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Reducing the Risk of Fentanyl Related Overdose in Medication Assisted Treatment

Programs Based on Principles of Motivational Interviewing

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Abstract

Background: The increase in fentanyl exposure by individuals who use illicit drugs has risen causing a significant increase in the number of overdoses and overdose-related deaths. Drug checking for the presence of fentanyl can allow drug users to make more informed decisions especially when combined with motivational interviewing.

Purpose: The purpose of this project was to assess the effectiveness of an educational program for clinical staff regarding the use of fentanyl test strips based on the principles of motivational interviewing.

Methods: The project was completed at a Medication Assisted Treatment (MAT) program in an outpatient behavioral health facility in New England. The educational training video was presented in-person in a group setting to clinicians. Surveys were conducted before and after the educational training video, which was also posted on the internet for additional access.

Results: Six clinicians participated in person and half the participants agreeing and half strongly agreeing that they were comfortable with using motivational interviewing in different stages of recovery after the presentation. All participants felt their knowledge of fentanyl use after the educational training video was presented increased: agreed (50%) and strongly agreed (50%).

Conclusions: The data collected before and after the educational training video demonstrate the need for further training on motivational interviewing and fentanyl testing strips prior for those working in outpatient MAT clinics.

Keywords: fentanyl, fentanyl testing, drug users, people who use drugs, opioids, opiates motivational interviewing, substance use, adults, opioid treatment, drugs, motivational enhancement, medication assisted treatment program, self-management of chronic conditions.

Introduction

Background

Opioid overdose remains to be one of the biggest public health concerns in United States. It is particularly important due to the possibility of street drugs to containing highly potent synthetic opioids such as fentanyl. According to the information provided by Centers for Disease Control and Prevention (CDC) there were 46,802 opioid overdose deaths in 2018 and 67% of them involved synthetic opioids. In Massachusetts alone there were 2,241 opioid overdose-related deaths recorded in 2018 (CDC.gov). Overdose death prevention methods consist of the treatment of opioid use disorder, overdose education, distribution of naloxone, drug testing services, and overdose prevention sites.

Despite all efforts to minimize the number of deaths related to opioids, overdose-related deaths increased by 10% from 2017 to 2018 (CDC). Treating patients with opioid use disorder (OUD) is a challenge due to the chronic nature of the disorder. Relapse, the ability for an individual in treatment for OUD to start to use illicit substances once again, is common during the course of treatment. One avenue to receiving treatment for OUD is through a Medication Assisted Treatment (MAT) program. MAT programs treat individuals diagnosed with OUD with pharmacotherapy of either Methadone, buprenorphine, or naltrexone, as well as psychosocial treatment modalities. However, due to chronic progression of the disease and social factors influencing individual's behavior, people who are enrolled in MAT often relapse and are 10 to 40 times more likely to die of an opioid overdose than the general population, because they have a lower tolerance for opioids after being enrolled in MAT but they continue to use the same amount of substances prior to treatment. This is when an overdose can occur (Buresh et al, 2019; Coffin et al., 2017; Glick et al., 2019).

Additionally concerning is the reality that street opioids may contain fentanyl (CDC.gov). Medical and mental health professionals who provide care for people with OUD tend to be reluctant to provide patients with fentanyl test strips and education regarding its use because they are afraid of encouraging patients to use opioids. In order to facilitate this approach, it is important to include the main principles of motivational interviewing (MI) when providing training to healthcare and mental health professionals and provide them with education on using MI techniques. Motivational interviewing is based on identifying an individual's readiness, ability and willingness to change. This technique can be an effective tool in helping to improve providers' willingness and ability to discuss the use of fentanyl test strips with the patients suffering from OUD (Olmstead et al., 2020).

The purpose of this project is to assess the effectiveness of an educational program for clinical staff regarding the use of fentanyl test strips based on the principles of motivational interviewing. It is important that healthcare providers remain nonjudgmental when approaching this problem and treat patients with OUD the same way they would treat patients with any chronic condition while anticipating the possibility of relapse. This project aims to educate staff on the effectiveness of combining pharmacotherapy with motivational interviewing in the treatment of opioid use disorder in adult patients.

Problem Statement

The risk of fentanyl related overdose among individuals with substance use disorder who are enrolled in medication assisted treatment programs, as indicated by increased numbers of overdose and overdose-related deaths in the United States, results from a knowledge deficit in the risks for overdose and harm reduction techniques, which include the use of fentanyl test strips and motivational interviewing.

The Centers for Disease Control and Prevention has experienced an increase in the number of overdoses and overdose-related deaths and the increase has been evident in the state of Massachusetts as well. The introduction of fentanyl test strips at the facility where the project was conducted was difficult because of the staff member's reluctance to educate patients regarding the use of fentanyl tests strips. Many staff members feel that educating clients on the use of fentanyl test strips is condoning the use of illicit substances. Due to the knowledge deficit of healthcare and mental health providers regarding fentanyl test strips, this method of reducing overdose-related deaths is highly underutilized. The organizational management was highly motivated to have an educational program centered around the use of MI to educate staff members on the use of fentanyl test strips for people who use opioid drugs.

Review of the Literature

The review of literature was completed as a two-step process and included the review of literature on drug testing for the presence of fentanyl and use of MI to facilitate behavior change among healthcare and mental health professionals working with adult patients with OUD.

Search criteria for articles on testing for fentanyl.

The literature for review on detecting the presence of fentanyl was chosen using three databases: CINAHL, PsycInfo, and PubMed. The databases were searched using the terms “fentanyl”, “fentanyl testing”, “drug users”, “people who use drugs”, “opioids”, and “opiates”. Inclusion criteria for the use of articles included fentanyl and the discussion or use of drug-testing, a correlation between drug testing and change in drug use behavior, and perspectives on using drug-testing for the presence of fentanyl in illicit drugs.

Additional inclusion criteria were peer reviewed academic journals, published between the years 2016 to 2021, and written in the English language. Articles were chosen for exclusion

if they focused on legally prescribed fentanyl use, written as a projected pilot study or meta-analysis, or primarily discussed illicit fentanyl use in relation to drugs other than opioids. Of the 87 articles on fentanyl use identified in the initial search, 12 were chosen for inclusion in the synthesis.

Articles were analyzed using The John Hopkins Nursing Evidence-Based Practice Rating (JHNEBP) scale (Newhouse et al., 2005). Of the 12 articles that discussed illicit fentanyl use and the harm reduction strategy of drug checking, one article focused stakeholder's point of view in the U.S. (Glick et al., 2019), one article's setting was an emergency department in New England (Griswold et al., 2018), two articles' settings were located in British Columbia, Canada (Karamouzian et al., 2018; Mema et al., 2018), and the remaining articles completed studies in the U.S. in the states of Rhode Island, Massachusetts, Maryland, California, and New York at various drug treatment programs (Buresh et al., 2019; Goldman et al., 2019; Kenney et al., 2018; Krieger et al., 2018; McKnight et al., 2018; Oh et al., 2020; Palamar et al., 2019; Sherman et al., 2019). Sample sizes of the articles ranged from 24 (Mema et al., 2018) to 994 participants (Buresh et al., 2019) and the study analyzed the results of 1411 drug checks from individuals not identified (Karamouzian et al., 2018).

Synthesis of Evidence Based Practices on Drug Testing for the Presence of Fentanyl

Individuals who do not utilize harm reduction techniques when using opioids have a greater risk of experiencing an overdose which can be fatal (Goldman et al., 2019; Oh et al., 2020; Palamar et al., 2019; Sherman et al., 2019). In the U.S., the leading cause of death among Americans under the age of 50 is drug overdose (Buresh et al., 2019). In 2017, the U.S. Department of Health and Human Services declared the opioid epidemic a public health emergency and focused its efforts on combating the alarming statistics of overdose-related deaths

(U.S. Department of Health and Human Services, 2019). Causing further distress, fentanyl, a synthetic opioid, has caused the number of deaths due to overdose to increase even more rapidly (U.S. Drug Enforcement Agency, 2020). Fentanyl, originally manufactured and Federal Drug Administration (FDA) approved for use as an analgesic, is roughly 50 to 100 times more potent than heroin (Buresch et al., 2019; Glick et al., 2019; McKnight et al., 2018; Oh et al., 2020; Palamar et al., 2019) and the amount equivalent to grains of salt is harmful enough to cause death in a human being (Goldman et al., 2019; Griswold et al., 2018).

Harm reduction techniques such as supervised injection facilities (SIF), Narcan administration and education, and drug checking are being exercised in multiple geographic locations across the globe even if not government sanctioned (Glick et al., 2019; Sherman et al., 2019). Drug checking, or the act of testing drug residue or the individual's urine before or after use of the drug, has gained popularity amongst people who use drugs (PWUD) to decrease risk of overdose (Kriegar et al., 2018). The following study's objective was to systematically review literature for associations between the harm reduction technique of drug checking and behaviors of PWUD to inform surrounding communities of its importance.

Apart from the article by Palamar et al. (2019) which focused drug testing of hair samples, all other articles discussed the use of specimen-analyzing machines to detect the presence of fentanyl (Glick et al., 2019; Griswold et al., 2018; Kenney et al., 2018; Sherman et al., 2019) or fentanyl testing strips (FTSs) (Goldman et al., 2019; Karamouzian et al., 2018; Kriegar et al., 2018; Mema et al., 2018; Oh et al., 2020). Drug checking results were physically analyzed in only 4 studies (Goldman et al., 2019; Karamouzian et al., 2018; Mema et al., 2018; Palamar et al., 2019) whereas discussions regarding behaviors related to results and testing were studied in all of the remaining articles. Glick et al. (2019) involved stakeholder's opinions on the

use of FTSs or machine drug analyzers and the article by Buresh et al. (2019) explored participants' knowledge on drug testing.

Multiple studies indicated that FTS drug checking prior to use of the participants drugs in the privacy of their own home was preferred (Glick et al., 2019; Goldman, et al., 2019; Kriegar et al., 2018; Palamar et al., 2019; Sherman, et al., 2019). Also known as self-testing, using rapid FTSs was also determined to be most cost-effective and the easiest of drug technologies to use with a high detection level for fentanyl and fentanyl analogs (Glick et al., 2019; Kriegar et al., 2018; Mema et al., 2018, Oh et al., 2020).

Several studies examined willingness to incorporate drug checking into participant's daily drug rituals as well as make changes to drug habits if they knew prior to using that the drug also had fentanyl in it. In the article by Kriegar et al. (2018), it was reported that 93% of individuals wanted to know if fentanyl was in their drugs before using them and 85% of individuals believed drug checking could help them prevent an overdose (Sherman et al., 2019). Various articles explored participant's positions on how they planned to change their drug behaviors with knowledge of positive fentanyl results such as taking test doses of the drug before injecting the entire dose, using with another individual nearby or with someone who could use Narcan, ceasing purchase of the drug from that dealer, or getting rid of the drug completely and not using it (Goldman et al., 2019; Karamouzian et al., 2018; McKnight et al., 2018; Oh et al., 2020; Palamar et al., 2019; Sherman, 2019).

The article by Mema et al. (2018) was the solitary article that interviewed participants, conducted drug checking, released results to participants, and then re-evaluated participants 2 to 4 weeks after the drug checking to see if those with positive results had a change in drug using behaviors. The sample size was small, consisting of 24 participants. Four participants in the

study tested positive for fentanyl and 3 participants reported changing drug using behaviors after receiving positive results (Mema et al., 2018). Identification of fentanyl before or during the use of drugs was reviewed. Griswold et al. (2018) reported 14 of 28 individuals being able to accurately identify exposure of fentanyl through appearance, affect, preparation, or all the above. It was noted that 331 of 994 participants (35%) stated they were able to tell the difference between fentanyl adulterated heroin (Buresh et al., 2019).

Few barriers to undergoing drug checking were mentioned amongst the collection of articles. Drug checking by individuals bringing in their drugs to be checked by a machine in a treatment facility presented the possibility of being intercepted by law enforcement with drugs on their person. Another barrier mentioned is the stigma associated with PWUD and some said they would feel uncomfortable being seen going into a treatment facility to have their drugs checked. The FTS take-home method would alleviate these barriers and would allow participants to feel more comfortable self-testing for fentanyl (Glick et al., 2019).

The states of Maryland, Rhode Island, and Washington D.C. have decriminalized drug checking paraphernalia, such as FTSs, if found on an individual by law enforcement (Glick et al., 2019; Goldman et al., 2019; Sherman et al., 2019). Massachusetts has submitted an addition to the Good Samaritan Law (Bill S.904) to include decriminalization of drug check paraphernalia in 2020 and is waiting for it to be passed by legislature (The General Court of the Commonwealth of Massachusetts, 2021).

The limitations mentioned within the articles included the use of small sample sizes and single participant recruiting settings which hindered the generalizability of study results to larger populations (Kriegar et al., 2018; Mema et al., 2018; Oh et al., 2020; Palamar et al., 2019). Due to many studies not having completed toxicology on the drugs, these studies said that self-report

of drug use was a limitation (Buresh et al., 2019; Kriegar et al., 2018; Oh et al., 2020; Sherman et al., 2019). Social bias or desirability and recall bias were also limitations (Oh et al., 2020; Sherman et al., 2018) and that change in behaviors after knowledge of a positive fentanyl test was self-reported as to what participants felt they would do to change behaviors but only Mema et al. (2018) measured what changes occurred in behaviors. The FTS method of drug checking illicit substances prior to use for the presence of fentanyl decreases the risk of overdose and overdose-related deaths by allowing for informed decision making by PWUD (Karamouzian et al., 2018).

Fentanyl has also been detected in other illicit substances such as cocaine, methamphetamine, ketamine, and counterfeit prescription opioid pills (Kriegar et al., 2018; McKnight et al., 2018). FTSs could be utilized amongst those that participate in polysubstance use as well. Ease of use and cost-effectiveness also make FTS drug checking an appealing option to utilize as a harm reduction technique (Glick et al., 2019). In a world where alarming rates of overdose-related deaths are occurring from a rapid increase of unknown use of fentanyl in drugs, encouraging the use of FTSs to help save even the smallest quantity of lives is imperative for combating overdoses and related fatalities.

Search Criteria for Articles on Motivational Interviewing

A literature search was then conducted that focused on principles of motivational interviewing was performed by gathering information through the electronic databases CINAHL, MEDLINE, PubMed and Psych INFO using the following search terms: motivational interviewing, substance use, adults, opioid treatment, motivational enhancement, medication assisted treatment program, self-management of chronic conditions, change theories.

The initial search yielded 1,258 results and was further limited to academic, peer reviewed articles in the English language that were published within the previous five years. Research that was focusing on motivational interviewing in self-care of other medical or psychiatric conditions were included in this systematic literature review. A total of 71 articles were identified and further evaluated based on applying exclusion criteria such as research focused solely on children, non-systemic reviews, letters, and interventions not focused on use of fentanyl test strips. Eleven articles were chosen for this systematic review.

These studies were organized using the matrix method to compare the purpose, methods, results, and implications of findings for each study (Appendix B). All studies were conducted in 2016 or later. The researchers of these studies targeted substance use, as well as other medical and psychiatric conditions. Three studies targeted the use of MI to improve patients' self-care in chronic health conditions; (a) cardiac disease (Al-Ganmi et al., 2018; Sokalski et al., 2020), (b) Type 2 diabetes (Sajjad et al., 2019), and (c) schizophrenia (Ertem & Duman, 2019).

Four studies focused on the use of MI in the treatment of opioid use disorder (Chang et al., 2020; Coffin et al., 2017; Navidian et al., 2016; Ronquest et al., 2020), and in an additional 4 studies, MI was applied in the treatment of varying substance use disorders (SUDs) (Kim et al., 2017; Martino et al., 2019; Olmstead et al., 2020; Oveisi et al., 2020). Sample size of the studies ranged from < 50 (n=5), 50-99 (n=2), 100-1000 (n=2), and >1000 (n=2).

The quality of reviewed articles varied by research design, statistical methods used for the evaluation of data, and modalities of delivering MI. Nine out of eleven research groups used randomized control study designs, one used a one-group pre- and post-design (Chang et al., 2020), and one used a quasi-experimental study design (Navidian et al., 2016). All research was

evaluated by using JHNEBP evidence rating scale and only articles with a level I and II strength of evidence, and a level A and B quality of evidence were included in this systematic review.

Synthesis of Evidence Based Practices on Use of Motivational Interviewing

Motivational interviewing (MI) is a proven patient-centered approach that allows patients to make necessary behavior changes. Ten out of eleven studies showed that motivational interviewing was effective in reducing substance use and improving self-care adherence. The study performed by Kim et al. (2017) compared the effectiveness of negotiated interviewing and motivational interviewing with a control group and found that 1 short session of an intervention lasting from 10-45 min does not improve a client's outcome.

Authors of multiple studies described that MI is effective if it is delivered to the client in different stages of recovery as the client moves from one stage of readiness to another (Al-Ganmi et al., 2018; Chang et al., 2020; Martino et al., 2019; Oveisi et al., 2020; Sajjad et al., 2019; Sokalski et al., 2020), and with longer than 30 minute sessions in duration (Coffin et al., 2017; Ertem & Duman, 2019; Martino, 2019). Navidian et al. (2016) showed that MI improves client outcomes even after MI sessions are discontinued by showing that participants who were enrolled in an MI group had a higher success rate of retention in the program at the 12-month duration mark (48%) vs the control group (14%).

All of the research showed that MI can be utilized by using different forms and methods of delivering it to the patient in combination with other therapies. It can be used in an inpatient setting (Martino et al., 2019; Olmstead et al., 2020), outpatient setting (Coffin et al., 2017; Ertem & Duman, 2019; Oveisi et al., 2020), primary care (Kim et al., 2017) or in-home service setting (Chang et al., 2020; Navidian et al., 2016). It can be delivered as a face-to-face intervention, group therapy, or individual therapy but it is most effective when at least some of the session is

delivered face-to-face (Al-Ganmi et al., 2018; Coffin et al., 2017; Martino et al., 2019; Navidian et al., 2016; Ronquest et al., 2020). Olmstead et al. (2020) showed that delivering MI face-to-face or through a phone consult is more cost effective than providing workshops or apprenticeships to the health care providers.

Cost Effectiveness of Motivational Interviewing

An increase in the number of MI sessions received needs to be supported by cost-benefit analyses that compare different forms of delivering the treatment. Olmstead et al. (2020) performed a study where he compared the cost between different forms of delivering MI to clients such as workshop, apprenticeship, and direct consult. None of these forms of delivering MI were superior to one another. Workshops and apprenticeships had higher startup costs whereas direct consults did not, but were more expensive and less accessible to clients due to the need for transportation. Martino et al. (2019) found that consults, one on one meetings with a healthcare provider, resulted in a significantly higher number of patients who received MI treatment. It showed that consults resulted in 21.8% of patients receiving MI vs 1.9% through other delivery methods. Currently there were no studies showing the cost analysis of delivering MI sessions via telehealth. This creates the need for further research considering the shift of healthcare towards telehealth due to the global COVID-19 pandemic.

In most of the studies, MI was applied to the patient to improve their health behaviors. This approach can also be applied to training healthcare professionals who are resistant to implement new ways of caring for clients indicating a need for behavior change (Mazzone et al., 2019; Olmstead et al., 2020). In order to improve the willingness of providers to educate patients regarding fentanyl test strips among adult clients who are enrolled in MAT programs, it

is important to utilize principals of MI when providing training to healthcare and mental health professionals.

Use of Fentanyl Test Strips to Protect Client Autonomy

Providers who are involved in treating clients with OUD have been reluctant to discuss the use of fentanyl test strips with clients due to a lack of knowledge regarding the rate of relapse, overdose-related deaths, and beliefs that the use of fentanyl test strips could encourage patients to use opioids. To facilitate provider's willingness to engage in this conversation with the clients, it is important to target psychological determinants such as readiness for change, perceived beliefs, and self-efficacy. In order to influence this behavior, it is important to overlap basic psychological needs of the providers such as autonomy, competence, and relatedness (Mazzoni et al., 2019).

Autonomy allows healthcare professionals to make evidence-based decisions regarding the best plan of treatment for a client. Competence of the provider in administering the training regarding the fentanyl test strips allows healthcare and mental health professionals to achieve the goals that were set for the client. Relatedness allows providers to stay connected with the client while improving the therapeutic relationship (Mazzoni et al., 2019; Olmstead et al., 2020). By overlapping these determinants, one creates an environment where providers recognize their own barriers to treating clients and become willing, ready, and motivated to change their attitude toward conversations regarding the use of fentanyl test strips (Ronquest et al., 2020).

For this project, it is important to incorporate motivational interviewing at different stages of recovery while being cognizant of the idea that clients have chemical dependency and altered brain chemistry with OUD. Relapse is considered a stage in recovery and is commonly undergone by those diagnosed with OUD. During each stage of recovery, providers need to

address the use of fentanyl test strips differently based on the principles of motivational interviewing. To achieve this goal, it is necessary to educate healthcare providers on how to apply the principles of MI when talking to the clients about the use of fentanyl test strips.

Theoretical Framework

This DNP project is guided by Ryan's Integrated Theory of Behavior Change. This theory suggests that behavior change can be enhanced by fostering knowledge and beliefs which increases an individual's desire for change (Ryan, 2009). The model of behavior change adopted for the purpose of this project is presented in *Appendix A*.

In order to address behavior changes in healthcare providers it is important to address their self-regulation skills and motivation. The first foundational stone towards behavior change is self-regulation skills and ability (Mazzoni et al., 2019; Ryan, 2009). This foundational stone is influenced by the provider's knowledge and beliefs regarding the possibility of overdose and overdose-related deaths that might occur if a client decides to use drugs. Self-regulation skills are also influenced by social facilitation which includes social and emotional acceptance, administrative support, and peer influences.

Providing healthcare and mental health professionals with self-regulation skills makes it possible to change their intentions when working with clients (Mazzoni et al., 2019). Intention is influenced by several factors such as the knowledge and skills on how to use fentanyl test strips, salience of behavior which can be changed through the application of MI, environmental constraints such as a lack of time or resources, and by personal habits.

The interventional approach of this project was based on the conceptual model of RAPIDS (Jacka et al., 2020) that is presented in *Appendix B*. It consists of building on knowledge regarding overdose information, motivational interviewing, and role-play teaching.

At the beginning of the training, healthcare and mental health professionals received information regarding the risks of overdose that are associated with the presence of fentanyl and how test strips could be used help to avoid overdose.

The presentation was facilitated by using MI techniques to encourage participants to limit their client's exposure to fentanyl to decrease the occurrence of overdose. This was achieved by introducing healthcare and mental health professionals to the basics of MI so that they could apply these concepts when teaching their clients. Lastly, healthcare and mental health professionals were provided with fentanyl test strips that they could practice with and administer in order to improve their level of confidence when teaching clients how to use fentanyl test strips.

Methods

Project Site and Population

The site that the project took place was at a Medication Assisted Treatment (MAT) program located in Springfield, Massachusetts which is a diverse city with a population of 153,606 people in 2019 (U.S. Census Bureau). Common race categories include African Americans which make up 20.9% of the population, Hispanic or Latino individuals at 45.0%, and White individuals that make up 65% of the population (U.S. Census Bureau, 2019). The MAT program at the project site is a relatively new program with the goal of reducing the number of different providers prescribing medications to a single client while providing continuity of care.

Inclusion criteria for the participants in the project included project site staff, both clinical and behavioral health, that provide services to individuals who have OUD and receive MAT at the project site. Exclusion criteria included individuals who were not staff members of the

project site such as the client's enrolled in the MAT program, as well as staff members who did not provide care to individuals who received MAT treatment. Recruitment strategies included a system-wide email for staff affiliated with the Springfield MAT program that asked them to participate in a pre-intervention survey, watch an educational intervention that was pre-recorded, and conduct a post-intervention survey. Participants were provided with lunch for their participation.

The project site facility offers a wide range of programs for individuals to work towards achieving optimal health at 26 different locations across Massachusetts and Connecticut. There are programs that assist clients in behavioral health, addiction recovery, child development, community support, housing and hunger, court-guided support, and intellectual and developmental disability support. The project site staff is made up of clinicians, case managers, administrative staff, residential staff, medication providers, nurses, recovery coaches, as well as a multitude of other positions.

Measurement Instruments

To measure the outcomes of this DNP project the following instruments were used: a pre-intervention survey prior to the educational intervention as well as a post-intervention survey following the educational intervention (*Appendix D*). The surveys employed a 5-point Likert scale which assessed staff member's knowledge on fentanyl test strip use as well as motivational interviewing techniques. Open ended questions were added to the pre and post Likert surveys that included questions regarding the knowledge of applying motivational interviewing at different stages in recovery and on educating patients on the use of fentanyl test strips to prevent fentanyl-related overdoses. The post-intervention surveys asked if staff members found the

educational program to be beneficial to them and what suggestions for improvement, if any, that they recommended.

Data Collection Procedure

Approximately one month prior to the project implementation, the MAT program was visited to establish a relationship with staff members. Data was collected on how many staff members provide treatment to MAT program clients which included psychiatrists, councilors, and other members of the team who were involved in direct patient care. Prior to the educational video intervention, the clinic administrators emailed potential participants advising them on the upcoming educational training. The email consisted of background information on the educational intervention.

The educational intervention consisted of a pre-recorded PowerPoint video with voice recording to address knowledge on opiate overdoses, motivational interviewing techniques, and the use of fentanyl testing strips (*Appendix E*). The pre-recorded PowerPoint video with voice recording was created and administered to the participants via an in-person presentation over the course of one day at the project site.

While at the project site on the day of the presentation, pre-intervention surveys were administered in-person and collected before the presentation started to the 6 individuals who attended. The educational training video was presented to participants and following the training a post-intervention survey was conducted and handed back to the presenters. Participants who were not able to attend in person received the educational intervention video via email. The educational training video was also posted on Youtube.com for additional viewing.

Data Analysis

A 5-point Likert scale conducted at the pre-intervention and post-intervention levels of the DNP project, provided ordinal data that inferences could be created from. A mean and median score was calculated from the scale items and descriptive statistics was used to evaluate the results. For the demographic data collected such as age, gender, position, educational level, and years of experience in the position they were currently in at the project site, DNP students ran a Chi-Squares test to determine a *p* value. All statistical data was run using the SPSS data software.

Ethical Considerations

The University of Massachusetts, Amherst Internal Review Board (IRB) approval was obtained prior to initiating the DNP Project. Ethical considerations were acknowledged in regard to consent and confidentiality. All participants of the project received information regarding the goals and objectives of the study and voluntary basis of participation based on this knowledge. Due to the sensitive nature of this project, personal identifying information was not asked. Responders did not provide names or personal details; thus, it does not violate the Health Insurance Portability and Accountability Act of 1996 (HIPAA) regulations.

All the surveys filled out before and after the training and were kept in a filing cabinet under lock. This project did not change any standards of care as it was based on providing education to healthcare professional regarding use of fentanyl test strips who then could determine the risks and benefits of the proposed intervention. Project related information was securely stored in a secured Windows-based software that required double identification.

Results

Despite encouragement of all providers to attend the presentation on fentanyl test strips and motivational interviewing, only six participants attended and completed the surveys. They included members of the multidisciplinary team such as a clinical supervisor (n=1), nurse case manager (n=1), recovery coaches (n=2), and registered nurses (n=2). The educational training that was presented is available online to all healthcare providers so that they can complete the training at their convenience and is also available to new hires of project site as well. Within one month of the educational intervention video being posted on YouTube; 23 views were obtained.

Sociodemographic Characteristics

Sociodemographic characteristics of study participants are summarized in Table 1. A total of six participants were recruited from the project site's MAT program.

Table 1: Sociodemographic Characteristics

	Age	Gender	Occupation	Educational Level	Years of Experience
Participant 1	29	Male	Recovery Coach	Some College	4
Participant 2	56	Female	Recovery Coach	Bachelors	4
Participant 3	34	Female	RN	Bachelors	Less than 2
Participant 4	32	Female	Clinician Supervisor	Masters	7
Participant 5	30	Female	Nurse Case Manager	Bachelors	Less than 1
Participant 6	33	Female	RN	Associates	Less than 1

Among the six participants who completed the pre and post surveys, the mean age was 35.67 (SD = 10.132). More than half (83%) of the study participants were female, and half of the participants (50%) were nurses by occupation followed by recovery coaches (33%) and clinicians (17%). Half of the participants (50%) had completed four years of college education, one participant (17%) completed two years of college, one participant (17%) finished less than

two years of college, and one participant (17%) completed six years of college. Years of experience with MAT included one third of participants (33%) with two years of experience, one third of participants with one year of experience, and 17% of participants with two years of experience and 17% of participants with seven years of experience. The data collected is examined and illustrated by the descriptive statistics in *Appendix F*.

Analysis

The nonparametric test, Pearson’s Chi-Square test, was used to compare categorical variables as well as means. One-sided p-values were used for all variables and were considered statistically significant at 0.05. Frequency analysis and descriptive statistics for the Likert scale data is presented in Table 2. below. Table 2: Pre/Post Test means, Pre/Post Test Chi-Chi-Square

Table 2:

Pre/Post Test Means, Pre/Post Test Chi-Square Values, and One-Sided p-Values Pre/Post Test: Before and After Educational Intervention

	Pre/Post Test Means	Pre/Post Test Chi-Square	One-sided p-values Pre/Post Test
Question 1	Knowledge on statistics of fentanyl overdose 2.83/3.50	2.667/.000	<.001
Question 2	Level of comfortability with the use of fentanyl test strips 3.17/3.50	1.000/.000	<.001
Question 3	Level of comfortability with using opened ended questions 3.33/3.50	.667/.000	<.001
Question 4	Level of comfortability in applying principles of MI throughout a client’s recovery 3.00/3.50	3.000/.000	<.001
Question 5	Level of comfortability in discussing the use of fentanyl test strips with a client 2.83/3.17	1.000/1.000	<.001
Question 6	Level of comfortability in teaching a client how to use fentanyl test strips 2.67/3.00	.667/3.000	<.001
Question 7	Knowledge of the core principles of MI 2.83/3.17	1.000/1.000	<.001
Question 8	Knowledge of the stages of change 3.50/3.67	.000/.667	<.001
Question 9	The ability to apply MI in client care to improve adherence to treatment 3.33/3.50	.667/.000	<.001
Question 10	Level of confidence in using MI with clients who are enrolled in MAT 3.00/3.50	.000/.000	<.001

Likert Scale Key: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree

Based on the pre-intervention surveys, it was determined that participants needed increased education on statistics regarding overdoses related to fentanyl use (Mean= 2.83), increased comfortability in discussing the use of fentanyl test strips (Mean= 3.17), education on applications of motivational interviewing when discussing the use of fentanyl test strips (Mean =3.12), and increased comfortability in teaching clients how to use test strips (Mean =2.67).

Based on the post-intervention survey data, it was discovered that an increase in knowledge about statistics regarding overdoses related to fentanyl (Mean= 3.5) was achieved, comfortability in discussing the use of fentanyl test strips (Mean= 3.5) had increased, the participant's knowledge on the application of motivational interviewing when discussing the use of fentanyl test strips (Mean =3.43) increased, and participants comfortability in teaching patients on how to use test strips (Mean =3.0) increased as well.

After providing the training, the knowledge of the healthcare and mental health providers improved in all areas; especially their willingness to train clients on the use of fentanyl test strips based on principles of motivational interviewing. The overall willingness to utilize concepts of motivational interviewing in clients with substance use disorder and administer fentanyl testing strips to clients was also high after the intervention. Overall, half the participants ($n = 3$, 50%) agreed and half ($n = 3$, 50%) strongly agreed that they were comfortable with using motivational interviewing at different stages of recovery and discussing the use of fentanyl test strips with clients.

Participant's knowledge level on statistics of fentanyl use increased to levels of agreed ($n = 3$, 50%) and strongly agreed ($n = 3$, 50%), and their knowledge of the core principles of

motivational interviewing increased to a comfortability of neither agree nor disagree ($n = 1$, 17%) to level of agreed ($n = 3$, 50%) and strongly agreed ($n = 2$, 33%) after the brief training. It shows that the intervention of providing specialized training for healthcare providers improves their knowledge and willingness to utilize fentanyl test strips based on principals of motivational interviewing when providing care for patients who are enrolled in MAT programs.

Discussion

The goal of this project was to assess the effectiveness of an educational program for clinical staff regarding the use of fentanyl test strips while utilizing principles of motivational interviewing in different stages of recovery. The results demonstrated that there was a significant improvement in knowledge and willingness to utilize fentanyl test strips and motivational interviewing after the educational intervention.

Recovery is not a linear process and patients who are enrolled in MAT programs have a chemical dependency and altered brain chemistry that may lead to relapse (Al-Ganmi et al., 2018). Relapse is a part of recovery which eventually can lead to readiness for cessation of use. Some clients will relapse several times, but as long as they feel supported, they are able to return to cessation of use (Oveisi et al., 2020; Sajjad et al., 2019). The literature review suggest that individuals who do not utilize harm reduction techniques when using opioids have a greater risk of overdose that can be fatal (Goldman et al., 2019; Oh et al., 2020; Palamar et al., 2019; Sherman et al., 2019).

During relapse it is extremely important that clients are aware of the presence of fentanyl in drugs so they can either significantly reduce the amount they use, or not use them at all, as there is significant risk of death from overdose (Chang et al., 2020; Martino et al., 2019; Oveisi et al., 2020; Sajjad et al., 2019; Sokalski et al., 2020). Multiple researchers show that those who

detect fentanyl in their drugs may change their behavior to either not to use the drug or reduce the amount of drug they use. Ninety three percent of individuals in one study wanted to know if fentanyl was in their drugs before using (Krigar et al., 2018), and 85% of individuals believed drug checking with fentanyl test strips could help them prevent an overdose (Sherman et al., 2019). The stigma associated with drug use can make people uncomfortable about being seen going into treatment facilities to have their drugs checked. The fentanyl test strip take-home method alleviates this barrier and allows participants to feel more comfortable self-testing for fentanyl. The educational intervention presented to participants highlighted the ease of use of fentanyl test strips as well as MI once comfortability with the two concepts are achieved.

The purpose of this project was to educate healthcare and mental health professionals regarding the risk of fentanyl overdose and motivate them to provide training to their clients regarding the use of fentanyl test strips. The goal of this project was to increase the number of staff members at the project site who were willing to use fentanyl test strips in everyday practice.

The surveys' substantiate an overall increase in the knowledge regarding overdoses related to fentanyl (pre-test mean= 2.83; post-test mean=3.5), comfortability in discussing the use of fentanyl test strips (pre-test mean= 3.17; post-test mean=3.5), application of motivational interviewing when discussing the use of fentanyl test strips (pre-test mean= 3.12; post-test mean=3.43), and comfortability of teaching clients on how to use test strips (pre-test mean= 2.67; post-test mean=3.0).

The intervention of an educational program improved provider's knowledge regarding the rise of fentanyl related overdoses, the use of motivational interviewing when talking to the patients about fentanyl test strips at different stages of recovery, and the use of fentanyl test strips. Sherman et al., (2018) revealed a knowledge gap about clinicians' willingness and

comfortability when discussing the use of fentanyl test strips with the clients because some providers feel that it promotes drug use when patients are enrolled in MAT.

The project participants reported that they will continue using the knowledge they received during the training. An open-ended questionnaire at the end of the survey identified the willingness to use fentanyl test strips by 5 participants (n=5), and a passive attitude by 1 participant (n=1). The passive attitude of the participant was related to seeing fentanyl testing strips as drug paraphernalia.

Despite evidence that fentanyl test strips are an effective way to prevent death due to overdose, there are only a few states where testing strips are legal. Massachusetts has submitted the Good Samaritan Law (Bill S.904) to include decriminalization of drug checking paraphernalia in 2020 and is waiting for it to be passed by legislature (The General Court of the Commonwealth of Massachusetts, 2021). Additionally in Massachusetts, the passing of Bill H.1717 would establish a pilot program for the purpose of implementing and studying the efficacy, public health, and public safety outcomes of the use of fentanyl test strips (The General Court of the Commonwealth of Massachusetts, 2021).

The strength of the project included support of the stakeholders who helped to organize the training and encouraged the multidisciplinary team to participate in the project. The organizational management of the project site is highly motivated to have an educational program centered around the use of MI to educate staff members on the use of fentanyl test strips for people who use opioid drugs. The stakeholders were also provided with the training for future use.

The limitations of the study consisted of a small number of participants who completed the surveys (N=6). During the implementation of the project, DNP students experienced a

significant barrier being the COVID-19 pandemic. A large number of healthcare providers, including most of the clinicians, worked from home which limited their ability to participate in an in-person training. Even though the training video was e-mailed to them, DNP students did not receive the surveys back and it was impossible to know if those providers completed the training. The training video was also posted on YouTube and received 67 views within the first 3 months, but it is impossible to evaluate the results of the training published on this public platform.

Facilitators and Barriers

The facilitators of the project included the project site's clinical director, the MAT program coordinator, and the nursing supervisor of the MAT program. The project site's clinical director provided information regarding e-mail addresses of the staff members who were eligible to participate in this project. DNP students also had access to the project site's MAT program facility to be able to have ongoing discussions with staff members to be able to create the educational program to be geared directly to their needs. A barrier that was discovered when conducting the project was the lack of participation by staff members due to COVID-19 restrictions.

Conclusion

In summary, overdose-related death rates have increased exponentially in the past decade due to the creation of the synthetic substance fentanyl. As a harm reduction technique, drug checking has become more widely used amongst healthcare and mental health staff, but still reservations to its implementation into practice exist because of a deficit in knowledge on the product. Motivational interviewing has proven to be beneficial in helping patients to improve

health behaviors by relying on stages of readiness to change (Mazzone 2019; Olmstead, 2020) when providing specialized training.

The purpose of this project was to assess the effectiveness of an educational training program for clinical staff regarding the use of fentanyl test strips based on principles of motivational interviewing. Specialized training was created based on an APNA training on MI and training provided by the manufacturer of the fentanyl test strips used in this project. Education for staff was provided through an in-person training and is indefinitely available on the YouTube platform. Participants of this project reported positive responses.

Overall, half the participants ($n = 3$, 50%) agreed and half ($n = 3$, 50%) strongly agreed that they were comfortable with using motivational interviewing at different stages in client's recovery. All participants felt their knowledge of fentanyl use after the educational training video was presented had increased: agreed (50%) and strongly agreed (50%). Based on the results of the study it was determined there was a statistically significant relationship between the educational program and staff's comfortability in discussing the use of fentanyl test strips based on principles of motivational interviewing to apply an evidence-based client-centered approach to care.

Cost Benefits Analysis

Estimated cost itemization of the project (*Appendix C*) amounted to \$1260.14. This estimated amount covered the cost of materials, equipment and software needed to complete the DNP project. Motivational interviewing training and Recovery to Practice training was offered by the APNA at no cost. The training for healthcare providers was delivered by using electronic equipment and during the in-person training for free. All participants were provided with fentanyl test strips to practice how to use the test strips which improved their level of confidence.

The overall cost of the proposed project was low considering the potential savings on costs related to overdoses are very high. According to the CDC, fatal opioid overdoses in the United States cost \$1.02 trillion in 2017 and is projected to increase by approximately 10% each year. The overall mean cost of an outpatient opioid-related visit is \$533 (ranging from \$395-\$802 depending on the location) where providers would typically educate patients on use of fentanyl test strips. An in-patient opioid-related visit costs \$4,383 (ranging between \$2,894 - \$5,835) with an average duration of stay being 4.35 days if an overdose occurs (Mallow, 2018). According to this data, potential savings could be as high as \$3,850 per patient.

This project emphasizes the importance of continuing education for healthcare providers to improve their willingness to provide care for clients and teach them how and when to use fentanyl test strips based on the principles of motivational interviewing. The educational intervention has been uploaded to YouTube so that it is available for healthcare providers, as well as public viewers, who are interested in implementing quality improvement projects on reducing the risk of overdose based on principles of motivational interviewing. The completed project positively impacted the project facility site as DNP students were able to create an educational training that stakeholders can use in the future as a continuing education program for healthcare providers.

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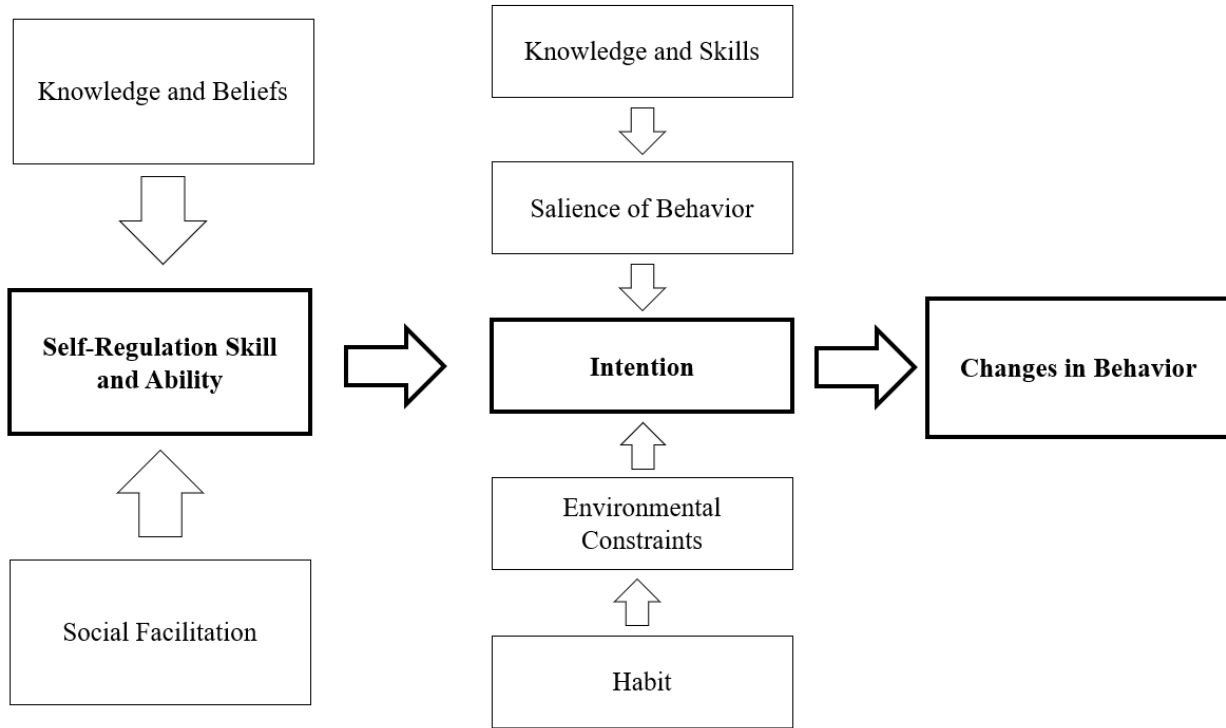
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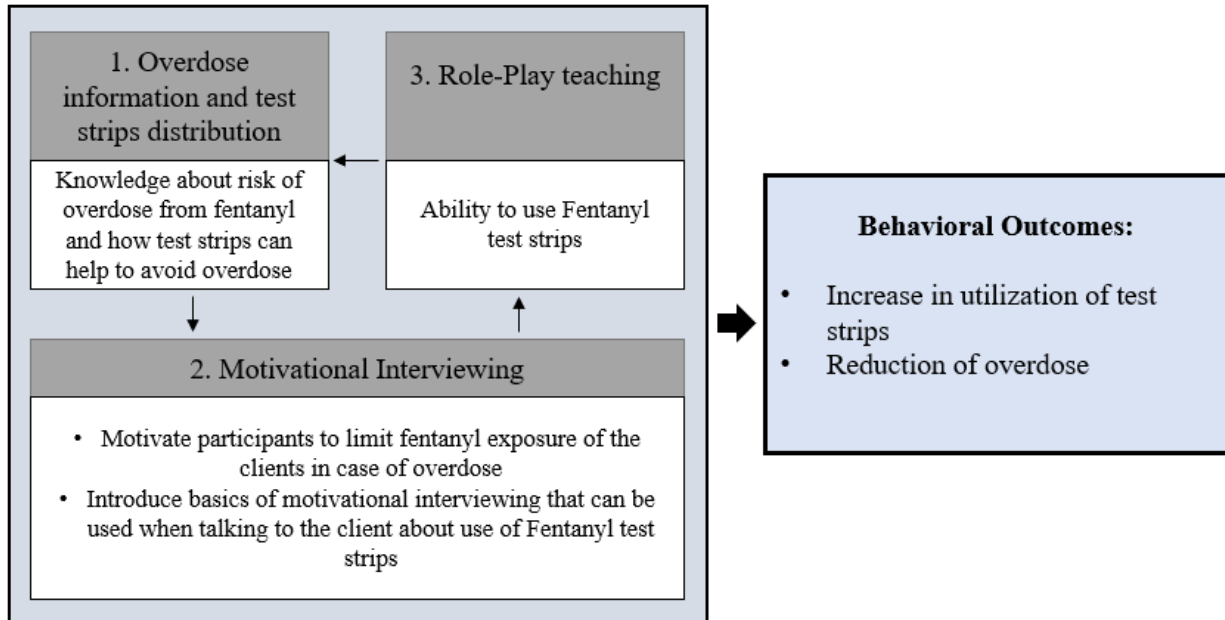
Appendix A

Ryan's Integrated Theory of Health Behavior Change adopted for DNP project



Appendix B

Conceptual Model of the RAPIDS intervention for the prevention of opioid overdose



Appendix C

Estimated Cost Itemization of DNP project

Item	Projected Cost of One Item	Number of Items Required	Total Cost
Physical materials			
Fentanyl Test Strips	\$31.86	6	\$191.16
Paper	\$9.00	1	\$9.00
Software			
SPSS	\$99.99	1	\$99.99
Toon Boom Harmony Rental/ Student	\$59.99	1	\$59.99
Personnel			
DNP student training in Motivational Interviewing (APNA)	\$0	2	\$0
APNA Recovery to Practice (APNA)	\$0	2	\$0
Reimbursement for Participation			
Reimbursement for Participation	\$20.00 – initial training \$10.00 – post training Survey	30	\$900.00
Total Estimated Costs	\$1260.14		

Appendix D

Pre/ Post Intervention Survey

(please fill out one before completing the module and one after)

Age _____ Gender _____ Occupation _____

Educational Level _____ Years of Experience in MAT _____

1=Strongly Disagree, 2=Disagree, 3= Neither Agree or Disagree, 4=Agree, 5=Strongly Agree

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
I know statistics regarding the risk of overdose from Fentanyl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable to discuss the use of Fentanyl test strips with the clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your client is 46-year-old female who has history of opioid use disorder and enrolled in MAT. You are confident that she is using drugs. You are comfortable in your ability to use an open-ended question to elicit more information from your client?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your client shares with you that she tried to stop using opioids in the past, but she feels that she was not fully ready. Amanda states that she is ready now, but does not know how to begin. You are comfortable to discuss it with her further.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You are discussing with Amanda her socio-cultural environment and she reveals that she lives with her boyfriend who suffers from SUD and is not willing to participate in MAT or to give up drugs. You are comfortable in discussing with her the use of Fentanyl test strips to prevent overdose?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable to teach patient how to use Fentanyl test strips (how to use strips, how to dispose and etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have proficient knowledge in the ideas and core principals of Motivational Interviewing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The stages of change are relevant to practice with clients who have substance use disorders. Incorporating these stages of change help to illicit motivational behaviors for change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that Motivational Interviewing is effective in encouraging patient adherence to MAT.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident in utilizing Motivational Interviewing with clients who have substance use disorders.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Open-Ended Questions:

What are your concerns with the use of Fentanyl strips by patients?

What is your attitude towards Harm Reduction methods?

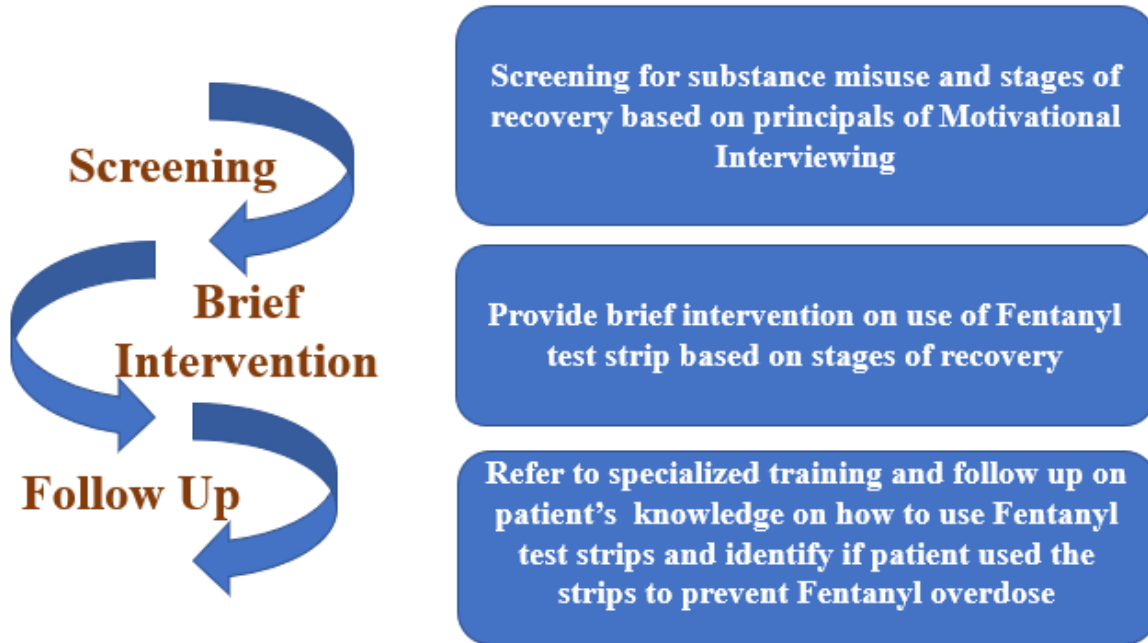
Appendix E

Overview of Educational Program Presentation

1. What is fentanyl?
 - a. Fentanyl educational information
 - b. Statistics on illicit fentanyl use
 - c. Physiology of fentanyl in body
2. What are fentanyl test strips?
 - a. Harm reduction technique introduction
 - b. How to use fentanyl test strips
 - c. How to interpret fentanyl test strips
3. Drug Behavior Education
 - a. Using with individual who can dispense Narcan or call 911
 - b. Using a test amount of the drug
 - c. Disposing of the drug if it is positive for fentanyl
 - d. Education on local facilities for detoxification and treatment
4. What is Narcan?
 - a. Narcan educational information
 - b. Where Narcan can be obtained
 - c. How Narcan is used, different types of administration
5. What is Motivational Interviewing?
 - a. MI core principles: partnership, acceptance, evocation, compassion
 - b. Examples of MI statements between client and provider
 - c. Cartoon representing how to use principals of MI
6. How is Motivational Interviewing beneficial to clients with SUD?
 - a. Motivate participants to limit fentanyl exposure
 - b. Patient-Centered Counseling Skills: OARS
 - c. Meeting client at their stage of readiness
7. Case Study to reinforce the knowledge

Appendix F

**Screening Patients for Different Stages of Recovery and Applying Motivational
Interviewing in Teaching Patients How to Use Fentanyl Test Strips**



Appendix G

Pre and Post Intervention Questionnaire Data

