengths of stay (Greissbach et al., 2019). Therefore, there are

multifactorial benefits for implementing a practice change to initiate PAWSS screening during admission for patients admitted with alcohol use disorder. The first benefit would include improving the quality of care for this patient population as early screening can trigger early intervention order sets for medications to manage alcohol withdrawal symptoms. The second benefit would include decreasing costs associated with SAWS by reducing the risk of ICU transfers and potentially decreasing hospital lengths of stay.

The literature search identified two studies that examined the relationship between early screening of patients with alcohol withdrawal in the ED and subsequent length of hospital stay. Glann et al., (2019) evaluated early screening of alcohol withdrawal in the ED using the CIWA tool, which has not been validated to specifically assess risk for SAWS. The study did not address whether early CIWA screening impacted early intervention with medication. Of concern, the design used to evaluate the CIWA tool's impact on hospital length of stay included pre and post intervention groups of subjects with very small sample sizes ($N < 10$). Although the authors concluded that the CIWA intervention was associated with decreased hospital length of stay, the small sample size undermined the significance of this finding (Glann et al., 2019).

Claus (2022) specifically examined the impact of PAWSS screening in the ED on hospital length of stay. A PAWSS score of 4 or higher triggered an order set of scheduled medication to treat alcohol withdrawal. Initiation of the alcohol withdrawal order set and medication administration in the ED, before arrival to the medical floor, was shown to be effective for reducing overall hospital length of stay from 4.2 to 3.3 days (Claus, 2022).

Level of Evidence

The Critical Appraisal Checklist was used to determine the level of evidence for the studies included in the review (Fineout-Overholt et al., 2010). Maldonado and colleagues (2014, 2015) tool validation studies offered prospective, randomized designs. The level of evidence for the prospective cohort is a two. Although Maldonado and colleagues' studies are more than five years old, they were included in the literature review as the PAWSS tool offered significant clinical value and emerged as a validated tool with the strongest evidence to support its use for identifying patients at risk for SAWS.

A meta-analysis by Holleck et al., (2019) limited their review to studies with a randomized and prospective design. Therefore, theirs is the only review in the group that rises to the level of one for the strength of design and value to the alcohol withdrawal research landscape. The remaining four meta-analyses relied on case control or retrospective cohort studies with significant heterogeneity. Therefore, the level of evidence for each of these meta-analyses would be limited to two. The meta-analysis by Kattimani and Bharadwaj (2013) was over five years old. However, this meta-analysis did offer a comprehensive review of benzodiazepine efficacy for the clinical management of alcohol withdrawal and, for that reason, was included in the literature review. Goodson et al., (2014) meta-analysis was also greater than five years old. Still, it was included in the literature review as this was one of the only level one studies that adequately accounted for heterogeneity.

Among the remaining studies, six utilized a retrospective cohort design, one used a retrospective case-control analysis, and three utilized a retrospective quality improvement design. The level of evidence for these quasi-experimental studies is three in terms of design and value added to the literature. The retrospective cohort by Steel et al., (2022) was poorly

designed with interventions that were unrelated to outcome measures and lacked appropriate statistical analysis to support the author's conclusions. This retrospective cohort was appraised at level four at best.

Two quality improvement studies were included in the review and the level of evidence for this study was appraised at level four. The remaining quality improvement study by Steel et al., (2021) was poorly designed, with vague pre and post intervention descriptions, and outcome measures that were not relevant to the original study aims. The study also lacked appropriate statistical analysis. Therefore, the study by Steel et al., (2021) offered little value to alcohol withdrawal literature and was appraised at level four.

Research Gaps

Significant gaps exist in the alcohol withdrawal research landscape. Few studies offered a prospective cohort or randomized-controlled design. This is likely due to the ethical consideration of using a no treatment or placebo control. Withholding necessary treatment for alcohol withdrawal could pose harm to the patient.

Although benzodiazepines are clinically accepted as the standard of care for the treatment of alcohol withdrawal, there are gaps in the research regarding best practices for how to best administer these medications. Meta-analyses that sought to compare symptom-triggered versus fixed dose regimens were weakened by significant heterogeneity among studies, most of which were retrospective cohort designs.

The PAWSS screening tool stood out as one of the most reliable, validated tools to evaluate risk for severe alcohol withdrawal. However, few studies utilized this important tool, and no clear prospective study evaluated the impact of early screening with PAWSS on

relevant outcomes such as length of time to treatment, development of delirium tremens, alcohol withdrawal related seizure and hospital length of stay.

Purpose Statement

The purpose of this quality improvement project was to evaluate the impact of early screening for alcohol withdrawal severity using the PAWSS tool on patient centered outcomes such as hospital LOS, ICU transfers, development of delirium tremens and use of the sedative medication Precedex during hospitalization. The primary objective of the quality improvement study was to identify patients at risk for SAWS at an early time point in the admission process while patients are being medically evaluated in the ED and to initiate early treatment for alcohol withdrawal for patients with SAWS risk. Therefore, the quality improvement project examined the impact of early screening on these important patient centered outcomes.

Summary

Comprehensive search of the literature revealed that early screening for severe alcohol withdrawal can improve patient centered clinical outcomes. The literature search identified several alcohol withdrawal screening tools. The validated PAWSS screening tool was shown to be both reliable and effective for identifying patients at risk for SAWS and had the highest level of evidence to support its use. Although there were studies that examined impact of PAWSS screening during medical admission, the search did not reveal studies which evaluated the impact of PAWSS screening in the emergency department setting on relevant outcomes such as hospital LOS and delirium tremens.

Chapter 3

Methodology

Quality improvement studies are underutilized in behavioral health (Samartzis & Talias, 2019). A retrospective chart review design was selected for evaluation of the impact of early screening for SAWS in the ED setting as it allowed for analysis of pre and post intervention data. Additionally, a retrospective chart review is an evidence-based design for quality improvement studies as results can provide relevant data which can lead to practice changes. This design allows for a review of patient outcomes following intervention and can provide data needed to improve the quality of care (Backhouse & Ogunlayi, 2020).

Theoretical Framework

The theoretical framework for the project is Lewin's change theory (Table 1). In Lewin's change model "unfreezing" refers to providing rationale for change. The "moving" phase of change refers to motivation for change. Finally, the "refreezing" phase involves establishing new practices (Barrow, 2022; Burnes, 2019). Education about the purpose of PAWSS screening was provided to nursing staff on the pilot ED during daily safety huddles to provide rationale for the project. To address motivation nursing staff received additional education about PAWSS use during their shifts and questions were addressed. Nursing staff were provided education about action steps for PAWSS. Nurses were instructed to notify the attending for PAWSS scores greater than or equal to four and to notify the primary attending, physician assistant, or nurse practitioner that the patient was at increased risk for severe alcohol withdrawal. Nurses were provided instructions to request initiation of CIWA protocol for any PAWSS score greater than or equal to 4 (Day & Daly, 2021; Maldonado, 2014).

Table 1. Stages of Lewin’s Change Theory applied to PAWSS tool implementation in the ED

| <i>Lewin’s Stages</i> | | | |
|------------------------|---|--|--|
| | Unfreezing | Change | Refreezing |
| <i>Change Activity</i> | <ul style="list-style-type: none"> -Recognize need for process change for early identification of patients at risk for SAWS -Encourage use of PAWSS tool vs no screening -Discussed process change with ED RN educator and -ED RN Manager. Provided rationale for practice change and addressed nursing staff concerns about use of a new screening tool in their practice | <ul style="list-style-type: none"> -Established intervention period -Engaged RN Manager and RN Nurse Educator in process change of initiating PAWSS Screening -Education provided during safety huddles at shift change throughout the intervention period -Notification of ED attendings and APPs of implementation of PAWSS intervention | <ul style="list-style-type: none"> -Developed process for regular PAWSS screening for patients at risk for SAWS -Embedded PAWSS screening tool into EPIC and work with IT to automatically launch for patients presenting to the ED with history of alcohol abuse -Launched clinical practice guidelines for scores > or = to 4 to initiate CIWA |

Note: This table represents the stages of Lewin’s Change Theory applied to the implementation of early screening of SAWS using the validated PAWSS tool in the pilot ED.

Setting

The pilot ED is a 49-bed unit in a densely populated suburban community hospital setting and is part of a multi-hospital health system. The pilot ED has 24-hour crisis and behavioral health staff for management of patients with substance abuse. The pilot hospital was located in a densely populated urban area of southeastern Pennsylvania.

Population/Sample

Adults aged 18 and over with alcohol abuse were identified by use of convenience sampling. No recruitment of subjects was used. The pilot hospital utilized the EPIC electronic medical record system. Patient presentations for alcohol abuse and alcohol dependence at the pilot hospital were evaluated using the SlicerDicer search engine tool within EPIC (Saini et al., 2021). Patients with ICD-10 diagnoses including history of alcohol abuse, alcohol dependence, alcohol withdrawal syndrome, alcohol withdrawal delirium and delirium tremens were used for the retrospective chart review. The retrospective chart review was completed for patients who were medically admitted to the pilot hospital through the ED during the same 12-week intervention period one year prior and served as the control. The population sample for the 12-week intervention period was limited to patients with alcohol withdrawal symptoms who were medically admitted and awaiting transfer from the ED to one of the medical floors of the same community hospital.

Exclusion Criteria

Patients who were under 18 years of age were excluded from the control and intervention samples. Patients who were not medically admitted were also excluded from the control and intervention samples. Patients who were medically admitted but did not receive medical treatment or behavioral health-based drug and alcohol treatment counseling during their admission were also excluded from the control and intervention samples. For patients with more than one medical admission during the sample period, the earliest admission was used for the analysis or the hospitalization for which the patient was treated for alcohol abuse or active alcohol withdrawal. For the intervention sample the admission that was associated with the completion of the PAWSS tool in the ED was used for the analysis.

Instrument

The Predictors of Alcohol Withdrawal Severity Scale (PAWSS) tool was used to assess risk for severe alcohol withdrawal syndrome (Appendix A). The PAWSS tool has been previously validated for use in an adult population in hospital and emergency department settings (Maldonado et al., 2014; Maldonado et al., 2015). Nurses completed PAWSS screening using a paper copy of the tool. Completed tools were returned with patient's MRN to a locked drawer in the pilot ED. The PAWSS tool has been validated and shown to be a reliable instrument for screening for severe alcohol withdrawal risk (Maldonado et al., 2015).

Data Collection

The retrospective chart review was completed from October 12, 2022, to January 12, 2023. The population for the retrospective chart review included adult patients 18 and over who were medically admitted and treated for alcohol withdrawal during the retrospective chart review time period. Adult patients who met criteria for the retrospective chart review were identified using the EPIC SlicerDicer tool (Saini et al, 2021). The population was identified by location, medical admission during the retrospective chart review time frame and by ICD-10 diagnoses which included alcohol abuse, alcohol dependence, alcohol withdrawal syndrome, alcohol withdrawal delirium and delirium tremens by history.

The intervention data was collected by nurses on the pilot ED. The PAWSS tool intervention time period was 12 weeks from October 12, 2023, to January 12, 2024. The intervention tool was introduced pilot ED nursing staff at the start of the intervention period. Pilot ED nurses received verbal, face to face education about use of the PAWSS tool during daily huddles for day and evening shifts during the 12-week intervention period. Pilot ED

nursing staff were trained to complete PAWSS tools for patients who were medically admitted and identified as having a risk for alcohol withdrawal either by self-report or by history obtained from the EMR. The pilot ED nurses identified patients with alcohol withdrawal either by patient history, patient report of alcohol use or review of the medical record and then completed the PAWSS intervention tool. Pilot ED nurses were trained to report PAWSS scores to the primary ED attending or ED advanced practice provider (APP).

Data Analysis

Patients included in the chart review and intervention groups were de-identified and assigned a non-identifying three-digit numeric code for the purposes of data analysis. Demographic variables including age, gender, co-morbid medical conditions including depression, anxiety, bipolar disorder, schizophrenia were included in the analysis. Health insurance versus uninsured was also included in the analysis. For the purposes of statistical analysis of the outcome variables, the presence of delirium tremens, ICU transfer, and use of the sedative medication Precedex were evaluated using Chi Square analysis. Hospital length of stay was evaluated using median value and Wilcoxon Rank Sum.

Protection of Human Subjects

The application for the healthcare organization's Evidence-Based Practice Project Proposal was completed and submitted to the pilot hospital's Office of Research and Internal Review Board (IRB). The project was determined by the pilot hospital Office of Research to be a quality improvement project and thus exempt from IRB submission for protection of Human Subjects. A letter of exemption was provided by the pilot hospital's Office of Research and submitted to the West Chester University Office of Research Studies (Appendix B). The West Chester University IRB application was completed and approval for

the quality improvement project was received September 25, 2023 (Appendix A). The quality improvement project did not involve active participants. There was no recruitment of human subjects. Data were collected via convenience sampling and analyzed via retrospective chart review.

Resources, Personnel & Technology

Data analysts employed by the pilot hospital's health system provided guidance for data collection using the EPIC Slicerdicer tool (Saini et al., 2021). Statistical analysis was provided through the pilot hospital health system's Office of Research and Grants. Paper copies of the PAWSS tool were provided at nursing stations in the pilot ED. Completed tools were returned to a confidential folder in a locked drawer of the crisis desk in the ED. Completed tools were collected by the principal investigator, patient information was de-identified using the same procedure as described above.

Summary

In summary, the methods used for this quality improvement project were feasible and could be fully implemented in the 12-week intervention period. The use of convenience sampling in the control sample likely reduced risk for selection bias among the control and intervention datasets. Face to face nursing education throughout the intervention period allowed for nurses' questions to be addressed and provided reinforcement of the rationale for the practice change. The retrospective chart review design allowed for examination of PAWSS screening primary outcome variables.

Chapter 4

Results

This chapter presents the results of the QI project. Demographic and outcome variables were evaluated using Excel and Stata software. Comparisons of demographic variables between control and intervention groups were included in the analysis of the results. Comparisons of the primary outcome variables between control and intervention groups were also included in the results.

Data Collection

A total of 479 patients were identified in Slicerdicer using ICD-10 codes for history of alcohol abuse, alcohol dependence, alcohol withdrawal syndrome and delirium tremens during the time period of 10/12/2022 to 1/12/2023. Duplicates were removed during data cleaning. After applying the medical admission exclusion criteria 196 patients remained in the control sample. After applying the exclusion criteria for patients who were not actively treated for alcohol withdrawal during the hospitalization, a total of 52 patients remained in the control data sample. The final sample size of the control data sample was 52 patients.

The intervention sample was collected between 10/12/2023 and 1/12/2024. A total of 22 patients received the PAWSS tool intervention in the pilot ED during the intervention period. One patient was excluded from the intervention sample as the patient did not receive any treatment for alcohol withdrawal or counseling for alcohol abuse during the associated medical admission. A total of 21 patients remained in the intervention sample after applying the exclusion criteria. The final sample size of the intervention data sample was 21 patients.

Demographic Data

Descriptive statistics were used to describe the control and intervention groups' demographics, comorbidities and disposition. Means were determined for the demographic variables in each group. To compare the means between groups, sample t-tests were used. A Mann Whitney U test was used for continuous variables and a chi-square test of independence for categorical variables. Three multivariable regression models were built with group and age as covariates. All analyses were performed in Excel and Stata 18.0 (Statacorp LLC, College Station, TX). A *p*-value of less than 0.05 was considered statistically significant.

The average age of the control sample was 55.4 years. The average age of the intervention samples was 49.6 years. Both the control and intervention samples were predominantly male. None of the patients in the control or intervention samples identified as non-binary or other gender. Both the control and intervention samples were predominantly Caucasian race. The remainder of the control sample was Black, Asian or identified as "other" race. The remainder of the intervention sample was Black and Latino/Hispanic (Table 2.).

The majority of patients in both the control and intervention datasets were insured with either Medicare or Medicaid as their medical insurance carriers. Among the control sample most patients were insured with a Medicare or Medicaid carrier. Similarly, most of the patients in the intervention sample were insured with Medicare or a Medicaid carrier. The percentage of patients with a commercial insurance carrier was similar for the control sample and the intervention sample. Uninsured patients accounted for similar percentage of the control sample and intervention sample. There was missing data for one patient in the control sample (Table 2).

Table 2. Demographic Data

| | Control n =52 | Intervention n =21 | p |
|--------------------------------|------------------|-----------------------|-------|
| Age (Mean/SD) | 55.4 (15.6) | 49.6 (14.9) | 0.148 |
| Age n (%) | | | 0.075 |
| 18-25 | 0 (0%) | 2 (9.5%) | |
| 26-44 | 15 (28.9%) | 7 (33.3%) | |
| 45-59 | 14 (26.9%) | 7 (33.3%) | |
| 60+ | 23 (44.2%) | 5 (23.8%) | |
| Gender n (%) | | | 0.66 |
| Female | 17 (32.7%) | 8 (38.1%) | |
| Male | 35 (67.3%) | 13 (61.9%) | |
| Race n (%) | | | 0.136 |
| White | 45 (86.5%) | 18 (85.7%) | |
| Black | 2 (3.9%) | 2 (4.8%) | |
| Latino/Hispanic | 0 (0) | 2 (9.5%) | |
| Asian | 1 (1.9%) | 0 (0) | |
| other | 4 (7.7%) | 0 (0) | |
| Insurance n (%) | | | 0.751 |
| Medicaid | 13 (25.5%) | 8 (38.1%) | |
| Medicare | 16 (31.4%) | 5 (23.8%) | |
| Commercial | 17 (33.3%) | 6 (28.6%) | |
| Uninsured | 5 (9.8%) | 2 (9.5%) | |
| Missing | 1 | 0 | |
| Comorbidities (Yes, n%) | | | |
| HTN | 28 (53.9%) | 4 (19.1%) | 0.007 |
| Mood/anxiety disorder | 24 (46.2%) | 18 (85.7%) | 0.002 |
| Other mental disorder | 16 (30.8%) | 6 (28.6%) | 0.853 |
| alcohol use disorder | 47 (90.4%) | 20 (95.2%) | 0.494 |
| SUD | 7 (13.5%) | 5 (23.8%) | 0.28 |
| COPD | 5 (9.6%) | 1 (4.8%) | 0.494 |
| Liver Disease | 12 (23.1%) | 7 (33.3%) | 0.366 |
| Coronary Disease | 6 (11.5%) | 3 (14.3%) | 0.747 |
| Disposition (%) | | | 0.272 |
| home | 38 (73.1%) | 13 (61.9%) | |
| D&A rehab | 1 (1.9%) | 2 (9.5%) | |
| SNF | 6 (11.5%) | 1 (4.8%) | |
| Psychiatric hospital | 3 (5.8%) | 2 (9.5%) | |
| Left AMA | 2 (3.9%) | 2 (9.5%) | |
| Deceased | 2 (3.9%) | 0 (0) | |
| transfer to other hospital | 0 (0) | 1 (4.8%) | |
| PAWSS (Mean/SD) | NA | 5.8 (1.3) | NA |

Note: this table demonstrates comparison of the demographic data of the control and intervention groups including race, gender, age, co-morbid medical conditions, and

disposition during hospital stay. This table also includes the mean PAWSS score for the intervention group.

Statistical significance was measured in p values <0.05 . There were no statistically significant differences between the control and intervention groups except for two variables. Hypertension was more prevalent in the control group and mood disorder was more prevalent in the intervention group.

Co-morbid Conditions

Among co-morbid conditions included in the data analysis, mood disorder was among the most prevalent co-morbidity of the control sample and of the intervention sample. Mood disorder was more prevalent in the intervention sample with statistically significant difference. Hypertension (HTN) was more prevalent in the control group as compared to the intervention group. Substance abuse disorder (SUD) was more prevalent in the intervention sample than the control sample although the difference was not statistically significant. Other co-morbidities including liver disease, coronary disease and chronic obstructive pulmonary disease (COPD) were present in both the intervention and control samples however, these differences did not achieve statistical significance. Presence of an alcohol use disorder diagnosis was prevalent in both the control and intervention groups with no statistical significance between groups (Table 2).

Disposition

There were no statistically significant differences between the number of patients in the control and intervention groups who discharged to home once medically stable for discharge. Few patients, of the control and of the intervention groups, discharged to a residential drug and alcohol rehab program. Patients who left against medical advice (AMA) accounted for similar percentages in control group and of the intervention samples. Two

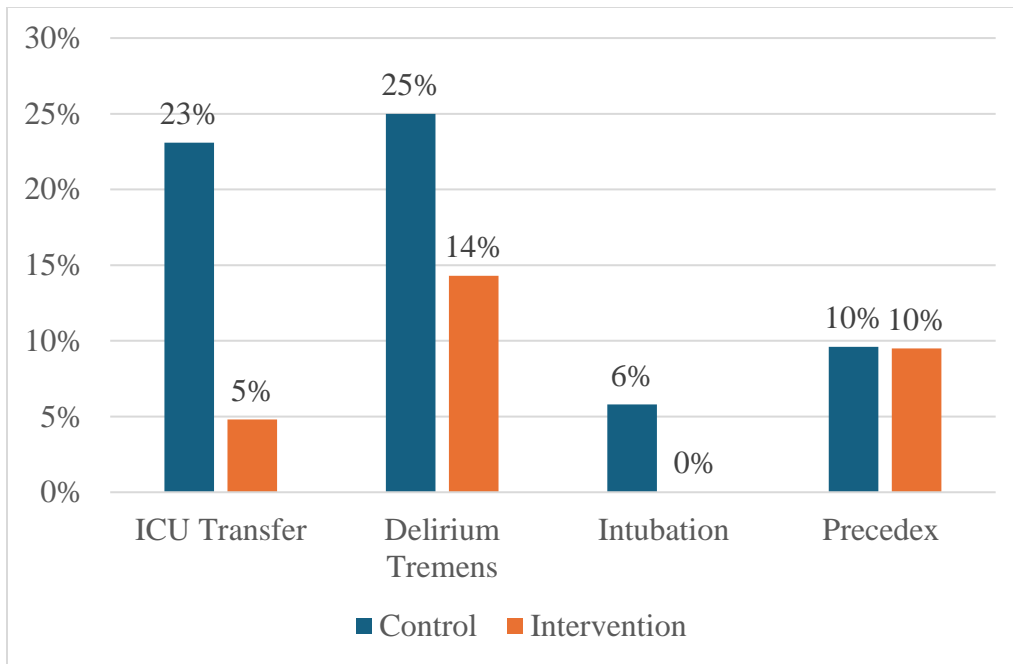
patients in the control sample died during the hospitalization due to complications from alcohol abuse or alcohol and substance abuse. There were no deaths in the intervention group (Table 2.).

Statistical Results of Primary Outcome Measures

Descriptive statistics were used to describe the control and intervention groups' primary outcome measures. For hospital LOS, this primary outcome variable was log-transformed to account for its non-normal distribution and then a linear regression was performed. For ICU transfer and delirium tremens, a logistic regression was used. All analyses were performed in Excel and Stata 18.0 (Statacorp LLC, College Station, TX). A *p*-value of less than 0.05 was considered statistically significant.

Among primary outcome measures, four of the five variables were not statistically significant between the control and intervention groups. Although there were fewer patients in the intervention sample who required ICU transfers, developed delirium tremens or required intubation these differences did not achieve statistical significance. The percentage of patients who required Precedex sedation was equal between the control and intervention groups. (Figure 1, Table 3.).

Figure 1. Comparison of Control vs Intervention Groups on Primary Outcome Measures



Note: This figure represents the average differences between control and intervention groups on primary outcome measures of ICU transfers, presence of delirium tremens, number of patients who required intubation and use of sedative medication Precedex (dexmedetomidine). Although there were differences in the average number of patients who developed delirium tremens and required ICU transfer these differences were not shown to be statistically significant ($p > 0.05$).

The only primary outcome measure that showed a statistically significant difference between groups was hospital LOS. The average hospital LOS for the control group was 5.3 days and the average hospital LOS for the intervention group was 3.8 days with a difference between groups of 1.5 days. The difference in the median number of hospital days between control and intervention groups was shown to be statistically significant (Table 3).

Table 3. Primary Outcome Variables

| Outcomes | Control | Intervention | <i>p</i> |
|---------------------|------------|--------------|----------|
| | n = 52 | n = 21 | |
| LOS (Median/IQR) | 4.5 (3-6) | 3 (2-4) | 0.042 |
| ICU Transfer | 12 (23.1%) | 1 (4.8%) | 0.064 |

| | | | |
|------------------|------------|-----------|-------|
| Delirium Tremens | 13 (25.0%) | 3 (14.3%) | 0.316 |
| Intubation | 3 (5.8%) | 0 (0) | 0.261 |
| Precedex | 5 (9.6%) | 2 (9.5%) | 0.99 |

Note: This table represents the statistical analysis of differences between the control and intervention groups. Descriptive statistics were used to describe the differences between intubation use and Precedex. For hospital LOS, this primary outcome variable was log-transformed to account for its non-normal distribution and then a linear regression was performed. For ICU transfer and delirium tremens, a logistic regression was used. There were no statistically significant differences between groups with the exception of hospital LOS. Median hospital LOS was shorter in the intervention group (3) as compared to the control group (4.5) and this difference met statistical significance ($p = 0.042$).

Summary of Chapter

In summary, there were no statistically significant differences in demographic variables between the control and intervention groups with the exception of two comorbidities. There were statistically significant differences between intervention and control groups for co-morbid conditions hypertension and unspecified mood disorder (Table 2). There were no statistically significant differences among the primary outcome variables of ICU transfers, delirium tremens, intubation and use of Precedex between the control and intervention samples. There was a statistically significant difference in median hospital LOS between the control and intervention samples. Patients in the intervention group had an average of 1.5 fewer days in the hospital as compared to patients in the control sample.

Chapter 5

Discussion

Early screening with the PAWSS intervention tool was shown to significantly decrease hospital length of stay. This chapter will evaluate the significance of the results of the QI study as well as the importance of early screening for both patient outcomes and potential cost savings to the healthcare organization. This chapter will also explore the implications of early PAWSS screening for nursing practice and areas for future research.

Review of the Problem

Alcohol use disorder is a prevalent condition that affects roughly 14 million Americans and contributes to 178, 000 premature deaths annually (Centers for Disease Control and Prevention, 2024). Acute alcohol withdrawal is a serious medical condition that results in 1.4 million hospitalizations annually (Suen et al., 2021). Failure to recognize alcohol withdrawal symptoms early in a hospital admission can lead to delays in treatment and poor clinical outcomes including ICU transfers and longer hospital lengths of stay (Lappin et al., 2018). Early screening of acute alcohol withdrawal syndrome has been shown to improve clinical outcomes (Claus et al., 2022).

The purpose of this quality improvement project was to evaluate the impact of early screening for alcohol withdrawal severity using the validated PAWSS tool on clinically significant outcomes, including hospital LOS, ICU transfers, development of delirium tremens, and the use of sedative medication, Precedex, during medical hospitalization. Early screening with the PAWSS intervention tool in the pilot ED was not shown to impact patient centered outcomes, including delirium tremens, ICU transfers, intubations and use of the sedative medication Precedex. Although there were fewer patients with delirium tremens and

ICU transfers in the intervention group as compared to the control group, these differences did not achieve statistical significance.

Analysis of demographic data demonstrated that the control and intervention groups were similar in demographic factors such as age, gender, and race. There were only two comorbid medical conditions, hypertension (more prevalent in the control group) and mood disorder (more prevalent in the intervention group) and the difference was statistically significant ($p < 0.05$). Therefore, the population of patients in the control and intervention groups were overall similar in demographics and likely reflect the true population of patients who received treatment for alcohol withdrawal during the intervention period in the pilot hospital.

Early screening with the PAWSS screening tool in the ED setting was shown to decrease hospital LOS by an average of 1.5 days. The difference between the median hospital LOS between the control and intervention groups was shown to be statistically significant ($p = 0.042$). In 2022, a single hospital day was shown to contribute to 2,989 dollars in expenses to the healthcare organization with which the hospital was affiliated (American Hospital Association, 1999-2022). Therefore, early screening with the PAWSS intervention tool in the ED has the potential to offer cost savings to the healthcare organization for each hospital day that can be reduced from the total LOS. As many healthcare organizations recover from revenue losses following the COVID-19 pandemic, interventions that can contribute to reduced hospital LOS and potential cost savings would merit implementation on a system level basis (Boserup et al., 2021).

Limitations of the Project

Small sample sizes of both the intervention and control groups limit the generalizability of the project. Both groups had sample sizes of less than 100 patients. It is unclear if a larger sample size would produce a statistically significant difference in hospital LOS between control and intervention groups. The short length of the project (12 weeks) also limits the strength of the findings. A longer intervention period, such as six months, would likely have provided a more robust data set.

Stigma associated with alcohol abuse has been shown to influence patients' decisions not to disclose alcohol use patterns to healthcare staff (Finn, Mejldal & Nielson, 2023). Therefore, stigma associated with AUD may have introduced bias into the intervention sample. Although the project did not measure patient feelings of reluctance to disclose alcohol abuse patterns on admission, it is possible that some patients were missed with a screening tool implemented in the ED. For example, patients who fear the consequences of disclosing alcohol abuse to healthcare staff may not disclose until they are in active withdrawal, which may not occur until 24 to 48 hours after admission. Thus, the intervention sample may represent the true percentage of the total population of patients who felt comfortable disclosing alcohol abuse patterns in the pilot ED.

Implications for Nursing Practice, Education and Research

Early screening for risk for SAWS in the ED was shown to demonstrate a potential benefit to both patients and the healthcare organization by reducing hospital LOS. For patients, this clinical outcome is significant, as shorter hospital LOS has been associated with an increased likelihood that patients will seek drug and alcohol treatment following hospital

discharge (Pace et al., 2018). For the healthcare organization, reduced hospital LOS offers potential cost savings of thousands of dollars per patient treated for acute alcohol withdrawal.

The implication for nursing practice is that early screening with the PAWSS intervention tool in the ED is a worthwhile practice change for reducing patient hospital LOS. In applying Lewin's Change Theory, the refreezing process would involve implementing the practice change (Barrow, 2022). To facilitate this practice change, the healthcare organization could upload the PAWSS tool into EPIC, which could be triggered to pop up during nursing admission assessment for patients who report alcohol use in the ED.

Introducing the PAWSS tool in the pilot ED using a face to face nursing education strategy was an important component of the change and refreezing processes. The face to face education strategy allowed for a clear description of the PAWSS tool as well as the rationale for the practice change. Pilot ED nurses were able to ask questions during the face to face education process. The process of addressing nursing questions and providing a clear rationale for the PAWSS intervention practice change contributed to the refreezing process of Lewin's change model.

Potential Benefits to the Healthcare Organization

There is an incentive for the healthcare organization to implement the PAWSS tool intervention throughout its multi-hospital system EDs. Reducing the length of stay by 1.5 hospital days for this population of patients could potentially save the healthcare organization hundreds of thousands of dollars over the course of a fiscal year. Therefore, the healthcare organization would benefit from engaging clinical nurse educators in the EDs across the health system to continue nursing staff education on the importance of early screening for severe alcohol withdrawal syndrome.

There were differences in the clinical outcomes of ICU transfer, intubation and development of delirium tremens between the control and intervention groups. Although these differences did not achieve statistical significance the differences likely had clinical relevance to direct care staff. For example, development of delirium tremens during alcohol withdrawal can lead to hyperactive impulsivity and agitation which can increase the risk of workplace violence and injury to direct care staff (Airagnes et al., 2019). Thus, if early screening with the PAWSS tool reduces the number of patients who develop agitation secondary to delirium tremens, there is a potential benefit to the healthcare system in fewer episodes of workplace violence and reduced risk for injuries to clinical staff providing direct care.

Fewer patients in the intervention groups required ICU transfer and intubation. Again, although this difference was not shown to be statistically significant there is clinical relevance for the patients who did not require a higher level of care during their hospitalization. For example, patients who require ICU transfer and intubation are at increased risk of debility, physical decline and hospital acquired infections (Vigouroux et al., 2021). Therefore, early screening with the PAWSS tool would be clinically relevant for those patients who benefit from early intervention with alcohol withdrawal medication and subsequently do not develop clinically worse outcomes that require ICU level of care.

Sustainability of PAWSS Intervention Practice Change

Finally, a comprehensive approach to early screening for SAWS risk with the use of the PAWSS tool would include education for ED clinical staff regarding stigma associated with AUD and patients' reluctance to disclose alcohol use patterns on admission. Coupling education regarding alcohol use disorder as a medical condition, as well as training clinical

staff on the use of person-first language when evaluating patients for AUD, has been shown to be an effective strategy for reducing bias among healthcare workers (Morris & Schomerus, 2023). Therefore, education for clinical staff on the use of the PAWSS tool in the ED as practice change should be coupled with education for clinical staff on strategies to use person-first language to decrease feelings of stigma when assessing for alcohol use disorder.

Preliminary data from this QI project supports a larger, longer-term study to evaluate the clinical impact of early screening for SAWS in the ED setting using the PAWSS tool. A longer intervention period of six months and implemented at all four acute care hospital EDs would likely generate larger sample sizes for both the control and intervention groups which could impact statistical significance. Differences in primary outcomes that did not show statistical significance in this smaller QI project may show statistical significance in a larger study with sample sizes of 100 or more patients. Finally, any cost savings achieved from reducing hospital LOS as a result of early screening using the PAWSS tool should be calculated over the course of a fiscal year to demonstrate the cost benefit with an estimated numeric value. A larger, multi-site QI project with a longer intervention period would go further to cement the PAWSS tool intervention as a standard practice in the ED setting and improve sustainability of this quality improvement effort.

Future research is also needed to better understand the impact of early screening for SAWS on treatment outcomes for patients with an alcohol use disorder. For example, an important area of study would be to evaluate the number of patients who received the PAWSS intervention and went on to engage in drug and alcohol treatment following discharge. Another important area of study would be to evaluate the number of hospital

readmissions for patients who received the PAWSS intervention in the ED on a previous admission.

Conclusion

In conclusion, alcohol use disorder is a serious medical condition affecting millions of people in the United States with potentially fatal outcomes. Early screening with the validated PAWSS tool has been shown to lead to early treatment for acute alcohol withdrawal (Maldonado et al., 2015). PAWSS screening for SAWS risk implemented in the ED setting effectively addressed the clinical question that early intervention impacts primary outcomes such as hospital LOS, ICU transfers, development of delirium tremens and intubation. As such, this QI project demonstrated that early screening with the PAWSS tool in the ED setting can contribute to decreased hospital LOS, which can lead to improved patient outcomes and significant cost savings to the healthcare organization. Therefore, early screening with the PAWSS tool and education of clinical staff to reduce stigma associated with AUD is recommended as a nursing practice change. Engaging clinical nurse educators in the ED and loading the PAWSS tool into the EPIC EMR can offer a means to automate the practice of PAWSS screening. Finally, a larger, longer QI project that can evaluate the impact of early PAWSS screening would contribute to further sustainability of this practice change.

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Appendix A: Predictors of Alcohol Withdrawal Severity Scale (PAWSS) Screening Tool

Prediction of Alcohol Withdrawal Severity Scale (PAWSS)

Maldonado et al, 2015

Part A: Threshold Criteria:

("Y" or "N", no point)

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

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

Part B: Based on patient interview:

(1 point each)

1. Have you been recently intoxicated/drunk, within the last 30 days?

2. Have you ever undergone alcohol use disorder rehabilitation treatment or treatment for alcoholism? (i.e., in-patient or out-patient treatment programs or AA attendance)

3. Have you ever experienced any previous episodes of alcohol withdrawal, regardless of severity?

4. Have you ever experienced blackouts?

5. Have you ever experienced alcohol withdrawal seizures?

6. Have you ever experienced delirium tremens or DT's?

7. Have you combined alcohol with other "downers" like benzodiazepines or barbiturates, during the last 90 days?

8. Have you combined alcohol with any other substance of abuse, during the last 90 days?

Part C: Based on clinical evidence:

(1 point each)

9. Was the patient's blood alcohol level (BAL) on presentation ≥ 200 ?

10. Is there evidence of increased autonomic activity?

(e.g., HR > 120 bpm, tremor, sweating, agitation, nausea)

Total Score: _____

Notes: Maximum score = 10. This instrument is intended as a SCREENING TOOL. The greater the number of positive findings, the higher the risk for the development of AWS.

*A score of ≥ 4 suggests **HIGH RISK** for moderate to severe (complicated) AWS; prophylaxis and/or treatment may be indicated.*

Appendix B: West Chester University IRB Approval Letter



Office of Research and Sponsored Programs | West Chester University | Ehinger Annex
West Chester, PA 19383 | 610-436-3557 | www.wcupa.edu

Sep 25, 2023 12:32:14 PM EDT

To: Erin Lopes
Department: School of Nursing, Nursing

Re: Exempt – Initial – IRB-FY2024-32 The Impact of Early Screening for Severe Alcohol Withdrawal Syndrome on Delirium Tremens and Hospital Length of Stay

Dear Erin Lopes:

Thank you for your submitted application to the West Chester University Institutional Review Board. We have had the opportunity to review your application and have rendered the decision below for The Impact of Early Screening for Severe Alcohol Withdrawal Syndrome on Delirium Tremens and Hospital Length of Stay.

Decision: No Human Subjects Research

If there are any questions, please don't hesitate to reach out to irb@wcupa.edu

Sincerely,
West Chester University Institutional Review Board

Appendix C: Main Line Health Office of Research Letter of Exemption



130 South Bryn Mawr Avenue
Bryn Mawr, PA 19010
1.866.CALL.MLH
mainlinehealth.org

August 29, 2023

RE: The Impact of Early Screening Using the Predictors of Alcohol Withdrawal Severity Scale (PAWSS) Screening Tool on Risk for Delirium Tremens and Hospital Length of Stay

Dear Ms. Lopes,

I have reviewed the Evidence Based Practice / Quality Improvement proposal submitted to the Nursing Research and Innovation Council. Based on the information you provided, the project as submitted, to be implemented between September 1, 2023 – September 1, 2024, is a Quality Improvement and Evidence Based project and does not require IRB approval.

As confirmation, this project has been reviewed in cooperation with the MLH ORP and confirms the project qualifies as quality improvement and that collection, use, and retention of data for support of this project is permitted.

In the future, if changes are made to the above referenced project, please notify me to determine if ORP review is necessary. Please contact me if you have questions or concerns regarding the proposal review.

Sincerely,

A handwritten signature in black ink that reads "Amy Callahan DNP, RN".

Amy Callahan, DNP, RN
System Director, Nursing Administration
Magnet & Professional Excellence
Nursing Research & Innovation Council, Facilitator
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Lankenau Medical Center | Bryn Mawr Hospital | Paoli Hospital | Riddle Hospital | Bryn Mawr Rehab Hospital
Mirmont Treatment Center | HomeCare & Hospice | Lankenau Institute for Medical Research