

Prediction of Alcohol Withdrawal Severity Scale in the Emergency Department

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### Abstract

*Background and Review of Literature:* Alcohol dependence is a problem nationwide and is often underreported by patients in a healthcare setting. People who suffer from alcohol dependence are likely to experience alcohol withdrawal if they suddenly cease alcohol consumption. The Prediction of Alcohol Withdrawal Severity Scale (PAWSS) is a tool which can identify a patient at risk for alcohol withdrawal.

*Purpose:* The purpose of the project was to screen patients being admitted from the emergency department utilizing PAWSS to identify those at risk for alcohol withdrawal.

*Methods:* The scores would then be examined within a retrospective chart review on patients screened to determine validity and reliability of the tool.

*Implementation Plan/Procedure:* The project was not implemented due to safety concerns during a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. Had implementation occurred, this quality improvement project could have potentially contributed to a decreased the incidence of acute alcohol withdrawal in hospitalized patients.

*Implications/Conclusion:* Protection of healthcare workers and patients was priority over a research project during the current time period. The project could be replicated for future use at a more appropriate time.

**Keywords:** alcohol withdrawal; Prediction of Alcohol Withdrawal Severity Scale; emergency department

## Prediction of Alcohol Withdrawal Severity Scale in the Emergency Department

Alcohol dependence is a known problem across the United States. However, alcohol use is often underreported by patients, thus providers' lack information related to potential alcohol dependence leading to late recognition of withdrawal symptoms which can be confused for other symptoms. Not recognizing withdrawal symptoms early enough can result in rapid patient decline and even death. There are ways to prevent the rapid decline of alcohol withdrawal in patients, but early identification is a critical first step. The Prediction of Alcohol Withdrawal Severity Scale (PAWSS) is one means of identifying patients at risk for alcohol withdrawal. The purpose of this paper is to outline a quality improvement initiative for implementation of the PAWSS in the emergency department.

### **Overview**

#### **Background**

Alcohol withdrawal is very dangerous and can include autonomic hyperactivity, tremor, agitation, hallucination, seizures, and delirium tremens (DT) (Mo et al., 2018). Alcohol withdrawal can even be life threatening and lead to hospitalizations where patients may need around the clock monitoring. Other symptoms of withdrawal that may be confused for another condition include anorexia, seizures, chills, irritability, palpitations, fever, impaired gait, and fatigue (Elliott, Geyer, Lionetti, & Doty, 2012). Patient condition can deteriorate throughout the course of the hospital stay, especially with co-existing neurological or infectious diseases (Mirijello et al., 2015). This can increase the cost of care, increase patient length of stay, and result in multiple patient

transfers to higher levels of care throughout the course of treatment. For every day spent in an intensive care unit (ICU) bed, patients will spend an additional 1.5 days in a non-ICU bed (Hunter, Johnson, & Coustasse, 2014).

The staff in the emergency department (ED) see many patients who suffer from alcohol dependence and may not discover this until the patient begins to suffer from withdrawal. There are several assessment tools available to identify risk for alcohol withdrawal syndrome. The Clinical Institute Withdrawal Assessment (CIWA) is a commonly used assessment tool that predominantly assesses subjective details of alcohol withdrawal syndrome. There are a few reasons why this may present a problem. Due to the nature of this subjective data, there may be unreliable data collected based on patient self report. Dosage of benzodiazepines for alcohol withdrawal symptoms is determined based on the CIWA scores (Knight & Lappalainen, 2017). Patients that have experienced withdrawal previously may know how to manipulate the score to receive more benzodiazepines. The CIWA tool also requires frequent monitoring and the questions may be difficult for the patients to answer as they fall further into withdrawal. The CIWA tool evaluates patients after symptoms have begun. The idea driving this project was to identify those who will have severe alcohol withdrawal before symptoms even begin, as an added bonus another tool may not be subject to manipulation.

Maldonado et al. (2015) found that the PAWSS tool had a 100% success rate in identifying patients who would experience severe alcohol withdrawal in a pilot study. The PAWSS tool is used to predict those who will experience withdrawal prior to symptoms beginning whereas the CIWA is used for once a patient is already experiencing withdrawal.

**Problem Statement**

The ED has a significant need to identify patients at risk for alcohol withdrawal and seeks to implement a screening tool to address this need. The question addressed in this project was: in adults who use alcohol that present to the emergency department, does using the “Prediction of Alcohol Withdrawal Severity Scale” in comparison with no screening tool accurately identify patients who would experience withdrawal?

**Purpose Statement**

The purpose of this project was to determine if using the Prediction of Withdrawal Severity Scale in the emergency department to screen adults for alcohol dependence accurately identified patients being admitted to the hospital who will experience alcohol withdrawal symptoms.

**Outcomes**

The primary outcome of this project was to substantiate the use of the Prediction of Alcohol Withdrawal Severity Scale to accurately identify patients who would experience alcohol withdrawal prior to being admitted to the hospital. The screening would be performed on all patients being admitted to the hospital while still in the emergency department. Patients that screen positive would be monitored for complicated alcohol withdrawal symptoms to determine a true positive. A negative PAWSS score would be monitored for lack of symptoms, determining a true negative. Outcomes would be measured by following the patient during his or her hospital stay to determine if he or she developed withdrawal symptoms and examine if the initial PAWSS score was positive or negative. A true positive PAWSS score was greater than or equal to 4 in a patient who does experience alcohol withdrawal. A true negative PAWSS score was less

than 4 and a patient who does not experience alcohol withdrawal. The significance surrounding this screening was to administer alcohol withdrawal treatment to patients who screened positive to help prevent decline in patient stability.

### **Review of the Literature**

This section highlights the literature utilized in the development of the proposal. Two databases were used and ultimately resulted in four articles pertaining to this project. A synthesis of evidence will be provided including application to the project.

### **Literature Search**

The literature search was completed using the databases “Cumulated Index Nursing and Allied Health Literature” (CINAHL) and “ProQuest Nursing Health & Allied Service”. The search terms for population included “alcohol adults”, “alcoholics”, and “adult alcohol abuse”. All of these combined resulted in 272 studies in CINAHL and 4,055 in ProQuest. The search terms for problem included “alcohol screening in emergency department” and “emergency department alcohol withdrawal”. These terms searched with “or” resulted in 189 studies in CINAHL and 5,537 in ProQuest. For intervention, the search terms included “Prediction of Alcohol Withdrawal Severity Scale” and “alcohol screening tool”. The terms searched combined using “or” resulted in 411 articles in CINAHL and 15,578 in ProQuest. The final search included “alcohol abuse in the emergency department” and “prediction of alcohol withdrawal severity scale” resulted in three articles in CINAHL and 303 in ProQuest. This search was repeated with the limiters including English, academic journal, and within the last 10 years. The exclusion criteria included subject matter not related to PICOT question: wrong population, no relationship to intervention, and duplicates. This had a final result



of four articles (See Appendix A and Appendix B). There is limited data regarding alcohol withdrawal screening tools, their cost, complications, or acuity in the emergency department.

### **Synthesis of Evidence**

There are indications that the CIWA which is most widely used in hospital settings, may not be as effective as previously thought (Higgins et al., 2019). Higgins et al. (2019) found that the CIWA scale is likely not valid across all populations. The lack of validity may come from the fact that the CIWA scale was developed for use in a detoxification setting, but has been used in an acute setting as well (Higgins et al., 2019). Although the CIWA scale can be effective once a patient is already experiencing withdrawal, it does not predict withdrawal like the PAWSS. This creates a problem where patients are not being identified as alcohol withdrawal patients until after being admitted and are already experiencing withdrawal. Other screening questionnaires such as the Alcohol Use Disorders Identification Test and the Cut-Annoyed-Guilty-Eye Opener (CAGE) questionnaire have not been tested on those who are critically ill (Sutton & Jutel, 2016). Maldonado et al. (2014) performed a pilot study on the PAWSS tool. When screening questions were answered honestly, 100% of patients who scored positive, experienced severe alcohol withdrawal. PAWSS may identify these patients in the emergency department prior to being admitted to the hospital. PAWSS is unlike any other tool due to the ability to predict alcohol withdrawal versus waiting for symptoms to begin to utilize the tool appropriately. Although PAWSS is a new tool, it has the potential to change the way alcohol withdrawal patients are identified and managed with early identification and treatment for patients.

### **Theoretical Framework**

The framework used for this project was the Iowa model (Titler et al., 2001). The Iowa model is used to guide nurses and other healthcare professionals to implement evidence based research into practice with a step by step model. Utilizing this model guided the development of this practice change. The Iowa Model was developed by the University of Iowa Department of Nursing as a conceptual framework to guide knowledge development (Johnson, Gardner, Kelly, Maas, & McCloskey, 1991). The key components include to identify priority topics, form a team, assemble literature, critique literature, determine research base, and pilot the change. This also includes determination of appropriate change in practice, institute the change, monitor results, and disseminate.

Based on the Iowa model, the identification of patients who will experience alcohol withdrawal was identified as a priority for the organization. For this project, a team of key stakeholders had already been identified based on the evidence. The team was formed and included this investigator, clinical partner, ED manager, and ED educator. It had been decided by the facility and providers to use the PAWSS tool based on the evidence. The section of the Iowa Model that was the focus for the project was “pilot the change”. The final step would be completed by the institution. Pilot the change is described in detail in Table 1.

Table 1

*The Iowa Model Steps* (Titler et al., 2001)

Steps of Iowa Model	Project Relation
Select Outcomes	Substantiate the PAWSS tool by determining true positives and true negatives.
Collect Baseline Data	224 patients over an 18 month period were found with a diagnosis of alcohol dependence or alcohol abuse.
Design Evidence Based Practice (EBP) Guidelines	Discuss goals and outcomes.
Implement EBP on Pilot Unit	The tool was chosen and brought to the hospital by an ED nurse practitioner. Intended actions during this step were to provide education to nurses and staff followed by implementation of the PAWSS tool over a 2 week period
Evaluate Process and Outcomes	Data collection and analysis. Compare results against expected outcomes.
Modify the Practice Guideline	This would be up to the institution to decide and would be within the organization's control.

### **Organizational Assessment**

The organization had expressed readiness for change by identifying this project as a hospital initiative. The emergency department was chosen as the place to implement the project as it is the metaphorical door to the hospital, meaning that the majority of patients who get admitted come through the ED. Emergency department nurses are accustomed to implementing changes as it seems many hospital wide changes are piloted in this setting. Barriers included staff resistance, lack of patient cooperation, and increased time with patients. Possible risks included offending or making a patient uncomfortable. Existing information on the PAWSS tool was limited and more studies are needed to truly evaluate the effectiveness of this screening tool. However, the hospital was in support of utilizing this tool in order to best help identify patients that will potentially suffer from alcohol withdrawal.

### **Methodology**

#### **Setting**

This project was set to be carried out in a Midwest metropolitan women's hospital emergency department. The hospital has 65 inpatient beds. The emergency department has 12 total beds. The ED sees roughly 30 to 35 patients a day or roughly 11,800 per year. Patients that are admitted to the hospital are only women, but men are also seen in the emergency department. Men requiring admission are transferred to the main campus hospital 11 miles away.

#### **Sample**

Potential participants were any adults 19 or older presenting to the emergency department who were to be admitted into the hospital for any reason during this time

frame. Any male patients admitted to the main campus hospital would be screened and followed in that setting. Exclusion criteria included participants under the age of 19 and adults who are not able to answer the screening for any reason. Speaking English was not an exclusion criteria due to interpreters being available.

### **Original Implementation Procedures**

Due to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, which struck across the globe, the project was not implemented for safety reasons. The intention for implementation is described in this section.

**Pre-Intervention.** Prior to implementing the tool in the emergency department, a meeting would have been held with the staff members to understand the purpose of the project. Education would have been provided in the form of a presentation.

**Intervention.** Printed copies of the PAWSS tool would have been placed at the nurses station for nurses to fill out when they have a patient presenting to the ED who would have been admitted. The nurse would screen the patient using the PAWSS tool and complete the questionnaire. The medical record number of the patient would be placed on the form so the medical record could be accessed at a later date. This form would be placed in a secure location for the investigator to collect and examine data. This would have occurred over the course of two weeks.

**Postintervention.** The information gathered would have included age, ethnicity, gender, and positive or negative PAWSS score. Results would examine if the participants had a true positive or true negative PAWSS score based on reviewing the medical record for presence of alcohol withdrawal symptoms after patient discharge.

**Measurement Instrument**

The tool begins with the first question “Have you consumed any amount of alcohol in the past 30 days?”. This opens up a dialogue for the rest of the questions. There are an additional eight questions to ask the patient and two based on objective data obtained in a hospital setting. A score greater than or equal to four puts the patient at high risk of severe alcohol withdrawal and can be treated accordingly. It is important to note that there have been minimal studies on this tool because it was developed in 2014, but has been chosen because it is the only tool available that predicts those who will experience alcohol withdrawal rather than evaluating those who are already experiencing withdrawal. Maldonado et al. (2014) evaluated PAWSS and found sensitivity and specificity at 100% with a positive score equal or greater to four. In a subsequent study, Maldonado et al. (2015) identified sensitivity of PAWSS to identify complicated withdrawal at 93.1 percent and specificity at 99.5 percent.

**Data Collection Procedures**

Data would have been collected using the paper PAWSS tool. The PAWSS tool would have been completed by the nurse administering the screening and the investigator would have collected the completed tools after two weeks.

**Ethical Considerations**

Institutional Review Board (IRB) approval was obtained prior to initiating the project. Risks for the population included psychological distress, potential offence perceived by the patient, or making a patient uncomfortable from the questions. Participants would be able to decline to answer any question. Benefits for sample participants would be early identification of alcohol withdrawal which would allow for

earlier treatment. Demographics for each patient screening would be obtained, but no personal information would be stored. Each finalized tool would be stored in a locked file cabinet, then uploaded into a password protected computer. The computer would only be accessible to the investigator. The investigator and mentor have completed Collaborative Institutional Training Initiative (CITI) Program training.

### **Data Analysis & Results**

Due to the project not being implemented, no data was collected. The SARS-CoV-2 pandemic during the proposed timeline for the project was weighing heavily on healthcare workers and the investigator discussed the appropriateness of implementation at that time with the facility, ultimately determining these workers already have enough to overcome without adding more screening.

The Centers for Disease Control and Prevention (CDC) (2020) wrote interim guidelines for the pandemic including visitor restriction in long term care facilities with the exception of certain compassionate care situations. For hospitals, the guidelines were not as strict. However, all hospitals in the quality improvement project site followed the guidelines listed for long term care facilities. This included restricting students from the healthcare facilities. By not collecting data, the investigator and participants were following CDC guidelines to help prevent the spread of infection throughout healthcare facilities.

### **Discussion**

This project faced several barriers, the first of which was the investigator did not work within the organization. This makes implementation more difficult because contacts within the organization need to be set up. Guidance from many different sources, all of

which need to be determined by someone within the organization was needed, resulting in an increase in difficulty with only one contact for the investigator. This project needed a clinical contact as well as connections with the department manager and department educator. This took several months and multiple attempts to contact to develop a team.

Once everything was set up within the organization, the SARS-CoV-2 pandemic began. This forced the investigator and the rest of the team to examine the appropriateness of the project. Since the project was in the emergency department, the frontlines of the outbreak, it was determined not to implement the project in the midst of the pandemic. Several factors were taken into account to make this decision. The first was the nurses in the ED. It did not seem appropriate to add more responsibility to their already overwhelming tasks. This decision came from the investigator and personal experience of being an emergency department nurse. The nurse in the ED needed to be focused on the health and safety of both the staff and the patients. The fewer distractions preventing the nurse from doing his or her best job, the better the outcomes for both the nurse and the patient. Due to the safety factor of both staff and patients, ethically it would be best to not have any unnecessary changes within the department during the rapidly changing healthcare system in the midst of a pandemic.

The next factor was the uncertainty of the SARS-CoV-2 pandemic. Unfortunately, with a new virus, there is no way of predicting the volume of patients the healthcare system would see. The final factor was the CDC recommendation that no visitors be allowed in the hospital (Center for Disease Control and Prevention, 2020). Although the primary investigator would not be administering the PAWSS, it was still necessary to be in the department to collect the data and examine the medical record. The investigator



took these considerations and reached out to the organization and the collaborative decision was made that it would be best not to implement at the current time.

Implementation of the project is step four of “Pilot the Change in Practice” in the Iowa Model framework. Due to the Iowa Model being a step by step diagram, the decision not to implement simply came to a stop during the pilot section. The institution is committed to this practice change and intends to revisit this project in the future when timing is more appropriate.

### **Plan for Sustainability**

Fortunately for any new investigator, this project could easily be reproduced and finished. The project has already been accepted and prioritized by the organization. Permission to use the tool from the author for research has already been obtained. Potentially, there will be more data on the PAWSS tool for future investigators to make an even more compelling argument when looking to implement this project. The project will remain applicable in the future due to the need for better alcohol withdrawal screening still being valid even after the pandemic. The PAWSS tool can still be utilized in the emergency department or in an inpatient setting even if healthcare changes as a result of SARS-CoV-2 as all that is involved is asking a patient questions. It would be beneficial for the organization to continue with this quality improvement project in the future because it could benefit many patients and could be built into the EMR if accepted as protocol.

### **Implications for Practice**

Making the best decision for a healthcare organization can be a difficult task. There are many factors that need to be evaluated and ethical considerations to evaluate.

For an organization, this may include deciding against implementing change for any number of reasons. Timing is an important factor in implementation. Events going on within the organization, or in this case across the globe, may be more important than implementing change. This can also change the priorities for both the investigator and the organization.

When a crisis occurs, the needs of the population should be considered before making changes, especially in healthcare. Staff needs to feel supported by the organization in any way necessary. The needs of staff become priority because without healthcare workers at their best, the patients are not getting the care they deserve. There is increased risk for human overload. This may include factoring in emotional, physical, and psychological needs to best keep staff and patients healthy. The tasks of individuals need to be examined and kept under control where possible, which could include not implementing changes in a department. For a project investigator, the stakeholders need to be an important factor in deciding whether or not to implement which was the case with this project. The stress of the staff, organization, participants as well as the safety of participants and investigator were prioritized over implementation.

### **Conclusion**

Alcohol withdrawal can be a very dangerous condition. Early identification of complicated alcohol withdrawal could allow for earlier treatment for patients prior to beginning withdrawal. This project, if conducted in the future, could also contribute to the sensitivity and specificity of the PAWSS tool. The decision not to implement during the current crisis was a difficult one to make, but was made with the best intentions for all stakeholders. A future investigator could replicate this project and utilize these results for

the benefit of the organization and the participants. Research is an important piece in the advancement of healthcare, but not at the risk of ethical issues for any part of the population.

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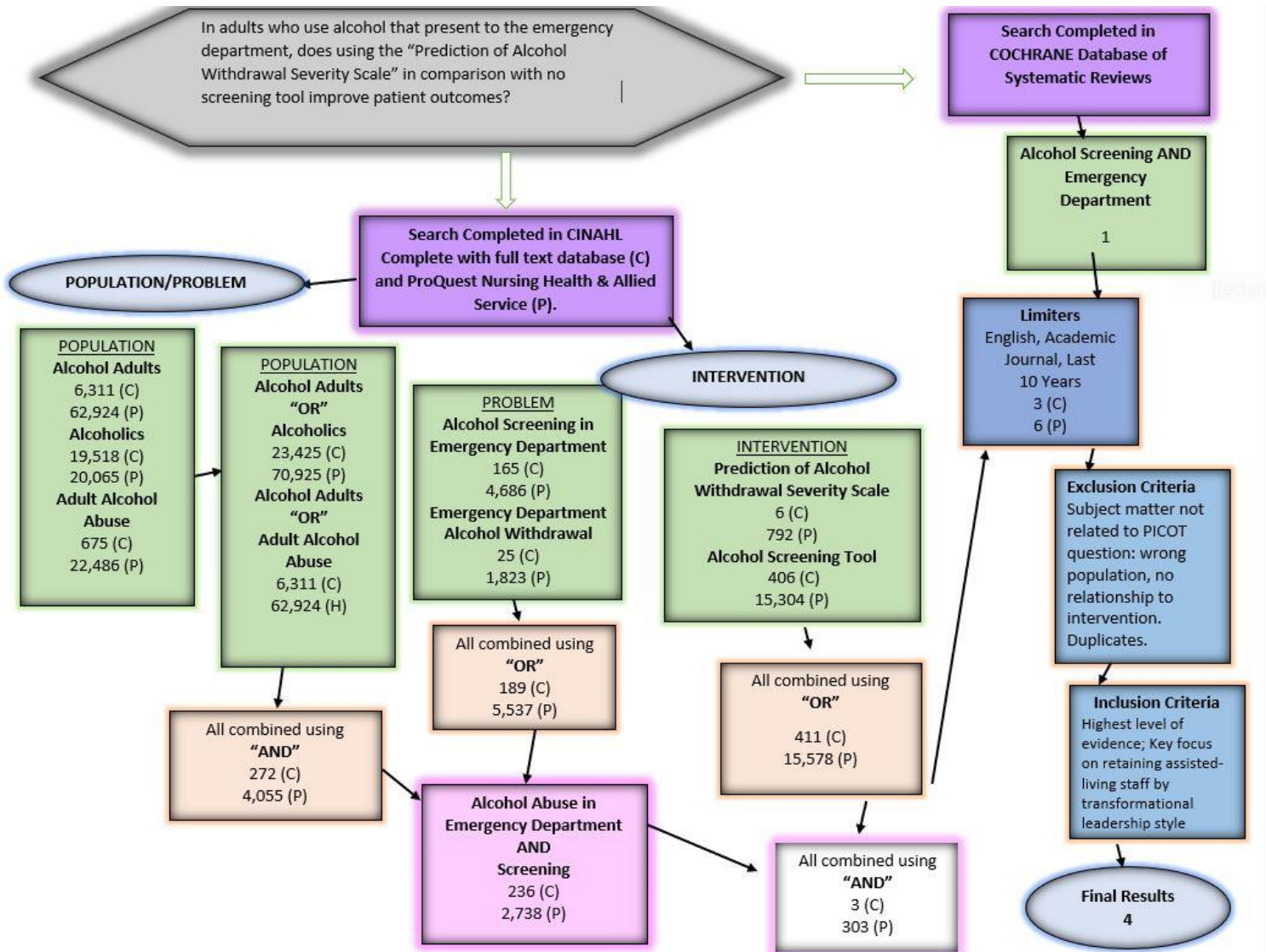
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Appendix

Appendix A

Literature Search



**Appendix B**

**Reference Matrix**

**Reference Matrix**

**Clinical Question:**

In adults who use alcohol that present to the emergency department, does using the “Prediction of Alcohol Withdrawal Severity Scale” in comparison with no screening tool identify more patients who would experience withdrawal?

Citation/Level of Evidence	Participant/Setting/ Sample Size	Purpose/Background	Methods/Design & Limitations	Findings/Summary/Strengths/ Weakness	Applicability to Own Research
<p>Maldonado, J. R., Sher, Y., Das, S., Hills-Evans, K., Frenklach, A., Lolak, S., ... Neri, E. (2015). Prospective validation study of the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) in medically ill inpatients: A new scale for the prediction of complicated alcohol withdrawal syndrome. <i>Alcohol &amp; Alcoholism</i>, 50(5), 509–518. <a href="https://doi.org/10.1093/alcalc/aggv043">https://doi.org/10.1093/alcalc/aggv043</a></p> <p>Level V</p>	<p>New York Presbyterian/ Columbia University Medical Center.</p> <p>403 participants Age 18+, English speaking, willing and consenting to participate</p>	<p>To test and validate the Prediction of Alcohol Withdrawal Severity Scale in the use of complicated alcohol withdrawal identification.</p>	<p>2 test groups: PAWSS <math>\geq 4</math> and PAWSS <math>&lt; 4</math> Followed for a maximum of 3 days. Compared with CIWA and AWS. Blind study.</p> <p>Limitations included some patients prophylactically treated due to previous admissions. 2 false positive and 2 false negative. Small number of true positives. Mostly performed on general medical patients.</p>	<p>A total of 1533 patients were admitted. 409 were studied and 403 were included in the study. The study was performed over the course of a year. 374 participants scored less than the cutoff and 29 scored positive. Of the 374, 372 never experienced complicated withdrawal. Of the 29 that scored positive, 27 experienced complicated withdrawal. This determines a 93.1% sensitivity and a 99.5% specificity.</p> <p>A weakness of this study was that it is the pilot study for a new tool. This resulted after review that the false positives and false negatives were actually scored inappropriately.</p>	<p>This article supports my research because it is the pilot study for the PAWSS assessment tool that I will be using in my research.</p>
<p>Higgins, J., Bugajski, A. A., Church, D.,</p>	<p>University of Kentucky</p>	<p>To test the reliability and validity of the CIWA in hospitalized patients.</p>	<p>Chart reviews were performed on patients with</p>	<p>The results showed that the CIWA may not be a reliable tool to assess the severity of alcohol withdrawal.</p>	<p>This article does support my research because it questions the</p>



<p>Oyler, D., Parli, S., Halcomb, P., ... Bernard, A. C. (2019). A psychometric analysis of CIWA-Ar in acutely ill and injured hospitalized patients. <i>Journal of Trauma Nursing</i>, 26(1), 41–49. <a href="https://doi-org.methodistlibrary.idm.oclc.org/10.1097/JTN.0000000000000414">https://doi-org.methodistlibrary.idm.oclc.org/10.1097/JTN.0000000000000414</a></p> <p>Level V</p>	<p>A chart review of 479 cases was performed. 118 were admitted to trauma/orthopedic and 361 to internal medicine.</p>		<p>an active order for alcohol withdrawal assessments over the course of a year.</p> <p>Limitations include being a retrospective design and only completed at a single center.</p>	<p>Weaknesses of this study are that it is a single institution study and that this was performed retrospectively.</p>	<p>validity of the CIWA which shows we may need a new tool to assess the severity of withdrawal.</p>
<p><b>Citation/Level of Evidence</b></p>	<p><b>Participant/Setting/ Sample Size</b></p>	<p><b>Purpose/Background</b></p>	<p><b>Methods/Design &amp; Limitations</b></p>	<p><b>Findings/Summary/Strengths/Weakness</b></p>	<p><b>Applicability to Own Research</b></p>
<p>Sutton, L. J. (2016). Alcohol withdrawal syndrome in critically ill patients: Identification, assessment, and management. <i>Critical Care Nurse</i>, 36(1), 28–39. <a href="https://doi-org.methodistlibrary.idm.oclc.org/10.4037/ccn2016420">https://doi-org.methodistlibrary.idm.oclc.org/10.4037/ccn2016420</a></p> <p>Level VII</p>	<p>This was a background information article so there were no participants or setting.</p>	<p>The purpose of this article was to discuss the CIWA and other alcohol withdrawal identifying tools and treatment.</p>	<p>There were no methods or design used in this article.</p>	<p>This article discusses what management of alcohol withdrawal looks like in critical care nursing, what to look out for, and how to treat.</p>	<p>This article supports my research as it provides information on how to assess and treat alcohol withdrawal.</p>
<p>McQueen, J. (2015). Brief interventions for heavy alcohol users admitted to general hospital wards. <i>Cochrane Database of Systematic Reviews</i>, (9).</p> <p>Level V</p>	<p>Southern General Hospital and Victoria Infirmary Glasgow, UK.</p> <p>Fourteen studies with 4041 participants were included.</p>	<p>The purpose of this research was to determine if brief interventions reduce alcohol consumption and improve outcomes for those admitted to inpatients.</p>	<p>Participants were followed after admission and had a 6 month, 9 month, and year follow up.</p> <p>Limitations included a majority of male patients.</p>	<p>There may be benefits to brief interventions for heavy alcohol abusers including reduced alcohol consumption and reduced death rates.</p> <p>Weaknesses include prior studies were inconclusive and screening alone may result in reduced alcohol consumption.</p>	<p>This article does not support my research because it does not relate to alcohol screening in the emergency department.</p>

