

Educating Nurses on the Use of the Clinical Opiate Withdrawal Scale to Improve Care of Adult Patients Undergoing Buprenorphine Induction

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Abstract

Introduction: Opioid addiction disease has become a global health and social problem complicated by drug misuse and abuse (Pearlman, 2016; Rettig & Yarmolinsky, 1995; Watkins, 2016). Buprenorphine, a partial opioid agonist, is an effective treatment for opioid addiction disease (Loreck et al., 2016). Its induction can trigger severe precipitated withdrawal in opioid-dependent patients whose mu receptors are occupied opioids (American Society of Addiction Medicine, 2015). Knowledge of assessing a patient's level of withdrawal using a validated tool is key to successful transition from other opioids to buprenorphine.

Aim: The aim of this study was to evaluate the effectiveness of training nurses on the use of the Clinical Opioid Withdrawal Scale (COWS) screening instrument by assessing their confidence in assessing and satisfaction with communicating withdrawal information crucial for patient safety.

Method: Ten registered nurses and three nurse practitioners working at a mental health community service center completed two surveys at three time points (Pre, Post, and Post-90 days). The first survey measured nurses' confidence in assessing, whereas the second survey measured their satisfaction with communicating withdrawal symptoms.

Results: The means' (*M*) magnitude for both assessment and satisfaction scores increased with time (across Pre, Post, and Post-90). Standard deviations tended to become smaller. Improvements were noted in nurses' confidence in the assessment of and satisfaction in communicating withdrawal symptoms after the intervention.

Conclusion: Participants expressed increased knowledge, confidence, and satisfaction with the COWS screening instrument. Ultimately, the patients benefited from the participants having more experience, education, skills, and confidence in monitoring withdrawal symptoms depicted by aggregate data of COWS screenings postintervention.

Keywords: buprenorphine, COWS, opioid addiction, opioid withdrawal symptoms

INTRODUCTION

Opioid addiction is a chronic disease characterized by the pathological pursuit and abuse of prescription opioid pain medications and heroin (Kampman & Jarvis, 2015; Volkow, 2014), despite unfavorable physical, social, and psychological consequences (Center for Substance Abuse Treatment [CSAT], 2004). The growing opioid epidemic globally, nationally, and locally presents an opportunity for quality improvement initiatives aimed at treating those who have developed patterns of opioid abuse and addiction. Opioids have created a global epidemic of addiction disease and escalating rates of dose deaths (Pearlman, 2016; Rettig & Yarmolinsky, 1995; Rudd et al., 2016; Watkins, 2016). Indeed, opioids have become the primary global contributor to drug-related deaths (Hall & Degenhardt, 2014). Specifically, the United States has recorded a steady increase in the rate of opioid abuse and addiction in recent decades (Ahrensbrak et al., 2017; International Narcotics Control Board, 2012, 2015; Lyapustina & Alexander, 2015; Meyer et al., 2014; Volkow, 2014). A border state, Texas experiences the movement of illicit drugs from Mexico through border cities like El Paso (Maxwell, 2016). According to Lucker (2010), the high drug traffic rate and frequency of citizens with substance abuse histories in El Paso make it one of the cities most plagued by substance abuse.

Buprenorphine, a partial opioid agonist, is effective in treating opioid addiction (CSAT, 2004). Transitioning patients to buprenorphine from other opioids can trigger precipitated withdrawal if the patient is not in mild-to-moderate opioid withdrawal. Medication-assisted treatment (MAT), the use of medications, in addition to other behavioral therapies, to provide treatment for substance use disorders, has been recognized

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as a critical approach in treating opioid addiction and abuse (American Society of Addiction Medicine, 2015; Botticelli, 2016; Rudd et al., 2014; Substance Abuse and Mental Health Services Administration, 2015). According to CSAT (2004), methadone, naltrexone, buprenorphine, and a buprenorphine/naloxone combination have been identified as some of the primary medications used in MAT.

Because of the potential of abuse of methadone, traditional opioid treatment requires that the patient make daily visits to a methadone clinic to obtain their medicine. In contrast, at the clinic where the quality improvement project was conducted, office-based opioid treatment (OBOT) was used with buprenorphine. OBOT is a MAT model created over a decade ago to address the dilemma associated with delivering opioid agonist treatment in an office-based setting (Alford et al., 2011; Walley et al., 2008). The creation of OBOT facilitated opioid addiction treatment in an office-based setting, where patients receive treatment for opioid addiction through their primary care providers whose convenience fosters compliance (Alford et al., 2011; Walley et al., 2008).

Buprenorphine and a buprenorphine/naloxone combination used in OBOT treatment are effective, well-tolerated, and safe medicinal treatments for opioid dependence and addiction (Kampman & Jarvis, 2015; Strain, 2011) but cause withdrawal symptoms, described as flu-like symptoms, which are difficult to endure (CSAT, 2004). For some, withdrawal may require hospitalization because of intractable vomiting, diarrhea, or muscle pain. Because of the high affinity of buprenorphine for mu (μ) receptors, it blocks other opioids from mu receptors, causing precipitated withdrawal. Thus, the patient who is on other opioids will have an abrupt precipitated withdrawal. Hence, it is important that the patient be in partial withdrawal when they begin buprenorphine. Buprenorphine maintenance treatment (BMT) is a type of MAT designed to guide the treatment of opioid addiction with buprenorphine.

Thomas et al. (2014) defined BMT as the use of buprenorphine or buprenorphine-naloxone to assist people with opioid use disorders to stop or decrease the use of illegal opioids or non-prescription opioids in an MAT. Induction, stabilization, and maintenance are the three phases of BMT (CSAT, 2004), although induction has the greatest importance to the quality improvement project. The discontinuation or decreased use of opioids by individuals addicted to opioids can lead to difficult physical withdrawal symptoms. The signs and symptoms include flushing, insomnia, anxiety, abdominal and muscular cramps, irritability, sweating, nausea and vomiting, runny nose, eyes tearing, elevated pulse rate, and yawning (Canan et al., 2015). Induction, the initial phase of BMT, assists patient transition from opioid of abuse to buprenorphine. A goal of this phase is to find the minimum dose of buprenorphine that will not result in withdrawal symptoms because of discontinuation or diminished use of other opioids (CSAT, 2004).

During the induction phase, inappropriate assessment of patients before the initiation of treatment with buprenorphine can lead to opioid withdrawal symptoms. Patients are expected to have abstained from all short-acting opioids such as

hydrocodone, heroin, and oxycodone for at least 12–24 hours, and with long-acting opioids such as OxyContin and methadone, the recommendation is for abstinence for a minimum of 24–48 hours before the initiation of the induction phase (CSAT, 2004). Clinical Opioid Withdrawal Scale (COWS) is an evidence-based screening tool developed by Wesson and Ling (2003) to improve screening, monitoring, and interventions during MAT (see Figure 1). The COWS has been shown to be a useful tool, outperforming most opiate withdrawal instruments in evaluating treatment results (Barbosa-Leiker et al., 2015). Nielsen et al. (2014) used the COWS to examine reasons for difficult induction and to compare different induction participant experiences with a prominent prescription opioid. The COWS was able to measure the severity of withdrawal, a significant consideration in the use of MAT for opioid addiction treatment. The COWS instrument has high internal consistency (Cronbach's $\alpha = .78$) and content validity to accurately detect different levels of opiate withdrawal (Tompkins et al., 2009). Scores on the COWS instrument are grouped into mild (5–12), moderate (13–24), moderately severe (25–36), and severe (>36 ; Wesson & Ling, 2003).

BACKGROUND

The need for an accurate assessment (e.g., withdraw symptomology) before the administration of buprenorphine is critical to successful initiation of treatment. This stage of pretreatment is successful if the nurses preparing the patient for MAT are knowledgeable in the actions and administration of buprenorphine, including assessment that includes history, physical examination, and current opioid use status. Training in the use of assessment tools has shown increased acceptance by clinicians, project sustainability, increased communication, and improved confidence and satisfaction among the clinicians (Lucas & Knobel, 2012; Suddaby & Josephson, 2013). Barnett et al. (2010) found that education and training improved nurses' knowledge, productivity, confidence, and attitude.

In addition, research has shown that providing education to nurses resulted in increased knowledge, improved patient treatment goals, and improved professional practice (Forsetlund et al., 2009; Marzlin, 2011). Furthermore, educating nurses on specific information regarding a medical problem was correlated with improved adherence to best practices in a study by Altun and Zencirci (2011). Precipitated withdrawal is an intense and rapid onset of withdrawal symptoms initiated by medication (National Alliance of Advocates for Buprenorphine Treatment, 2011), which can occur when the abstinence requirement is not met (CSAT, 2004). In response to the need for observation of signs and symptoms of withdrawal during the induction phase of the BMT (CSAT, 2004), the COWS screening tool facilitates assessment of both subjective and objective symptoms of withdrawal (National Alliance of Advocates for Buprenorphine Treatment, 2011; Tompkins et al., 2009), using 11 medical signs and symptoms (Wesson & Ling, 2003).

Nurses can use COWS to assess that a patient is in partial opioid withdrawal and thus avoid triggering precipitated

Clinical Opiate Withdrawal Scale (COWS)

Flowsheet 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 increased pulse rate would not add to the score.

Patient Name: _____		Date: _____			
Buprenorphine Induction: _____					
Enter scores at time zero, 30 minutes after first dose, 2 hours after first dose, etc.		Times of Observation:			
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 1/2 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 Assessment					
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 Opiate 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 1/2 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					
Score: 5-12 = Mild		Total score			
13-24 = Moderate					
25-36 = Moderately Severe					
More than 36 = Severe Withdrawal					
		Observer's initials			



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*Source: Wesson et al. 1999.

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Figure 1. COWS screening instrument.

withdrawal (National Alliance of Advocates for Buprenorphine Treatment, 2011).

Equipping nurses with the knowledge and skills on practice guidelines needed for assessing and communicating opioid withdrawal symptoms during buprenorphine induction is crucial to the successful implementation of the MAT

program. For optimal use of COWS screening, nurses should be able to adequately assess and effectively communicate the level of a patient's withdrawal symptoms. Optimal use of the COWS tool should promote nurses' satisfaction and confidence, while improving patients' quality of care and safety. According to Azimi-Bolourian and Fornili (2010), consistency

between practice and science is a result of adequacy in staff education and training. Therefore, the purpose of this quality improvement project is to educate nurses in screening, monitoring, and intervention with regard to opioid withdrawal symptoms and to determine their satisfaction and confidence in the assessment and reporting of their findings.

Achievement of this aim indicated an increase in the nurses' confidence and satisfaction in assessing and communicating withdrawal symptoms determined by a pre/post and post 90 days' survey. In addition, aggregate data depicting number of COWS screening performed and providers' confidence in using the results showed successful realization of the aim and benefits related to the successful implementation of the OBOT.

METHOD

This quality improvement program was implemented in a community outpatient mental health clinic in a city on the U.S./Mexico border. An OBOT program using MAT was developed that specifically targeted drug usage among homeless and indigent individuals who were either uninsured or unable to access mental health care services. The nurses who would assess program participants were from a convenience sampling of registered nurses and nurse practitioners working at a community mental health center. Each participating nurse was asked to attend an educational session and to complete a pretest and posttest of their knowledge and comfort with the use of the COWS tool. The participants were also asked to complete the survey again at 90 days after the educational session.

A modified version of the questionnaire developed by Suddaby and Josephson (2013) used for assessing nurses' satisfaction and confidence with the Withdrawal Assessment Tool-1 was administered as a pretest and posttest survey to assess nurses' satisfaction, and confidence, before, after, and 3 months after the training. Permission to use the instrument was obtained from its developers. The survey questionnaire is a Likert-type scale that ranges from 1 to 5 with 1 indicating "strongly disagree" and 5 indicating "strongly agree." For determination of construct validity, the authors invited clinical experts such as nurses and doctors with expertise in withdrawal in adults, withdrawal in children, and/or tool development. The experts evaluated the survey questions based on clarity and usefulness in answering the research questions. Successful implementation of the MAT was measured by nurses' comfort and confidence with using the COWS, the program outcomes of COWS use by the nurses, and the avoidance of precipitated withdrawal among MAT program enrollees.

Intervention

After evaluating stakeholder needs and gaining approval for implementation at the community mental health clinics, an educational session was presented to the clinic nurses using printed materials and visual aids. To increase the effectiveness of the training, the nurses' confidence and satisfaction toward assessing withdrawal symptoms and the COWS screening implementation were evaluated. The educational intervention

included information regarding the buprenorphine treatment modalities, the COWS screening guidelines, and the rationale for implementing an improved screening tool during opioid addiction treatment. Nurses had the opportunity to ask questions during the training. After the session, nurses were encouraged to use the tool for all the patients coming in for buprenorphine induction for the next 3 months.

Measures

A modified version of a questionnaire developed by Suddaby and Josephson (2013) was administered to assess nurses' satisfaction and confidence before (Pre), after (Post), and 3 months after the training (P90). Requesting participant feedback at three time points provided the ability to evaluate the long-term success of the COWS implementation. The pretest was implemented for the collection of the participants' baseline data and to measure their confidence in assessing withdrawal responses and satisfaction with communicating responses with the use of the COWS tool. The initial posttest was conducted directly after the presentation by utilizing the same questions used for the pretest to evaluate knowledge gained. A second postsurvey was administered 3 months after the educational intervention. The results were evaluated using descriptive statistics.

Ethical Considerations

After Institutional Review Board approval, purposive sampling was used to reach the target population (i.e., nurses working in a community mental health setting) with no other exclusion criteria. The project did not target any vulnerable populations (e.g., pregnant women). Data were coded to protect participant confidentiality. Informed consent made participants aware that their participation was voluntary, and they could be withdrawn from participation at any time.

RESULTS

The educational intervention went according to plan and was not modified. Nurses ($n = 13$) indicated achievement of the project aim as evidenced by an increase in the nurses' confidence and satisfaction with assessing and communicating withdrawal symptoms determined by a pre/post and post 90 days' survey. Items from the "Confidence in Assessing Withdrawal Symptoms" survey ($n = 9$) and the "Satisfaction with Communication Responses" ($n = 6$) were measured at three time points and computed as single factors at each time point. Their measurement before the intervention was referred to as "Pre-assessment" and "Pre-satisfaction," respectively.

Measurements just after the intervention were referred to as "Post-assessment" and "Post-satisfaction," respectively. Finally, measurements 90 days after the intervention were referred to as "P90-assessment" and "P90-satisfaction," respectively. The variables, generally, were referred to as "Assessment" and "Confidence" for the purposes of the current project. Descriptive statistics are presented in Table 1, and Figure 2 is the chart of the overall Pre-assessment, Post-assessment, and P90-assessment test.

The means (*Ms*) for both Assessment and Satisfaction scores increased with time (i.e., across Pre, Post, and P90), whereas standard deviations (*SDs*) tended to become smaller. Four nurses (30.8%) indicated either some confidence or minimal confidence, whereas nine nurses (69.2%) reported no confidence on the Pre-assessment for confidence in assessing withdrawal responses. Comparison of the scores from the Pre-assessment with the Post-assessment and P90-assessment showed that 12 nurses (92%) reported improved confidence, with one nurse (8%) indicating somewhat confidence on one item related to autonomic response such as eye tearing, nose running, and tremor.

Similarly, four nurses (30.8%) indicated either some satisfaction or minimal satisfaction, and nine nurses (69.2%) reported no satisfaction in the Pre-satisfaction for communicating withdrawal symptoms. For Post-satisfaction and P90-satisfaction, all the nurses (100%) reported satisfaction with communicating withdrawal responses.

The internal reliability of the items for the Assessment and Satisfaction variables was suitable for continued use, with alpha coefficients of .946 and .952, respectively. Anecdotal feedback and archival data depicting the number of COWS screenings performed and providers' confidence in using the results showed successful realization of the aim and benefits related to the successful implementation of the intervention for the OBOT program over time with no modification to the intervention.

The lack of increase from the postintervention survey to the P90 scores could be attributed to a lack of opportunity for some participating nurses to consistently use the COWS. The lack of opportunity may have been partially because of the substantial attrition (19 of 24 patients) from the patient program because of noncompliance ($n = 18$) and personal preference for another treatment ($n = 1$). There were no missing data or outliers.

DISCUSSION

Summary

The project showed an educational intervention improved nurses' long-term knowledge, perception, and confidence in screening for opioid withdrawal using the COWS tool.

TABLE 1 Descriptive Statistics for Each Variable Measurement				
Item	<i>M</i>	<i>SD</i>	Number (<i>n</i> = 13)	Percentage (%)
Pre-assessment	3.03	0.68	4	30.8
Post-assessment	4.51	0.47	12	92
P90-assessment	4.68	0.49	12	92
Pre-satisfaction	3.29	0.57	4	30.8
Post-satisfaction	4.45	0.52	13	100
P90-satisfaction	4.69	0.48	13	100

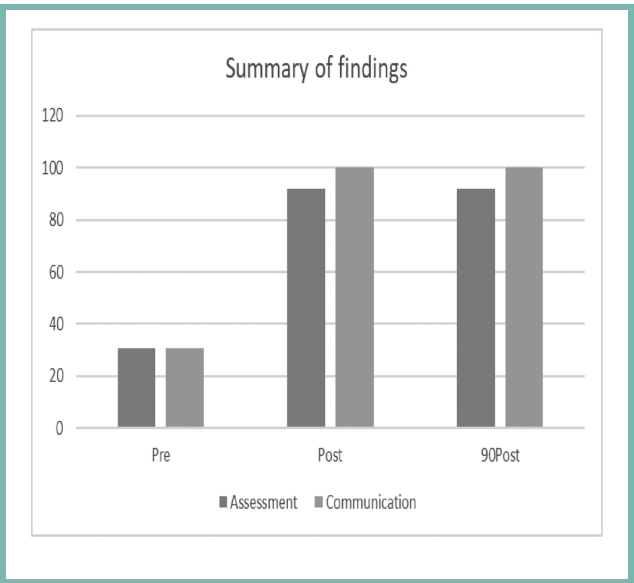


Figure 2. Summary of overall Pre, Post, and P90 tests.

Assessment and Confidence scores with using the COWS increased directly after the intervention but showed no residual or continued increase because of consistent use during the 3 months after the intervention. Survey report data findings aligned with the aggregate data from the organization, both indicating that the application of the evidence-based educational intervention increased knowledge and confidence, supporting the continued use of educational interventions to promote COWS implementation.

The COWS tool was used for all 24 participants, and their withdrawal signs and symptoms should indicate a score of 5–24 (mild to moderate) on the COWS tool before induction process (National Alliance of Advocates for Buprenorphine Treatment, 2011). Two OBOT patients who were not in active withdrawal because they had not abstained from using opioids for a sufficient period were identified with the COWS tool and rescheduled until they begin to experience the symptoms of withdrawal, resulting in zero precipitated withdrawal during the induction period. However, screening is ongoing, and it will be periodically reviewed, along with usage and episodes of withdrawal.

Interpretation

This study, much like that of Suddaby and Josephson (2013) and Lucas and Knobel (2012), was designed to assess the finding that education and training improve knowledge, confidence, and attitude. In both Suddaby and Josephson and Lucas and Knobel, the results showed significant increases in satisfaction and the ability of nurses with necessary tools to consistently and accurately assess withdrawal symptoms and infant with neonatal abstinence syndrome, respectively. Improvement for the working psychological state (e.g., satisfaction and confidence) of the nurses is likely to benefit the entire clinic and those that they

serve. There were no substantial costs, strategic trade-offs, or opportunity costs.

Limitations

On the basis of the consistently high scores of the postsurveys, there was little room for improvement on post-90-day assessments. The implementation of this intervention was effective because of the strict requirements of the funding source, the Health and Human Services Commission, the absence of which could constitute a limitation. In addition, the use of a small, convenience sample may further limit the generalizability of the results. It was also notable that, despite high internal consistency on the presurveys and postsurveys, the consistent pattern and lack of variability in response to items may have been because of a lack of participant time, status (e.g., tiredness), or attention to the content of each item.

In addition, demographic data such as previous training/education and number of years of experience with assessment and communication of withdrawal symptoms were not measured but may have influenced some variance in test scores. Finally, the aforementioned lack of opportunity for some nurses to use the COWS consistently with patients may have limited the understanding of long-term effects of the intervention (e.g., P90).

CONCLUSIONS

The implementation of this project was piloted with positive outcomes, especially with regard to the OBOT program. There was no precipitated withdrawal recorded because of the use of the COWS to accurately identify withdrawal occurrence before the induction phase. A “full staff” educational intervention to improve COWS implementation appears to have been successful and should be replicated at other facilities to support the efficacy of the intervention style.

A primary facilitator for smooth, effective implementation and sustainability of this project is the current health care emphasis on the opioid epidemic, which resulted in the OBOT grant and the organization's commitment, readiness, and eagerness to meet the goals specified by the grant. However, after full staff interventions, it may be more appropriate to develop reproducible online training modules that can be used “at will” by nurses who need to refresh their knowledge or by onboarding nurses who may be less familiar with the COWS implementation.

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