Evaluating Impact of Opioid Detoxification Lengths of Stay on Withdrawal Symptoms Upon Discharge

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Abstract

Purpose: The purpose of this project was to determine if a longer length of detoxification is more affective reducing withdrawal symptoms. Detoxification is the process in which toxic substances in an effort to excrete them from the body. Adequate detoxification treatment for opioid use disorder is essential. The length of stay as well as the pharmacological use for detoxification are the most important aspects in treatment. An adequately treated patient during detoxification may lead to better treatment outcomes.

Method: This project compared COWS scores in the beginning and at the end of detoxification with the use of Subutex for a five-day and a seven-day length of stay. The data was evaluated and compared using independent and paired t-tests. This project took place at a 16-bed detoxification facility in northern New Jersey. The use of a tool to determine the level and severity of withdrawal is important to help determine if the treatment regimen is effective in the resolution of opioid withdrawal. The clinical opioid withdrawal scale (COWS) is the tool most commonly used during detoxification to assess withdrawal symptoms when treated with Subutex.

Implications for practice: The findings from this project suggests that patients that detox from opioids do better after completing a seven-day detox. Based on the findings of this project the facility should consider collecting additional data to assess the relapse rate for a five-day length of stay to determine how many patients return for treatment after discharging due to opioid relapse.

Keywords: Opioid, treatment, detoxification, substance abuse, buprenorphine, suboxone, COWS, and drug abuse.

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Opioid abuse has become a crucial health concern in the United States (U.S.). In 2013, over 13 million people abused prescription opiates and up to 600,000 have been found to use heroin (Blevins, Abrantes, Kurth, Gordon, & Stein, 2012). Approximately two million people with prescription opioid abuse required withdrawal treatment at some point in their life (Blevins et al., 2012). According to Blevins et al. (2012), the rates of opioid abuse continue to increase as does the risk for overdose. Inpatient detoxification is one treatment method available for opioid abuse which takes place under 24-hour supervision and care by medical and psychiatric providers (Dunn, Saulsgiver, Miller, Nuzzo, & Sigmon, 2015). The purpose of an inpatient detoxification setting is to safely treat and manage opioid withdrawal symptoms with the assistance of approved detoxification medications. Approximately 90% of patients treated in inpatient detoxification settings relapse within the first six months after treatment and 60% of those patients relapse within one week (Blevins et al., 2012). Subutex is an opioid u-receptor partial agonist that is used with tapers for the treatment of opioid abuse during detox (Spear, 2014). The goal of this project is to evaluate the length of stay for detox treatment for opioid abuse with Subutex treatment by measuring the clinical opioid withdrawal scale scores to determine if a seven-day length of detox treatment is more effective in resolution of withdrawal symptom prior to discharge.

Background and Significance

In 2014, there was an increase in deaths from opioid abuse, heroin, prescription opioids, and other opioid derivative drugs. Over 1.8 million people in the U.S. are dependent on opioids and are unable to discontinue taking opioids without experiencing withdrawal symptoms (Rusch,

2015). According the U.S. Department of Health and Human Services (HHS, 2006) overdoses related to drug consumption are the primary cause of unintentional death in the U.S. In 2015 there were 52,404 deaths due to drug overdose (HHS, 2006). A total of 20,101 overdose deaths were related to prescription opioids and 12,990 were related to heroin use (HHS, 2006). According to Han, Compton, Jones and Cai (2015), the U.S. has had an increase in morbidity and mortality related to opioid abuse. Since 1999 emergency rooms have noted an increase in opioid-related visits leading to deaths related to drug overdoses (Han, et al., 2015). There was also an increase from 0.4% to 0.6% from 2003 to 2013 of opioid use disorder diagnosis in children 12 years and older (Han, et al., 2015). The opioid abuse-related emergency room visits more than doubled from 82.5 per 100,000 in 2004 to 184.1 per 100,000 in 2011 (Han et al., 2015). According to Coffin et al. (2017) there has been an increase in healthcare costs and overutilization of resources for the treatment of opioid abuse. The financial implication of opioid abuse disorder has been estimated to be at approximately $55 billion (Coffin et al., 2017). According to Coffin et al. (2017) emergency room utilization was 20% higher for those patients that did not seek treatment.

According to HHS (2006), opioids are classified as drugs that produce an effect on the nervous system to alleviate pain and fabricate relaxation of the brain. Opioids include codeine, heroin, morphine, hydromorphone, oxycodone, and methadone. Opioids are extremely addictive therefore chronic use or abuse can will lead to withdrawal symptoms when taken away from the body. Opioid withdrawal symptoms include, but are not limited to sweats, nausea, vomiting, diarrhea, skin-crawling, irritability, tachycardia, hypertension, insomnia, tachypnea, muscle spasms, anxiety, and muscles pain (HHS, 2006). Opioid withdrawal symptoms are non-life-threatening but will produce moderate to severe distress to the body. It is vital to ensure that

patients experiencing opioid withdrawal remain medically stable and this is achieved by initiating and tapering medications used to treat withdrawal symptoms throughout several days and sometimes weeks (HHS, 2006). Opioids are abused due to the euphoric effects produced by the specific drug (HHS, 2006). As opioid prescription laws and policies become more stringent people with prescription opioid abuse transition to heroin use which leads to an increased risk for severe withdrawal and overdose (Coffin et al., 2017).

The use of inpatient treatment facilities for opioid use disorder increased from 37.5% (2004-2008) to 51.9% (2009-2013) (Han et al., 2015). More people in need of opioid abuse treatment received care in inpatient settings from 2004 to 2013 (Han et al., 2015). According to HHS (2006) detoxification is an intervention provided under 24-hour medical supervision intended at managing acute drug intoxication and withdrawal symptoms to clear the body from the toxins due to substance abuse. Detoxification is an essential and initial treatment for people with opioid abuse (Dunn et al., 2015). According to Spear (2014), in the US numerous readmissions to detox facilities for opioid use disorder treatment is common. Patients are at higher risk for relapse after completion of detox treatment. One-third of patients with opioid abuse relapse and return for detox treatment up to two or more times within a six-month period which suggests inadequate treatment and use of resources (Spear, 2014).

According to Canamo and Tronco (2019), during inpatient opioid detoxification patients' withdrawal symptoms are monitored closely by using the clinical opiate withdrawal scale (COWS). The COWS tool consists of 11 items that capture symptoms of opioid withdrawal to assess severity of symptoms and/or treatment effectiveness. The tool uses a score technique with possible scores of zero to 48 (Canamo & Tronco, 2019). Each withdrawal symptom is assessed individually and scored from zero to four and some are scored from zero to five. The symptoms

on the COWS tool include; resting pulse rate, sweating, restlessness, pupil size, bone or joint pain, runny nose or tearing, gastrointestinal upset (nausea, vomiting, diarrhea, stomach cramp), tremors, yawning, anxiety/irritability, and gooseflesh skin. The withdrawal score severity between five and 12 are mild, 13 to 24 are moderate, 25 to 36 are moderate to severe, and more than 36 are severe withdrawal symptoms (Canamo & Tronco, 2019).

Subutex is one of the pharmacotherapy methods used for opioid detoxification management of symptoms during withdrawal. Subutex is a partial opioid agonist which means it stimulates the opioid receptors in the brain. An opioid receptor is specific sites on cells in the brain where opioids bind to produce its effect (HHS, 2006). Subutex has pharmacological properties that allow for treatment with dosing taper regimens. Subutex can be initiated 24 hours after the last dose of opioids or as soon as the patient starts to demonstrate mild to moderate withdrawal symptoms.

There is an increase in a chronic relapse in patients with opioid use disorder at a northern New Jersey detoxification facility. Patients are currently being treated Subutex tapers during opioid detoxification treatment. According to Lee et al. (2018), withdrawal is likely to occur with premature discontinuation of a partial opioid agonist such as Subutex. Premature discontinuation of Subutex treatment during detoxification could lead to opioid relapse which puts the patient at risk for overdose (Lee et al., 2018). After discharge from detoxification, patients are more vulnerable to relapse if the treatment during opioid detoxification is inadequate (lee et al, 2018). The need to improve treatment during detoxification is critical for this population to prevent relapse and or opioid overdose (Spear, 2014)

Problem Statement

Opioid use disorder impacts people of all ages weather prescribed opioid abuse or illicit drug use. Opioid abuse may lead to overdose and or death. The problem emerges when patients with opioid use disorder do not receive effective treatment to relieve withdrawal symptoms. There are inconsistencies in the treatment regimen during opioid detoxification with respect to an adequate length of stay that is effective in minimizing withdrawal symptoms upon discharge. In a northern New Jersey detoxification facility, all patients are assessed using COWS tool however some are treated with Subutex for a total of five days while others for seven-days. It is unclear which length of treatment allows for resolution of withdrawal symptoms at discharge.

Needs Assessment

Approximately 275 million people worldwide used drugs and among those people 27 million had opioid use disordered (World Health Organization, 2018). A total of 20.5 million people in the U.S. were diagnosed with substance abuse disorder in 2015 (HHS, 2006). Two million of those people had a prescription abuse disorder, and 591,000 were using heroin (HHS, 2006). An estimate of 23% of people with substance abuse disorder had a heroin addiction (HHS, 2006). Drug overdose is the leading cause of accidental death in the U.S. (HHS, 2006). In 2015 there were 52,404 deaths due to a drug overdose, with 20,101 related to prescription pain opioids, and 12,990 related to heroin (HHS, 2006).

According to Knudsen, Abraham, and Roman (2011) the substance abuse and mental health services administration's national survey of substance abuse treatment services data from 2007 showed 14.3% of facilities in the U.S. used Subutex as a pharmacological treatment for opioid abuse treatment. In New Jersey there were 7,217 people with opioid use disorder who were admitted to a facility for treatment from 2013-2017 (New Jersey Department of Health,

2017). In Monmouth County there were 1,486 heroin and 1,487 prescription related emergency room visits from 2008-2017 with 172 reported deaths (New Jersey Department of Health, 2017). There is a gap in the literature on specific treatment regimens and length of stay on a state or local level therefore more research is warranted on this topic.

There is an increase in chronic relapse in patients with opioid use disorder at a northern New Jersey detoxification facility. Patients are currently being treated with Subutex tapers during opioid detoxification treatment. According to Lee et al. (2018), withdrawal is likely to occur with premature discontinuation of a partial opioid agonist. After discharge from detoxification, patients are more vulnerable to relapse if the treatment during opioid detoxification is inadequate. The need to improve treatment during detoxification is critical for this population to prevent relapse and or opioid overdose (Spear, 2014).

In consideration of the intended project a strengths, weaknesses, opportunities, and threats (SWOT) analysis was conducted. The strengths of this project include the support of the facility's medical director. The project has the potential to be cost effective and decrease relapse rate. There is also a supportive staff and administration. The weaknesses include adequacy and consistency of COWS assessments by staff in electronic health record. The opportunities include alignment of recommendations to standardize length of stay and modification of Subutex protocol for symptom relief. Threats may include insurance company reimbursement which may not cover seven-day treatments even if data supports it and competing programs in the northern New Jersey area.

Aims and Objectives

The aim of this project is to evaluate detoxification program with the inclusion of formal recommendations for patient care management. This project will evaluate and compare the

admission and discharge COWS scores for both five-day and seven-day to and compares the results based on length of stay.

Objectives of this project were to:

- evaluate variables such as gender and age.
- evaluate the COWS scores upon initiation and at completion of a five-day detoxification treatment over three months.
- evaluate the COWS scores upon initiation and completion of a seven-day detoxification treatment over three months.
- identify if COWS scores differ on a five-day compare seven-day treatment.
- identify the Subutex dose used for five-day detoxification treatment.
- identify the Subutex dose used for seven-day detoxification treatment.
- establish formal recommendations for opioid detoxification treatment time.

Review of Literature

The literature review search was conducted using the databases Cochrane Library, PubMed, ESBSCO, HOST, CINAHL and MedLine. The search strategy was developed using the following keywords words: *opioid, treatment, detoxification, substance abuse, buprenorphine, suboxone, COWS*, and *drug abuse*. The advanced search engine helped produce evidence-based research full-text peer-reviewed articles. The databases included in the search produced randomized controlled trials, systematic reviews, cohort, secondary analysis and treatment guidelines. The following information was extracted from each study: Full reference, the sample number (participants), the type of interventions (buprenorphine dosages), the setting (inpatient or outpatient), type of control intervention and outcomes. The literature search identified a total of 1,184 articles. Of these, 26 studies were retrieved in full text and assessed according to eligibility

criteria. A total of 12 studies were appraised using the John Hopkins Evidence Level and Quality Guide tool (see Appendix A).

Length of Treatment

The literature regarding subutex length of treatment for opioid use disorder recommend longer tapers of the medication during treatment for adequate management of withdrawal symptoms. In the study conducted by Jain, et al., Chavan, Sidana and Das (2018) which compared the effectiveness of different doses of sublingual Subutex for opioid detoxification and found that on day seven of detoxification treatment patients were still experiencing withdrawal symptoms compared to day 14. Even on day 14 of detoxification treatment patients did not report full resolution of withdrawal symptoms (Jain, et al., 2018). In addition, there was statistical significance with treatment of higher doses of Subutex (Jain, et al., 2018). When controlled for the baseline characteristics, buprenorphine 6 participants were three times less likely to drop out the first 7 days than buprenorphine 1 participants (adjusted hazard ratio (aHR) = .28, p = .03) (Jain, et al., 2018). The dose of Subutex was higher in the group that had better withdrawal symptom control. According to Northup et al. (2015) patients treated with Subutex required a slow and longer taper. A fast Subutex taper produced rebound withdrawal symptoms and cravings leading to relapse (Northup et al., 2015). In the study conducted by Marsh et al. (2016) the findings revealed a difference in participants who had opioid negative drug urine tests. The participant that were treated with a 56-day Subutex taper had more negative urine drug screens compared to those that were treated with a 28-day Subutex taper (Marsh et al., 2016). The study focused on the efficacy of Subutex and the length of time participants maintained opioid abstinence after treatment completion. The results of the study showed that the participants that had a longer Subutex taper of 56-days were able to remain opioid-free with better treatment

retention when compared to the 28-day taper (Marsh et al., 2016). Findings Intent-to treat analyses revealed that participants who received a 56-day buprenorphine taper had a significantly higher percentage of opioid-negative scheduled urine tests compared with participants who received a 28-day buprenorphine taper [35 versus 17%, P = 0.039; Cohen's d = 0.57, 95% confidence interval (CI) = 0.02, 1.13]. Participants who received a 56day buprenorphine taper were retained in treatment significantly longer than participants who received a 28-day buprenorphine taper (37.5 versus 26.4 days, P = 0.027; Cohen's d = 0.63, 95% CI = 0.06, 1.19) (Marsh et al., 2016).

COWS Assessment

The COWS assessments were found to be important predictors of treatment retention in those who were treated with Subutex tapers.The COWS assessment were carefully monitored in the study conduted by Jacobs et al. (2015) when comparing Subutex doses less than 16mg compared to doses greater than 16mg. The findings were consistent with treatment of higher doses of buprenophine as well as longer length of stay for treatment (Jacobs et al., 2015). The guidelines for opioid use disorder in this literature review also strongly recommend the use of longer subutex tapers to help reduce the risk of overdose deaths. According to Coffin et al. (2017) prior overdose history is a strong predictor of future overdose therefore implementing an intervention such as treatment after the the first overdose may reduce the risk of repeat overdose. At baseline, 33.3% of participants had experienced an overdose in the past four months, with a similar mean number of overdoses in both arms (p = 0.95); 29% overdosed during follow-up (Coffin et al., 2017). By intention-to-treat, participants assigned to REBOOT were less likely to experience any overdose (incidence rate ratio [IRR] 0.62 [95%CI 0.41–0.92, p = 0.019) and experienced fewer overdose events (IRR 0.46) (Coffin et al., 2017).

Subutex Treatment

Some studies compared Subutex treatment with other pharmacological agents to compare the severity of withdrawal and medication efficacy during opioid withdrawal. Subutex reduces opioid cravings and withdrawal symptoms (National Institute of Drug Abuse, 2018). In the study conducted by Lee et al. (2018) Subutex and vivitrol phamacolotical treatments were compared. The discontinuance of Subutex may lead to an increase in overdose risk (Lee et al., 2018). The findings indicated no statistical significance with reported cravings between Subutex and vivitrol treatments both treatments were equally as effective (Lee et al., 2018). Participants that were successfully inducted (per-protocol population, n=474), 24-week relapse events were similar across study groups (p=0·44). Opioid-negative urine samples (p<0·0001) and opioid-abstinent days (p<0·0001) favored suboxone compared with naltrexone among the intention-to-treat population but were similar across study groups among the per-protocol population (Lee et al., 2018). Self-reported opioid craving was initially less with naltrexone than with suboxone (p=0·0012), then converged by week 24 (p=0·20). In the systematic review conducted by Gowing, Ali, White, and Mbewe (2017) the study assessed the efficacy of Subutex compared to methadone tapers, clonidine, comfort medications or placebo, or a variety of suboxone tapers to treat opioid withdrawal. The study also assessed the level of withdrawal symptoms patients felt, the length of time and conclusion of treatment, and unfavorable effects (Gowing, et al., 2017). The study found that there was no statistical significance between the Subutex and methadone treatment in terms of average duration (Gowing, et al., 2017). There was no difference between buprenorphine and methadone in terms of average treatment duration (mean difference (MD) 1.30 days, 95% confidence interval (CI) −8.11 to 10.72; N = 82; studies = 2; low quality) or treatment completion rates (risk ratio (RR) 1.04, 95% CI 0.91 to 1.20; N = 457; studies = 5;

moderate quality) (Gowing, et al., 2017). Patients receiving buprenorphine stayed in treatment for longer, with an effect size that is considered to be large (SMD 0.92, 95% CI 0.57 to 1.27; N = 558; studies = 5; moderate quality) and were more likely to complete withdrawal treatment (RR 1.59, 95% CI 1.23 to 2.06; N = 1264; studies = 12; moderate quality) (Gowing, et al., 2017). The difference in treatment completion rates translates to a number needed to treat for an additional beneficial outcome of four (95% CI 3 to 6), indicating that for every four people treated with buprenorphine, we can expect that one additional person will complete treatment than with clonidine or lofexidine (Gowing, et al., 2017). In the study conducted by Eastwood, Strang, and Marsden (2017) pharmacological treatments included in the study were Subutex, naltrexone, and methadone. The participants that completed treatment were at a lower risk of re-admission for treatment compared to the participants that dropped out treatment (Eastwood, et al., 2017). The study showed one-fifth of the participants in treatment did not return for additional opioid treatment within six months after initial treatment (Eastwood, et al., 2017). The length of time in treatment was a big factor in reducing opioid relapse (Eastwood, et al., 2017). Successful completion and no re-presentation within six months achieved by 21.9%. Heroin and crack cocaine users were significantly less likely to achieve this outcome than patients who used heroin only (adjusted odds ratio [AOR] 0.90; 95% confidence interval 0.85–0.95) (Eastwood, et al., 2017). According to Bruneau et al. 2018 guidelines recommend continual adjustment of dosing to accommodate the individual needs of each patient and identify that a large percentage of patients will benefit from the flexibility of being able to move between different treatment regimens. The guidelines also recommend the use of suboxone treatment as the initial treatment for patients with opioid abuse due to the lower risk of overdose (Bruneau et al., 2018). In the study conducted by Day and Strang (2011) there was noted to be an increase in rates of

treatment. The study indicated that more inpatients completed treatment compared to outpatients, but the difference was not statistically significant. More inpatients (n = 18, 51.4%) than outpatients (n = 12, 36.4%) completed detoxification, but this difference was not statistically significant ($\chi^2 = 1.56$, p = .21) (Day & Stran, 2011). However, the outpatient group received a significantly longer period of medication, and when the length of detoxification was controlled for, the results favored the inpatient setting (Exp(B) = 13.9, 95% confidence interval = 2.6–75.5, p = .002). Only 11 (16%) participants were opioid-free at the one-month follow-up and eight at the six-month follow-up, with no between-group difference (Day & Stran, 2011).

Assessment of withdrawal symptoms is the crutial during opioid use disorder treatment. In the study conducted by Dunn et al. (2015) Subutex withdrawal severity was assessed during several different taper periods in order to manage withdrawal symptoms effectively. The withdrawal severity was measured by patient self-reporting, objective findings, and the use of comfort medications for withdrawal symptoms (Dunn et al., 2015). The participants that were assigned to the four-week Subutex taper experienced fewer sleep disturbances which are a characteristic of opioid withdrawal (Dunn et al., 2015). The participants randomized to the four-week taper experienced minimal if any withdrawal symptoms after completion of the Subutex taper compared to the one-week and two-week tapers (P=0.04) (Dunn et al., 2015). The findings of sleep disruptions symptoms were self-reported by the participants of each taper group (Dunn et al., 2015). A significant effect of taper group was evident on lowest mean houses of sleep, with the four-week-taper group reporting less loss of sleep compared to the one-and-two-week groups (p=0.04) (Dunn et al., 2015). A significant effect of study week (p=0.01) and interaction between taper group and study week (p=<0.001) were also observed for the number of ancillary medications used during the study (Dunn et al., 2015).

The findings in the literature review favor a long Subutex taper. Although there was no specific indication of an exact time frame when longer tapers were compared to shorter tapers participants had more favorable results. The studies about Subutex treatment reviewed found that longer tapers of Subutex are more effective. Some indicated that adequate length of treatment reduced relapse rates and opioid related deaths after treatment completion. When Subutex treatment was compared to other pharmacological agents the studies favored the treatment with Subutex based on study results. The COWS tool was found to be useful in the monitoring of withdrawal symptoms during treatment. Although there were no specific dose recommendations for Subutex during detoxification the studies how that higher doses are more effective in management and withdrawal from opioids. This project was needed to help determine and establish formal recommendations for the length of Subutex treatment for opioid detoxification.

Theoretical Framework

The Plan-Do-Study-Act (PDSA) is a mode used by different disciplines for improving process and or to carry out change (White, Brown, & Terhaar, 2016). This model was introduced as a framework for the development, test and implementation of change for improvement. The PDSA model allows to examine the change from structured test cycles before implementation of any type of change. The PDSA model provides stakeholders involved in change the ability to evaluate different proposed changes to determine its success without disruption in care (ACT Academy, n.d.).

The PDSA is the model that will be used to help in developing, testing and implementation of this Doctor of Nursing Project (DNP). The PDSA is one of the few modules used for QI projects which emphases on change, the interpretation of ideas and implementation (Reed & Card, 2016). According to Reed & Card (2016), the PDSA cycle permits a team to

quickly determine if the intervention of the project was effective. In this DNP project, the PDSA help to determine if the ideas and intervention worked within a reasonable time frame. The PDSA model helped build new ideas during the research process and was helpful in achieved the final outcome which is implementation of change with opioid use disorder and adequate length of treatment.

The PDSA model's simplicity makes is favorable and can be used by healthcare workers to implement change. The PDSA thus far is an easy tool to use which makes it favorable for this DNP QI project. The detailed stages of the PDSA makes it fairly easy to comprehend as it breaks down each step of the model to help capture each phase. The model is built to allow for multiple cycles to test different project ideas (Reed & Card, 2016). According to the ACT Academy, the PDSA allows for sequential and simultaneous cycles. The sequential cycles occur when a different approach is needed for the project. The simultaneous cycles occur when there are more complex projects that involve more than one department or when the proposed change is more complex. The PDSA cycle provides the opportunity to learn quickly if this DNP project goal/intervention is favorable for the inpatient detox.

According to Coury et al. (2017), the PDSA model is used in healthcare settings when planning for change to any current work process. The PDSA model is to determine a goal, how to measure the proposed improvement and have clarity on the ideas tested. The model uses small tests of change before finalizing new changes in practice. The PDSA has been used in clinical settings and is known to clinical staff therefore it is a useful model for implementation of research-based interventions in a clinical setting.

The PDSA model consists of four stages (Act Academy, n.d.).. *Plan* is the change one is looking to test for implement. During the *plan* the objectives, questions and predictions are

clearly defined and the planning for data collection based on objectives and questions to be answered. In this project the *plan* is to determine the COWS scores of a 5-day treatment compared to a 7-day treatment for patients with opioid abuse. *Do* is the step in which the change or test is carried out. During *do* the data is collected, the data analysis begins, and the plan is carried out. In this project the *do* is a retrospective chart review for a three-month period to compare the patient's COWS score in the beginning and at the end of a five-day versus a seven-day detoxification treatment with Subutex. The data is collected on a spreadsheet then compared based on length of stay and COWS score. The plan determines if the results of this project comparing COWS scores led to a recommendation to suggest a standard length of stay for either five or seven-days. *Study* is the step where the data is collected before and after the proposed change to reflect on the impact and the knowledge obtained. In this project data was analyzing the COWS scores upon initiation and at completion of a five-day and seven-day detoxification over three months and the Subutex dose used for five-day and seven-day detoxification treatment. *Act* is the step when the change is fully implemented or when the plan for the next change cycle occurs (Act Academy, n.d.). This project provided formalized recommendations about appropriate length of stay/protocol development for opioid detoxification.

According to Act Academy (n.d.), there are important factors that must be addressed when planning a proposed change with the use of PDSA. The proposed change needs to have goals that have measurable targets. The goals should be focused on active concerns or problems in the organization. The goals should have a realistic length of time for this project. The project changes should lead to justifiable improvements. After careful consideration of the important factors noted above the next step is to start the PDSA cycle (see Appendix B).

In conclusion, the PDSA model is a favorable model for the QI DNP project that took place in an inpatient setting. The PDSA model help support the implementation of safe, adequate and cost-effective care to patients undergoing treatment for opioid use disorder. The PDSA provided an organized experimental learning method to test change (see Appendix B).

Methodology

Setting

The site in which this project was conducted is in a northern New Jersey drug and alcohol treatment center. The treatment center is a private non-profit facility that consists of 16 beds. The facility provides alcohol and drug detoxification, short term residential, behavioral disorder, outpatient, and intensive outpatient treatment. The facility provides treatment for people struggling with alcohol, opiates, cocaine, amphetamines, and/or benzodiazepines addiction. The patients that seek treatment are primarily white/non-Hispanics and African Americans. The facility treats approximately 1,000 patients a year. Approximately 70% of the patients have a diagnosis of opioid use disorder. Most patients are insured with a small percentage that were granted government funds for treatment.

Study Population

The population studied were adults 18-65 years of age who completed opioid use disorder treatment with use of Subutex medication protocol. According to Jones, Logan, Gladden and Bohm (2015), rates of heroin use are higher among men. Inclusion criteria includes adults 18 years and older up to age 65 year of age with a diagnosis of opioid use disorder who presented for detoxification treatment. The inclusion criteria consist of patients who presented for detox of opioid use disorder only. The exclusion criteria consist of patients that present for treatment of alcohol and benzodiazepines in combination of opioids. In addition, charts were excluded from

the data collection if the patients were using methadone prior to seeking detoxification treatment and patients that are not treated with Subutex. The chart review included three months of retrospectively data totaling in 98 charts. The sample size was determined based on the approximate number of patients treated for opioid detoxification in 30 days which is approximately 48 totaling in 144 patients in a three-month period.

Subject Recruitment

There was no recruitment for this project as it was a retrospective chart review.

Consent Procedure

A waiver of consent was obtained.

Risks/Harms

This project posed minimal risks. There was a small possibility of loss of confidentiality of data collected and produced. Potential risks were be mitigated through the collection of data by diagnosis only and without collection of personal identifiers were be used. Only the research staff had access to the information obtained for each chart which was stored in a password protected computer at project site.

Subject Costs and Compensation

There were no subject costs or compensation involved in this project.

Study Interventions

The data was extracted on site from the electronic health record used by the facility. The electronic health record has a feature in the reports section that allows for filters to be applied base on the data being collected. The search in the electronic health record was filtered by the diagnosis of opioid use disorder as well as five and seven-day lengths of stay. Once the report results based on the filters the COWS assessment are stored in the electronic health record under

"assessments." Each COWS assessment was assessed based on the length of treatment. The chart review consisted of data collection of COWS scores for five-day and seven-day length of stay. The COWS scores were critically analyzed and documented on a spreadsheet at the beginning and end of a five-day length of stay as well as at the beginning and end of a seven-day length of stay for a three-month period. The scores were documented on the spreadsheet side by side to facility the comparison with a single view. The completed data collection sheet was be provided to Rutgers University IRB.

Outcome Measures

Chart reviews consisted of measuring the physical withdrawal symptoms measured with the use of COWS tool scores in patients who completed the Subutex protocol. The length of stay was also measured based on a five-day and seven-day treatment. An excel spreadsheet had columns designated to five and seven-day. The data collected on spreadsheet helped keep tract of the COWS scores after the completing of a five-day Subutex protocol and a seven-day Subutex protocol. The variables included were gender, age, and drugs used. According to Wesson and Ling (2003) COWS tool was first published in a training manual for Subutex treatment. The COWS tool is used to assess withdrawal severity in clinical trials and practice (Wesson & Ling, 2003). According to Wesson and Ling (2003) the tool consists of 11 observed (clinician-rated) and subjective (patient-rated) items (see Appendix C). The COWS tool scale scoring system is based on withdrawal symptoms such as resting pulse, sweats, restlessness, pupil size, bone aches, runny nose/tearing, GI upset, yawning, anxiety/irritability and gooseflesh skin (Wesson & Ling, 2003). Cronbach's alpha for the COWS was 0.78, indicating good internal reliability (Tompkins et al., 2009).

Project Timeline

The project took a total of eight months until completion from the planning stage until the dissemination of results. This includes IRS approval, chart reviews, collection of data, and final data comparison (see Appendix D).

Resources Needed/Economic Considerations

The costs associated for this project was be the sole responsibility of the co-investigator (DNP student). Costs include writing/office materials, statistician consult, and dissemination posters. There were no additional research expenses included in this project (see Appendix E).

Evaluation Plan

Data Maintenance/Security

All efforts where be made to keep all information confidential. The project protected the patient's information by not using any patient identifiers therefore the data was collected and coded strictly by diagnosis only. All data collected was maintained and stored in a locked cabinet at the site the where the project took place in which only the DNP student had access. The office where the cabinet was located was locked at all times. The spreadsheets used to collect data were stored on a password-protected computer at the site that is password protected in which only the co-investigator (DNP student) had access to. As the data was being collected the DNP student had full access to the information collected to adjust accordingly. The DNP student had access to the electronic health record with a username and password which was accessed at the site where the project took place. Upon completion of the project, closure of the IRB, and final writing of the manuscript all data was be destroyed in accordance with Rutgers University guidelines. Aggregate data will be housed at Rutgers School of Nursing office 11th floor office 1126 at 65 Bergen Street, Newark, New Jersey 07107.

Data Analysis

All data collected was entered in Microsoft excel spreadsheets. The spreadsheet was used to keep track of the COWS scores for detoxification treatment of day one, five, and seven. Descriptive statistics was used to compare the retrospective chart review findings of variables of gender and age. The statistical software SPSS was used for the completion of data analysis. A paired t-test was used to perform comparison of admission and discharge COWS for five-day and seven-day length of stay. An independent t-test was used to compare five-day versus seven-day length of stay COWS scores.

Findings

A total of 98 patient's charts were reviewed for this project. The mean age of the patient was 38 years old. There were more (n=76) men than women (n=22) treated for opioid detox during project. After careful review of COWS score from admission on day one, the mean score was 7.13. The mean COWS score for patients that completed a five-day Subutex detox taper was 4.16 versus 2.55 for patients that completed a seven-day detox taper. The COWS results for day one, five, and seven all fall within the mild withdrawal category which includes scores from five to 12. No patients were found to be in moderate or severe withdrawal upon admission or completion of detox treatment. The most common opioid used was heroin (n=76) and oxycodone (n=22). The data analysis also revealed that half of the patients used an opioid in combination with another drug. The findings of the data analysis show a difference in the mean COWS scores of 1.61. The data shows the COWS scores are lower at seven days compare to the five-day length of stay. This suggests that patient's withdrawal symptoms are less after a seven-day length of stay. The findings were found to be statistically significant in the scores for five versus seven days.

Discussion

Detoxification is an important process in which toxic substances are excreted from the body therefore adequate detoxification treatment for opioid use disorder is essential. The length of stay as well as the pharmacological use for detoxification are two of the most important aspects in treatment. An adequately treated patient during detoxification will experience less withdrawal symptoms upon completion of treatment. As indicated in the literature a rapid detox taper produces rebound withdrawal symptoms and cravings leading to relapse (Northup et al., 2015). It is important to improve patient outcomes but in order for that to occur patients need to feel well enough after completion of treatment. There was consistency in the COWS scores for each length of stay but the seven-day length of stay showed lower scores indicating improved withdrawal symptoms.

Limitations

Regarding the limitations of this project, some patients using opioids were also using other substances such as crack, cocaine, crystal meth, or marijuana therefore, it is unclear if the patient's opioid withdrawal symptoms were exacerbated by the other substances used. There was no comparisons made between the patients that were using only opioids and those that had multi drug use. In addition, this project did not assess the patients with multiple drug use separate from the patients that were only using opioids individually.

Implications

Clinical Practice

The findings from this project suggests patients that detox from opioids do better after completing a seven-day detox. Based on the findings of this project the facility should consider collecting additional data to assess the relapse rate for a five-day length of stay to determine how

many patients return for treatment after discharging due to opioid relapse. Also, additional data is needed on payer source to determine what each payer will cover, and the cost associated with a five and seven-day detox treatment compared to what it would cost for multiple detox treatments due to relapse. This information can be helpful to strengthen this study and be able to present the findings to payers in an effort to get a seven-day length of stay approved for all patients regardless of payer who present for opioid detox treatment. The COWS tool is a well-known effective tool that has been in use for some time to assess opioid withdrawal severity therefore will recommend continuing to use this tool. Future research should also focus on the different drugs used in combination with opioids to determine if they play a role in opioid withdrawal severity.

With resolution of withdrawal symptoms there is a potential for reduced re-admissions for detoxification and or overdose risk. Increasing the length of stay may help decrease opioid-related emergency room visits and decrease opioid related deaths. It is important to educate the medical staff on the importance of improvement/complete resolution of withdrawal symptoms prior to discharge. With changes in increase length of stay there may be an improvement in quality of care as patients will have minimal symptoms or be asymptomatic upon completion of treatment. The change will also help improve patient satisfaction during treatment and upon discharge.

Healthcare Policy

The findings from this project may demonstrate clinical practice strengthening on engagement efforts through the use of improved patient outcomes and communication between patients and nurses during treatment. This will also allow for improved healthcare delivery and patient satisfaction. The healthcare providers involved in opioid withdrawal treatment may

incorporate appropriate standards of care within their organization based on the findings of this study. Substance abuse healthcare providers will be able to address symptoms and treat accordingly with an increase length of stay. Policy formulation may lead and promote healthcare providers to actively participate in promoting positive patient outcomes.

Quality and Safety

This project will add to the body of knowledge as well as research that is needed to manage opioid use disorder and detoxification. This project will also add insight to the length of treatment gap at hand for detoxification. It may potentially allow patient to remain opioid free which may decrease opioid related deaths from relapse immediately following completion of treatment. Patients may be able to better manage their addiction by remaining drug free after treatment thus improving quality of life.

Dissemination & Professional Reporting

These results may allow change of detoxification protocol to a longer length of stay as the results favor a seven-day length of stay. The findings of this project were shared with stakeholders at the project site. These results have been disseminated to Rutgers School of Nursing via a presentation, abstracts will be submitted for presentation at professional conferences. Consideration will also be made for potential manuscript submissions for publication.

Summary

In summary, this project allowed a comparison of COWS scores in the beginning of treatment and at the completion of treatment with Subutex for a five-day and a seven-day length of stay. The results of this project favor a longer length of stay for opioid detoxification treatment with noted improved COWS scores at day seven indicating a more effective length of

stay. With an increase length of stay there may also potentially be a decrease in relapse rates and opioid related deaths. This project may assist patients in obtaining improved healthcare outcomes assuming they follow through with their recovery after detoxification treatment.

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Appendix A

Table of Evidence

Article	Author, Date	Evidence Type	Sample, Sample Size, Setting	Study Findings that help answer EBP question	Limitations	Evidence Level & Quality
#1	Jain, N. et al. (2018)	Comparative, open-label, and prospective study conducted at the [redacted]	100 patients with the diagnosis of opioid dependence as per the International Classification of Diseases-10 criteria, fulfilling the inclusion and exclusion criteria.	Between day two through day seven there was a significant decrease in withdrawal symptoms. At day fourteen of the opioid detoxification treatment some participants were not symptom-free from opioid withdrawal. Showed that patients in high-dose buprenorphine group had better control of withdrawal symptoms, and the difference was significant when compared with low-dose buprenorphine. Persistence of withdrawal symptoms can lead to early relapse and poor motivation for	20 participants dropped out during the study Study occurred outside of the Country where guidelines may be different of those from the US.	level I quality A Research Study

				nonpharmacological intervention for relapse prevention. 70% of the patients had a history of treatment for substance use disorders in each group. The mean score did not reach zero even on day 14 in any group, there was a progressive decrease in withdrawal score in all the four groups. Comparison of subjective withdrawal symptoms during detoxification, although the mean score did not reach zero even on day 14 in any group, there was a progressive decrease in withdrawal score in all the four groups. Buprenorphine high dose P-value 0.206 and low dose 1.0		

#2	Jacobs, P., et al. (2015)	Secondary analysis of a study of opioid-dependent adults seeking treatment in eight treatment settings.	740 participants inducted on BUP with flexible dosing outpatient	Participants on more than 16mg of suboxone by the 28th day were more likely to continue in treatment. Participants on ≥16 mg Buprenorphine compared to those on <16 mg at Day 28 were less likely to drop out and less likely to have adverse reactions during the first 28 days. Opioid Withdrawal Scale (COWS), were important predictors of retention. When controlled for the baseline characteristics, buprenorphine 6 participants were three times less likely to drop out the first 7 days than buprenorphine (BUP) 1 participants (adjusted hazard ratio (aHR) = .28, p = .03). Opioid use and adverse effects (AEs) were similar across	Participants for this study were not randomized to different (predetermined) dose trajectories. The study was implemented in outpatient with daily observed buprenorphine dosing. Therefore, the results might not be fully generalizable to treatment in physicians' offices with less directly supervised dosing requirements.	level I quality A Research Study

				trajectories. Participants on ≥16 mg BUP compared to those on <16 mg at Day 28 were less likely to drop out (aHR = .013, p = .001) and less likely to have AEs during the first 28 days (aOR = .57, p = .03).		
#3	Bruneau, J., et al. (2018)	National guideline using a structured literature review approach	The Canadian Research Initiative in Substance Misuse a Canadian Institutes of Health Research funded research network composed of four regional networks distributed across Canada (British Columbia, the Prairies,	This guideline recommends strongly against offering withdrawal management in isolation; the resulting loss of tolerance coupled with high rates of relapse associated with this practice increases the risk of overdose death.	Canadian jurisdictions have a lack of resources dedicated to health care provider education and to overall addiction care, as well as the absence of comprehensive provincial and territorial or national guidelines, have delayed the implementation of evidence-based treatment strategies for opioid use disorder across the addiction care continuum.	level IV quality A Non-Research Study

			Ontario and Quebec–Atlantic).			
#4	Lee, J. D., et al. (2018)	24 week, open-label, randomized controlled, comparative effectiveness trial at eight US community-based inpatient services and followed up participants as outpatients	570 randomly assigned participants	Outcomes were consistent with observational analyses showing overdose risk increases substantially after discontinuation of buprenorphine. The risk of early opioid treatment dropout is likely to be greater among participants actively using heroin and initially admitted to acute detoxification units than opioid patient cohorts initiating outpatient medication treatment. Among participants successfully inducted (per-protocol population, n=474), 24-week relapse events were similar across study groups (p=0·44). Opioid-negative urine samples	Treatment retentions. The trial design choices, particularly the acute detoxification setting, flexible randomization, and the varied induction protocols, which were likely to have had a substantial effect on Naltrexone induction, limit interpretation. Recruitment of previously detoxified people or randomization only of participants able to immediately BUP-NX treatment.	level 1 quality B Research Study

				(p<0·0001) and opioid-abstinent days (p<0·0001) favored BUP-NX compared with XR-NTX among the intention-to-treat population but were similar across study groups among the per-protocol population. Self-reported opioid craving was initially less with XR-NTX than with BUP-NX (p=0·0012), then converged by week 24 (p=0·20). With the exception of mild-to-moderate XR-NTX injection site reactions, treatment-emergent adverse events including overdose did not differ between treatment groups. Five fatal overdoses occurred (two in the XR-NTX group and three in the BUP-NX group).		

#5	Marsch, L. et al. (2016)	Double-blind, placebo controlled, multicenter randomized controlled trial.	Participants Volunteer sample of 53 primarily Caucasian participants between the ages of 16 and 24 who met DSM-IV opioid dependence criteria in two New York hospital-based clinics	Findings Intent-to treat analyses revealed that participants who received a 56-day buprenorphine taper had a significantly higher percentage of opioid-negative scheduled urine tests compared with participants who received a 28-day buprenorphine taper [35 versus 17%, P = 0.039; Cohen's d = 0.57, 95% confidence interval (CI) = 0.02, 1.13]. Participants who received a 56day buprenorphine taper were retained in treatment significantly longer than participants who received a 28-day buprenorphine taper (37.5 versus 26.4 days, P = 0.027; Cohen's d = 0.63, 95% CI = 0.06, 1.19). Daily attendance requirement was associated with decreased abstinence and shorter retention compared with a two to three times weekly attendance requirement, independent	Study was conducted on youth <18 yrs old. Small sample size.	level I quality B Research Study

				of taper duration. Follow-up data were insufficient to report. Conclusion Longer (56-day) buprenorphine taper produces better opioid abstinence and retention outcomes than shorter (28-day) buprenorphine taper for opioid-dependent youth.		
#6	Dunn, K.E. et al. (2015)	Secondary analysis of data from a randomized, placebo-controlled, double-blind evaluation of 1, 2, and 4-week outpatient buprenorphine tapers among primary prescription opioid abusers	70 participants in outpatient office setting.	A significant effect of taper group was evident on lowest mean houses of sleep, with the 4-week-taper group reporting less loss of sleep compared to the 1-and-2-week groups (p=0.04). A significant effect of study week (p=0.01) and interaction between taper group and study week (p=<0.001) were also observed for the number of ancillary medications used during the study. No additional effects of taper group were found, though VAS ratings of sick (p=0.04), withdrawal (p=0.02), and mean pupil diameter	Secondary Analysis Limited sample size Participants were primary prescription opioid abuse Withdrawal ratings may have been influenced by concurrent ancillary medication use during taper or naltrexone initiation following the taper.	level I quality B Research Study

				(p=0.001) (covaried for final buprenorphine stabilization dosing) varied in a significant way as a function of study week.		
#7	Gowing, L., Ali, R., White, J. M, & Mbewe, D. (2017)	Systematic review	N/A	Subutex is more successful in decreasing withdrawal symptoms for the management of opioid abuse in terms of the withdrawal severity, the duration of treatment, and the increasing percentage of treatment completion. There was no difference between buprenorphine and methadone in terms of average treatment duration (mean difference (MD) 1.30 days, 95% confidence interval (CI) −8.11 to 10.72; N = 82; studies = 2; low quality) or treatment completion rates (risk ratio (RR) 1.04, 95% CI 0.91 to 1.20; N = 457; studies = 5; moderate quality).	Treatment protocol, including doses, frequency, and duration of buprenorphine administration, require further research to determine the most effective treatment.	level I quality B Research Study

				Patients receiving buprenorphine stayed in treatment for longer, with an effect size that is considered to be large (SMD 0.92, 95% CI 0.57 to 1.27; N = 558; studies = 5; moderate quality) and were more likely to complete withdrawal treatment (RR 1.59, 95% CI 1.23 to 2.06; N = 1264; studies = 12; moderate quality). At the same time there was no significant difference in the incidence of adverse effects, but dropout due to adverse effects may be more likely with clonidine (RR 0.20, 95% CI 0.04 to 1.15; N = 134; studies = 3; low quality). The difference in treatment completion rates translates to a number needed to treat for an additional beneficial outcome of 4 (95% CI 3 to 6), indicating that for every four people treated with buprenorphine, we can		

				expect that one additional person will complete treatment than with clonidine or lofexidine.		
#8	Eastwood, B., Strang, J., & Marsden, J. (2017)	five-year, prospective, observational cohort study	54,347 adults (≥18 years) in 149 local treatment centers in England	Participants that completed treatment were at a lower risk of re-admission for treatment compared to the participants that dropped out treatment. The length of time in treatment was a big factor in reducing opioid relapse. Successful completion and no re-presentation within six months was achieved by 21.9%. Heroin and crack cocaine users were significantly less likely to achieve this outcome than patients who used heroin only (adjusted odds ratio [AOR] 0.90; 95% confidence interval 0.85–0.95). Older patients (AOR 1.09; CI 1.07–	Patients entering treatment in 2008/2009. Not able to access national deaths registry data or prison systems. While all available covariates in NDTMS were screened in the present analysis, other covariates could further elucidate the likelihood.	level I quality B Research Study

				1.11), those employed (AOR 1.27; CI 1.18–1.37) and those enrolled for longer treatment were more likely to achieve the outcome measure. After risk adjustment, the local treatment systems that achieved substantially better outcome performance (14/149) had a lower rate of opiate prevalence in the local population at time of study initiation (incidence rate difference [IRD] 4.1; CI 4.0–4.2), fewer criminal offences per thousand (IRD 28.5; CI 28.1–28.8) and lower drug-related deaths per million (IRD 5.9; CI 5.9–5.9).		
#9	Coffin, P.O. et al. (2017)	single blinded randomized trial	63 participants with opioid depended in San Francisco	Prior overdose history is a strong predictor of future overdose. Implementing an intervention after first overdose may reduce risk of repeat overdose. At baseline, 33.3% of	Small sample size. Data was self-reported. Study conducted in only San Francisco.	level I quality A Research Study

				participants had experienced an overdose in the past four months, with a similar mean number of overdoses in both arms (p = 0.95); 29% overdosed during follow-up. By intention-to-treat, participants assigned to REBOOT were less likely to experience any overdose (incidence rate ratio [IRR] 0.62 [95%CI 0.41–0.92, p = 0.019) and experienced fewer overdose events (IRR 0.46)		
#10	Day, E., Strang, J. (2011)	Randomized controlled trial	68 participants with opioid dependence Inpatient and outpatient treatment in Birmingham.	Increase rates of treatment completion in inpatient setting. Nineteen day long opioid treatment. More inpatients (n = 18, 51.4%) than outpatients (n = 12, 36.4%) completed detoxification, but this difference was not statistically significant ($\chi^2 = 1.56$, p = .21). However, the outpatient group received	The only medication used to treat opioid withdrawal during the study was lofexidine.	level I quality A Research Study

				a significantly longer period of medication, and when the length of detoxification was controlled for, the results favored the inpatient setting (Exp(B) = 13.9, 95% confidence interval = 2.6–75.5, p = .002). Only 11 (16%) participants were opioid-free at the 1-month follow-up and 8 at the 6-month follow-up, with no between-group difference.		
#11	National Institute of Drug Abuse	Guidelines	N/A	Buprenorphine reduces cravings and withdrawal symptoms. Buprenorphine is available in two forms: Subutex and in combination with the opioid receptor antagonist naloxone (Suboxone). Buprenorphine must be administered at sufficiently high doses such as 16mg daily or more for effective treatment.	No specific dosing for detox that includes length of stay recommendations	level IV quality B Non-Research

#12	Northup, T. F. et al. (2015)	Randomized clinical trial	653 participants with opioid dependence in 10 opioid treatment sites.	Participants experienced opioid rebound withdrawal symptoms and cravings with a quick medication taper. Class 1 (n = 40) had the highest initial levels of craving and withdrawal, with decreases during stabilization, and a quick rebound in withdrawal and craving at the beginning of taper, with all class members lapsing by week 5. Class 4 (n = 72) is distinguishable from class 1 by a lower baseline withdrawal level along with more gradual rebound symptoms on both craving and withdrawal and a slightly longer time-to-first-use curve with all class members lapsing by week 6. Class 2 (n = 441) and class 3 (n = 100) are distinguished by a lower baseline craving score and a lower level of ongoing craving for class	Participants dropped out after 4 weeks which limited the data.	level I quality B Research Study

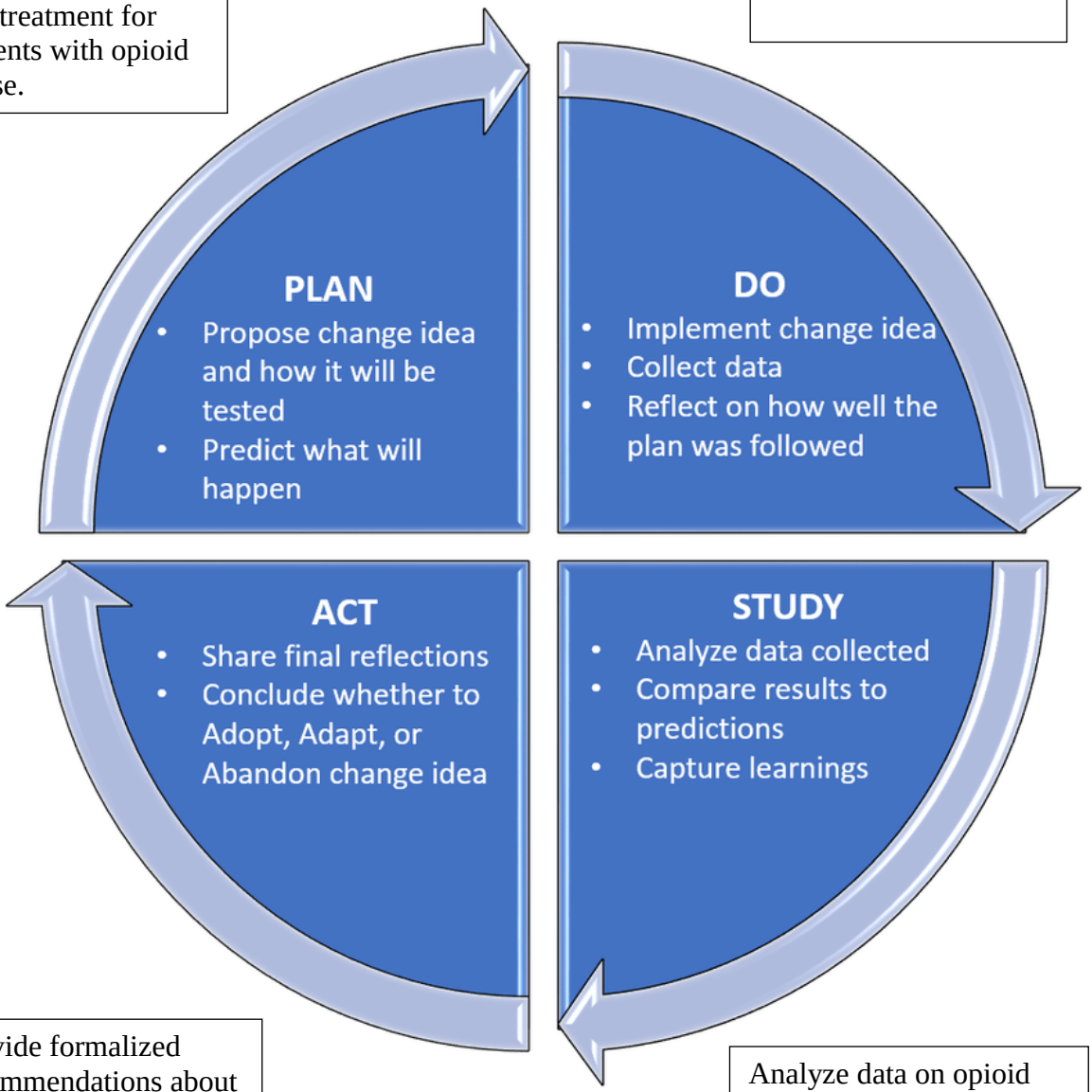
				3. Also, not all participants lapsed in these two classes: classes 2 and 3 had 3.85% and 4.00% opioid-free survival beyond week 6, respectively. A majority of all participants (> 65%) were placed in class 2 by the LCA, suggesting this as the most typical experience of craving, withdrawal, and survival for this sample. Noteworthy, all classes had a sharp decrease in withdrawal from baseline to week 1; however, craving lagged behind withdrawal and sharp decreases were not apparent until the interval between weeks 1 and 2.		

Appendix B

Theoretical Framework

Determine effectiveness of 5-day compared to a 7-day treatment for patients with opioid abuse.

Retrospective chart review back 3 months.



Provide formalized recommendations about appropriate length of stay/protocol development.

Analyze data on opioid detox relapse after a day 5-day and 7-day opioid protocol treatment.

(Adapted from Act Academy, n.d.)

Appendix C

Clinical Opiate Withdrawal Scale (COWS)

Flow-sheet for measuring symptoms over a period of time during buprenorphine induction.

For each item, write in the number that best describes the patient's signs or symptom. Rate on just the apparent relationship to opiate withdrawal. For example, if heart rate is increased because the patient was jogging just prior to assessment, the increase pulse rate would not add to the score.

Patient's Name:_____ Date:_____

Buprenorphine induction:

Enter scores at time zero, 30min after first dose, 2 h after first dose, etc.

Times: ____ ____ ____ ____

Resting Pulse Rate: (record beats per minute) *Measured after patient is sitting or lying for one minute* 0 pulse rate 80 or below 1 pulse rate 81-100 2 pulse rate 101-120 4 pulse rate greater than 120				
Sweating: *over past ½ hour not accounted for by room temperature or patient activity.* 0 no report of chills or flushing 1 subjective report of chills or flushing 2 flushed or observable moistness on face 3 beads of sweat on brow or face 4 sweat streaming off face				
Restlessness *Observation during assessmen*t 0 able to sit still 1 reports difficulty sitting still, but is able to do so 3 frequent shifting or extraneous movements of legs/arms 5 Unable to sit still for more than a few seconds				
Pupil size 0 pupils pinned or normal size for room light 1 pupils possibly larger than normal for room light 2 pupils moderately dilated 5 pupils so dilated that only the rim of the iris is visible				

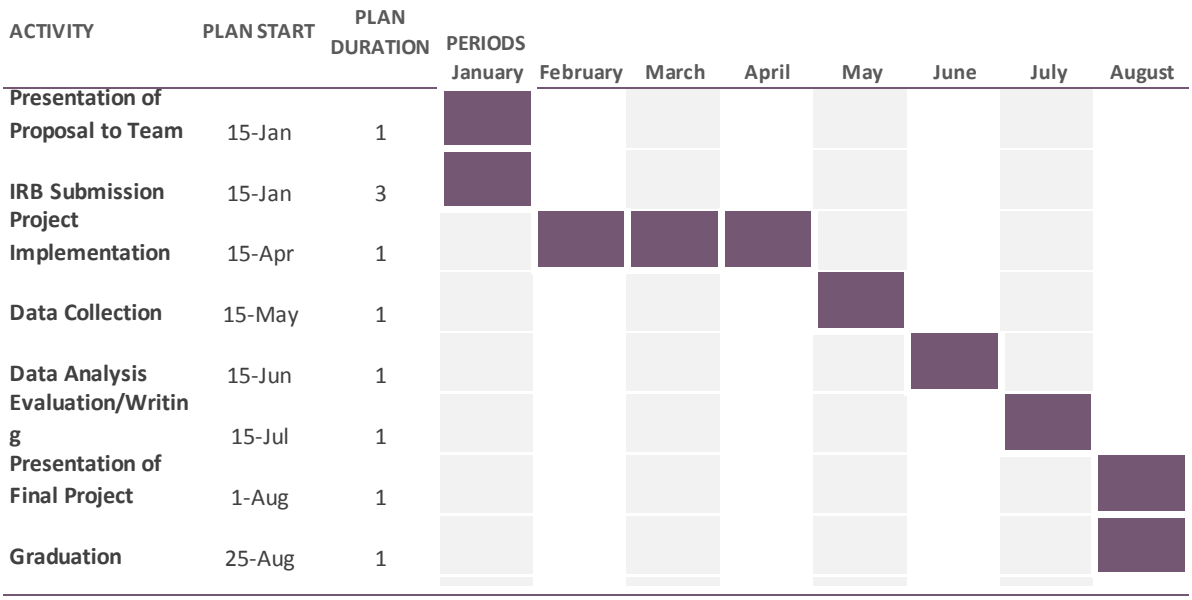
Bone or Joint aches *If patient was having pain previously, only the additional component attributed to opiates withdrawal is scored* 0 not present 1 mild diffuse discomfort 2 patient reports severe diffuse aching of joints/ muscles 4 patient is rubbing joints or muscles and is unable to sit still because of discomfort				
Runny nose or tearing *Not accounted for by cold symptoms or allergies* 0 not present 1 nasal stuffiness or unusually moist eyes 2 nose running or tearing 4 nose constantly running or tears streaming down cheeks				
GI Upset: *over last ½ hour* 0 no GI symptoms 1 stomach cramps 2 nausea or loose stool 3 vomiting or diarrhea 5 Multiple episodes of diarrhea or vomiting				
Tremor *observation of outstretched hands* 0 No tremor 1 tremor can be felt, but not observed 2 slight tremor observable 4 gross tremor or muscle twitching				
Yawning *Observation during assessment* 0 no yawning 1 yawning once or twice during assessment 2 yawning three or more times during assessment 4 yawning several times/minute				
Anxiety or Irritability 0 none 1 patient reports increasing irritability or anxiousness 2 patient obviously irritable anxious 4 patient so irritable or anxious that participation in the assessment is difficult				

Gooseflesh skin 0 skin is smooth 3 piloerection of skin can be felt or hairs standing up on arms 5 prominent piloerection				
Total scores with observer's initials				

Score:
5-12 = mild;
13-24 = moderate;
25-36 = moderately severe;
more than 36 = severe withdrawal

Appendix D

Project Timeline



Appendix E

Budget

Detail

EXPENSE	AMOUNT	Total Cost
Office Supplies	$10.00	$10
Poster Cost	$50.00	$50
Statistician Consult	$50/hr. x 2 hrs.	$200
Total		**$260**