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Nurse Practitioner-Led Hepatitis C Virus Education in a Central Valley Opioid Treatment Program

Nikiesha Thomas Redus

A doctoral project completed in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice in the Valley Foundation School of Nursing, San José State University

April 2023

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Nurse Practitioner-Led Hepatitis C Virus Education in a Central Valley Opioid Treatment Program

Nikiesha Thomas Redus, MSN, FNP-C, PHN

Doctor of Nursing Practice Program

The Valley Foundation School of Nursing

San José State University

April 30th, 2023

Abstract

Introduction Viral hepatitis has been classified as a worldwide public health threat and it is estimated that 130-150 million people worldwide are infected with viral hepatitis. In the United States, increases in hepatitis C infections can be attributed to intravenous drug use and associated behaviors. Many people who inject drugs are unaware of their serostatus and access to accurate hepatitis C virus (HCV) information and education is limited. However, opioid treatment programs are well positioned to fill hepatitis C services gap among people who inject drugs by providing education, to raise hepatitis C awareness and lead to services and treatment utilization.

Aims The primary aim was to assess the effects of the implementation of an educational session on a patient's hepatitis C knowledge in an opioid treatment program. A secondary aim of the project was to increase a patient's willingness to seek HCV care by a community healthcare provider. **Methods & Design** This study used a one-group, pretest-posttest, quasi-experimental design to measure hepatitis C knowledge before and after an educational session and pre and post-test in 12 participants.

Results The results of the two-tailed paired t tests were significant based on an alpha of 0.05, $t(11) = -4.30$, $p = 0.001$; 41% of participants followed up with care after the intervention.

Conclusion This study showed that providing HCV education to participants in an opioid treatment program was successful at improving their knowledge and awareness regarding hepatitis C and increased their willingness to follow up with HCV care.

Contents

Introduction

Viral hepatitis has been classified as a worldwide public health threat (Bhadoria et al., 2022; Singh, 2018). It is estimated that 130-150 million people worldwide are infected with viral hepatitis (World Health Organization [WHO], 2016). This family of viruses has accounted for approximately 1.4 million annual deaths, with 48% of those deaths being from the hepatitis C virus (HCV) (WHO, 2016). The HCV is a substantial cause of death and illness in the United States (US), where approximately 3.4 million people are infected with HCV and 20,000 people die annually (Gowda & Lo Re, 2018). In the US, mortality from HCV has surpassed infectious diseases such as human immunodeficiency virus and tuberculosis (Gowda & Lo Re, 2018). Much of the increase seen in HCV infections can be attributed to intravenous drug use and associated behaviors (Blake & Smith, 2021; Fadnes et al., 2021).

Before 2015, there was no emphasis on HCV as a public health threat because the US medical and science community did not believe it was possible to eliminate HCV. This attitude changed with recent therapeutic advances in the form of direct acting antivirals and have radically improved the ability to treat and cure HCV, with greater than 90% success rates (Gowda Lo Re, 2018). Two such promising antivirals that are making strides in the treatment of HCV include the combination medications Epclusa (Sofosbuvir 400 mg/ Velpatasvir 100 mg) and Mayvret (Glecaprevir 100 mg/ Pibrentasvir 40 mg). Epclusa and Mayvret are both FDA-approved to treat all six genotypes of HCV in people without cirrhosis of the liver or in those who have uncompensated liver failure (Ahmed, 2018). Epclusa can be used to treat those with decompensated liver failure while Mayvret cannot (Ahmed, 2018).

These two medications are highly effective and can be taken for as little as eight to twelve weeks. Both medications have been shown produce a 90% sustained virologic response

(Ahmed, 2018). This development has led the WHO to set worldwide elimination target goals by 2030 to include reduction of new HCV cases by 80% and a 65% reduction in mortality from 2015 levels (Blake & Smith, 2021; Fadnes et al., 2021; Sherbuk et al., 2020; WHO, 2016; WHO 2017). In today's era of direct acting antivirals, treatment for HCV is highly effective, requires a shorter duration of therapy, has less intolerable side effects, less monitoring, and drug-drug interactions (Ahmed,2018). But despite these advances, cases of HCV continue to rise in the US, driven primarily by intravenous drug use (Blake & Smith, 2021; Fadnes et al., 2021).

HCV is primarily transmitted through percutaneous blood exposure. People who inject drugs or who have previously injected drugs are unduly burdened by HCV, with 50-90% of this population experiencing HCV infection (Alter, 2007; Hojati et al., 2018; Millman et al., Norton et al., 2018). Despite success with direct acting antiviral treatment and with people who inject drugs being disproportionately affected by HCV, uptake in treatment services and HCV knowledge remains unacceptably low in this population, with fewer than 17% of people who inject drugs having been linked to HCV care due to preventable barriers (Sanvisens et al., 2020; Sherbuk et al., 2020).

According to Sherbuk et al. (2020), barriers to HCV care include stigma, lack of linkage-to-care due to patients not having an established primary care provider or because of the linkage simply not being done. Barriers also include lack of knowledge about treatment guidelines, characteristics of the healthcare system, and patient and physician characteristics such as biases and judgmental attitudes toward people who inject drugs (Sherbuk et al., 2020). Many people who inject drugs are unaware of their HCV serostatus (American Society of Addiction Medicine [ASAM], 2017) and due to stigma or previous negative encounters with the health care system, their access to accurate HCV information and education is usually limited. However, opioid treatment programs (OTP/s) are well positioned to fill HCV services gap among people who

inject drugs by providing HCV education, which will raise HCV awareness and lead to HCV services and treatment utilization.

Literature Review

A literature review was conducted to explore HCV in substance use and the best practices interventions for patients with HCV, particularly those in OTPs. The search databases utilized included Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Medline. Using Boolean operators, the search terms included, hepatitis c virus, methadone clinics, opioid treatment program, substance use disorder, drug treatment, treatment, interventions, drug use, addiction, education, HCV, and hep c. The studies searched were initially limited to the past five years, but some older studies were included due to the significance of their findings. The studies were critically appraised for reliability, validity, and generalizability as well as relevance to the author's DNP project. The literature search revealed recurring themes of an increased HCV knowledge gap in people with substance use disorders and illustrated the importance educational interventions.

Educational Interventions

Multiple studies and systematic reviews have shown that educational interventions for substance use disorder patients significantly increase and improve a patient's HCV knowledge and behaviors (treatment uptake and risk factor reduction) (Bajis et al., 2017; Larios et al., 2014; Roux et al., 2016; Shah & Abu-Amara, 2013; Zhou et al., 2016). Studies have shown that HCV education delivered in various formats are simple, inexpensive, and highly effective (Roux et al., 2016; Shah & Abu-Amara, 2013; Zhou et al., 2016). Shah and Abu- Amara (2013) conducted a systematic review on peer-reviewed studies that evaluated educational interventions for HCV and hepatitis B patients. Fourteen studies that evaluated educational intervention and reported on

patient outcomes or effectiveness were chosen for review.

Some of the studies revealed that most of the interventions were nurse-led and this has important implications because nurses can dedicate more time and knowledge to patient education. Overall, educational interventions showed significant (P<.05) improvements not only in patients' HCV knowledge, but also significant improvements in HCV testing, willingness start and adhere to treatment. Other outcomes such as self-efficacy and vitality were also observed.

Similarly, a systematic review using meta-analysis (Zhou et al., 2016) analyzed fifty-six studies (18 for hepatitis b and 41 for HCV) and reported on HCV care continuum outcomes. Clinician reminders to prompt patients for HCV testing during clinical visits increased HCV testing, and educational interventions that were nurse-led improved HCV treatment completion. Moreover, coordinated services in the areas of mental health, substance use, and HCV awareness also significantly increased HCV treatment utilization and cure. Overall, the study exposed a need for an integrative approach to HCV care treatment in vulnerable populations.

Bajis et al. (2017) reviewed fourteen studies (56% random controlled trials) on interventions to improve HCV testing and interventions to improve linkage-to- care and treatment in persons who inject drugs. The review found that interventions which improved HCV testing outcomes included onsite pretest counseling, education, and blood spot testing. Intervention for improvements to linkage-to-care included facilitated referral for further HCV evaluations and scheduling of specialist appointments.

Other studies also found that educational interventions significantly increased knowledge surrounding hepatitis in general (Larios et al., 2014; Roux et al., 2016). A randomized controlled study to assess the effectiveness of an HCV educational method in 440 methadone patients was conducted by Larios et al. (2014). Patients were randomly assigned to a

control group or a motivational enhanced viral hepatitis education and counseling group. Results revealed significant increases in knowledge of hepatitis A, B, and C over time in the second group.

Roux et al. (2016) studied the effectiveness of an education on the associated risks of drug injection. The percentage of participants with at least one unsafe HIV/HCV practice in the intervention group decreased significantly (44% to 25%) as well as injection site complications (66% to 39%), while in the control group the percentages remained stable. Multivariate analyses showed that the intervention group experienced a significant reduction in unsafe HIV/HCV practices at [coefficient, 95% confidence interval (CI) = 0.73 (1.47 to 0.01)] and in injection-related complications [coefficient, 95% CI =1.01 (1.77 to 0.24)].

Educational interventions were also shown to decrease patients' high-risk behaviors associated with human immunodeficiency virus and HCV (Garfein et al., 2007; Roux et al., 2016). Integrated services for high-risk populations such as those with substance misuse benefited patients the most and improved outcomes (Bajis et al., 2017). After education, Powell et al. (2021) found that homeless patients were highly confident in their ability to adhere to HCV treatment. Also, older age was associated with adherence to therapy. Despite some non-adherence, patients had superior sustained virologic response (Powell et al., 2021).

Knowledge Gap

In reviewing relevant studies, some gaps in knowledge were found among hepatitis patients, especially those with histories of substance use disorder (Kowalska et al., 2018; Krans et al., 2018; Strauss et al., 2007; Sultan et al., 2018; Li et al., 2017). Kowalska et al. (2018) evaluated the HCV knowledge in 200 patients in the Department of Infectious Diseases at the Medical University of Lublin and HCV support groups members of in Lublin and Warsaw. The

study found that more than 25% of the patients described their HCV knowledge level as insufficient. As part of a study, a survey to evaluate HCV knowledge and awareness in pregnant women with opioid use was conducted by Krans et al. (2018). The study found that multiple gaps in HCV awareness and education existed in this population of women and highlighted the need for health care clinicians to increase HCV education and counseling in pregnant women.

Sultan et al. (2018) conducted a cross-sectional study to evaluate the level of knowledge in patients diagnosed with HCV. Results revealed that the level of HCV knowledge among patients infected with HCV was insufficient. About half of the participants believed that HCV infection was transmitted through sex, while 79 (39.9%) did not know that HCV could be transmitted from a mother to her infant during labor. A quarter of participants believed that an HCV vaccine was available, and 45 (24.6%) never knew if their treatment was successful. The median knowledge score of HCV infection in the survey was 7.5 (50.3%).

Li et al. (2017) collected data from 240 methadone maintenance patients and 58 staff members to study HCV prevalence in methadone maintenance patients, HCV knowledge, and barriers to receiving or delivering HCV services. Results of the study show that the HCV seropositive rate was high (70%), and both patients and staff had limited HCV knowledge. The mean score of patient knowledge regarding HCV was 6.8 out of 20 (SD = 3.7), while the mean score of staff HCV knowledge was 10.9 out of 20 (SD = 3.1). Only 13.7 of HCV-positive patients had accessed medical treatment for the disease. Barriers included the expenses related medical treatment, lack of HCV knowledge, lack of professional training from staff to provided HCV-related services from individuals or MMT clinics, and lack of an adequate policy-making system.

There were some studies that found basic HCV knowledge to be high (Chemaitelly et al.,

2013; Schnittker et al., 2021). However, multiple gaps were seen in the specific knowledge regarding modes of transmission for HCV (Chemaitelly et al., 2013). Many of the studies were conducted in substance use patients and patients receiving services in substance use treatment programs.

Many studies highlighted that knowledge regarding HCV often remains low in these high-risk populations. Reasons included stigma and bias that patients have experienced from health care professionals and patient characteristics such as perceived low threat of HCV (Grebely et al., 2008; Strauss et al., 2007; Zeremski et al., 2014, Li et al., 2017). Strauss et al. (2007) collected information on drug use behaviors, HCV knowledge, utilization of HCV education services and facilitators and barriers to utilization from 280 patients at 14 US drug treatment programs. There were gaps in knowledge identified between participants who never injected drugs and current injection drug users.

All the treatment programs offered some type of HCV education and 60% of patients stated that they utilized their treatment program's HCV education services. Despite many patients being aware of HCV education programs, there were some who were unaware that such services existed. Strauss et. al (2007) highlighted the need for treatment programs to ensure that they are promoting HCV education awareness to patients in their facilities.

A limitation that was prevalent throughout many of the studies was the risk of self-reported bias (Grebely et al., 2008; Strauss et al., 2007; Zeremski, et al.2014; Li et al., 2017;). Many of the studies also relied on convenience sampling which could give way to participants providing socially desirable answers to some of the questions. Convenience sampling could expose the risk of selection and response bias. Some studies reviewed were conducted when standard interferon-based therapy, and there have been therapeutic advances with direct acting

antivirals, which is now standard treatment as well. Bajis et al. (2017) conducted studies in only low- or middle-income countries. Half of the studies reviewed were non-randomized studies and most of the studies had small sample sizes which increased the risk of bias and confounding (Bajis et. al., 2017).

Although the review done by Shah and Abu-Amara (2013) revealed significant outcomes for educational interventions, an important limitation was highlighted. Much of the effective outcomes could have been attributed to publication bias because authors could have selectively chosen to submit studies from journal manuscripts that showed only statistically significant results. In one review (Zhou et al., 2016), all the studies except for one were conducted in high income countries; therefore, results may not be generalizable to patients in low- to middle-income countries. Despite these limitations, the studies identified highlight the needs for targeted HCV education in high-risk populations, particularly those in treatment for substance use.

Though research evidence supports the use of educational intervention to increase HCV knowledge, HCV education in opioid treatment programs remains inadequate. Opioid treatment programs are well positioned to fill the HCV knowledge gap seen in the patient population. Therefore, the primary aim of this quality improvement project was to assess the effects of the implementation of an HCV educational session on a patient's HCV knowledge in an opioid treatment program. A secondary aim of the project was to increase a patient's willingness to seek HCV care by a community healthcare provider with hopes that the patient would initiate uptake of HCV care services and treatment.

Theoretical Framework

To understand the reasons behind this phenomenon, the theory of reasoned action/planned behavior (TRA/TPB) was first explored. Theory is essential in nursing because it

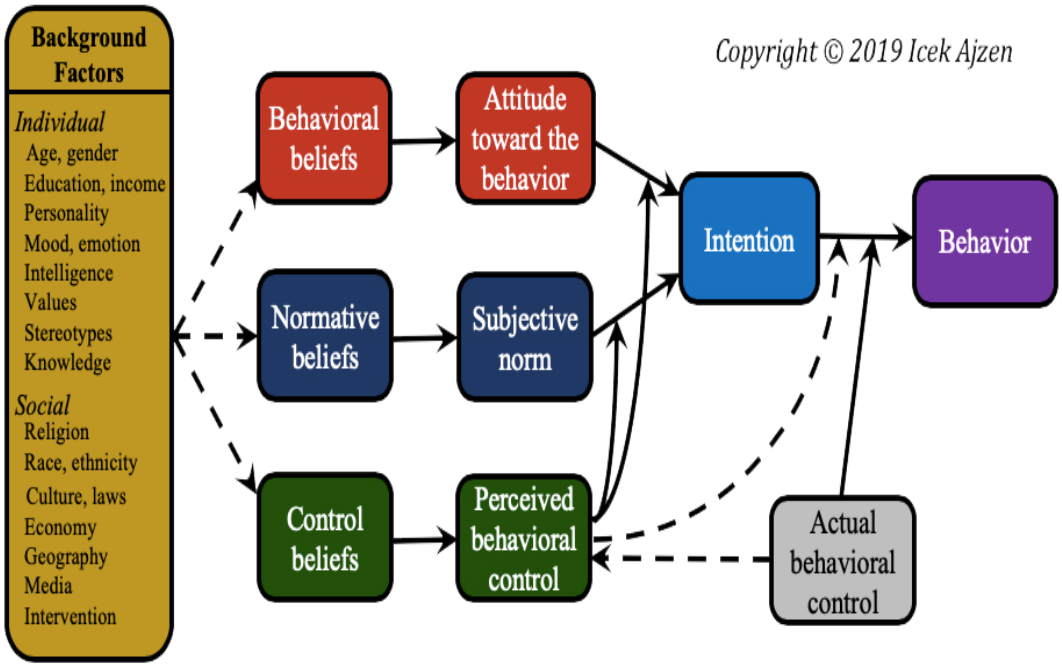
defines what nursing practice is and assists in outlining the structure of the patient care delivery system (Younas, & Quennell, 2019). Nursing care quality is improved by the application of relevant theories and nursing interventions that are guided by theory have been shown to increase patient outcomes (Younas, & Quennell, 2019). Therefore, it is necessary for nursing practice to be guided by theory so that nursing interventions are appropriately tailored to populations, which further improves health outcomes.

In 1975, while at the University of Illinois, social psychologists Icek Ajzen and Martin Fishbein coauthored the book, *Belief, Attitude, Intention and Behavior* (Ajzen, 2020). Ajzen and Fishbein were studying human behavior and initially set out to understand an individual's intention to engage (not engage) in behavior change, which they called the theory of reasoned action (TRA) (Ajzen, 2020). The original assumption was that people do what they intend to do and do not do what they do not intend to do.

The TRA originally described and analyzed behavior based only on the constructs of attitudes, norms, and intentions. The TRA did not account for a person's perception of the power they had over their behavior. Thus, the theory of planned behavior added the construct of perceived behavior control and was born TRA/TPB. There are six concepts in the TRA/TPB that characterize an individual's actual control over their behavior, and they include: attitudes (positive or negative view towards behavior change), behavioral intention (motivational influences), subjective norms (social pressure from important other), social norms (standard rules/protocols in a cultural context), perceived power (facilitator or barriers to performance of behavior change) and perceived behavioral control (belief about the ease or difficulty of of performing behavior).

Collectively, the relationship between the concepts is that the more positive the attitude

and subjective norms are towards the behavior and the greater the perceived control is, the stronger the person's intention will be to engage in behavior change. This relationship can be better described by the below diagram:



The TRA/TPB has been characterized as the most dominant framework for predicting, explaining, and changing human behavior (Kan & Fabrigar, 2017). The TRA/TPB was applicable to the DNP project because the project was conducted in the drug treatment setting where it was crucial to address patient related influences and practices on HCV. This would enable better understanding of HCV knowledge, HCV treatment interests, and patient perceptions of HCV diagnosis and treatment. A lot of the highlighted barriers to HCV treatment focused on the existing healthcare system and how it contributes to the gap. Even though minimizing access to HCV care and treatment is an important concern for people who inject drugs, it also imperative to focus on establishing and maintaining patient engagement and

awareness to address the gap in HCV knowledge.

Methods

Project Design & Setting

This quality improvement project used a one-group, pretest-posttest, quasi-experimental design to measure HCV knowledge before and after an HCV educational session. The quality improvement project took place at an outpatient opioid treatment program clinic located in Merced, California. Patients served at the clinic included those who suffer from a substance use disorder, with most patients suffering from opioid use disorder. The clinic provides Medication Assisted Treatment for Merced County residents with Food and Drug Administration-approved long-acting opioids, in the form of methadone or buprenorphine. The treatment is provided in conjunction with psychological and behavioral therapies to provide a whole-person approach to substance use disorder treatment.

The clinic serves a marginalized patient population of about four hundred patients in the city of Merced and surrounding cities in Merced County. The population of Merced County is over 281,000 people and the clinic is the only federally licensed Narcotic Treatment Program in the County to dispense methadone. About 90% of the patient population served in the clinic is covered by Medicaid-type insurance. According to the most recent community health assessment for Merced, HCV was the most reported communicable diseases and despite a previous decrease in cases, HCV cases in the county had been on the rise at the time of this project (Merced County Department of Public Health, 2016).

One provider works at the clinic daily and support staff for the project included three medical assistants (MA) and three licensed vocational nurses (LVNs). The clinic was comprised of one patient exam room where all provider visits such as follow ups and new admissions took

place, one lab where medical assistants performed vitals, blood draws, urinalysis testing, and other diagnostics, two medication dispensing windows where LVNs dispensed either methadone or buprenorphine, and eight counseling offices where case managers provided individual and group counseling, discharge planning, and aftercare services.

Population & Sample

Study participants included a convenience sample of patients who visited the clinic daily to receive Medication Assisted Treatment. Inclusion criteria was as follows: Patients had to be 18 years or older, on long-term methadone or buprenorphine maintenance therapy, positive for hepatitis C virus antibody, able to meet criteria for diagnosis of Opioid Use Disorder (according to established Diagnostic and Statistical Manual (DSM-5) criteria), able to read, write, and speak English, and able to give informed consent. Exclusion criteria was as follows: those on a 21-day detoxification or administrative detoxification, diagnosed with a severe mental health disorder, diagnosed with severe chronic medical comorbidities, currently incarcerated, and currently receiving hepatitis C virus treatment (see Appendix A).

Intervention

A 20-minute PowerPoint presentation was created by the clinic provider and given to participants in-person, in English. The educational session was created using viral hepatitis information from various sources such as: the Centers for Disease Control and Prevention, WHO, the American Association for the Study of Liver Diseases, and Infectious Diseases Society of America.

The content of the educational intervention included information on HCV epidemiology, prevalence and statistics, which populations were at highest risk of acquiring HCV, potential signs and symptoms, and dangers and complications of untreated HCV. The educational sessions

began after the patients were given the pretest. The session was given individually, before the patient's regular clinic visit.

The private sessions took place during normal business hours in the clinic provider's office, which was in the opioid treatment program facility. Once the participant arrived for their session, the medical assistant checked the participants into the queue, which flagged the patient and notified the clinic provider of their arrival. Then the PowerPoint and materials were presented. Prior to the start of the intervention, the clinic provider again went over the consent and protocol so that participants would have a chance to review it and ask any questions. The clinic provider would be available throughout the intervention to address any questions or make clarifications.

Instructions were given to the patient before the start of each education session. The clinic provider delivered all the educational sessions and performed all data collection. The participant was first given the demographic survey. Then, participants were given the 10-item, True/False, HCV knowledge pretest to assess baseline knowledge. Once the pretest was finished, the educational session was delivered.

Immediately following the educational session, participants were given the post-test. Two weeks after the intervention, the clinic provider conducted a follow up to assess the participant's willingness to seek HCV treatment. Pertinent findings were then presented to the organization to highlight the importance of this project to the clinic and patient population. To ensure ongoing sustainability of the intervention, the clinic provider would then advocate for standard HCV education to be followed in all OTPs.

This project aligns with the mission and vision of the organization. Current standards of practice within the organization already exist regarding communicable disease education. One of

the organization's principal tenets is at minimum, OTPs should be providing HCV education to patients and referring patients out for HCV care and treatment, as necessary. Therefore, providing HCV education is a standard of care that the clinic is to follow and would not require additional funding.

The organization's mission states that it wants to remove all barriers to recovery and its vision states that the creation of a better world through comprehensive treatment of those with substance use disorder is crucial. Substance use is not just about treatment, medication, and counseling; it is about removing barriers to treatment so that individuals can live long, full lives. Moving forward, the clinic provider will disseminate the educational PowerPoint used in this presentation to all the providers in the organization and a provider workflow will be created so that providers will be able educate newly identified HCV patients.

Sharing this information will help to ensure that all new physicians, nurse practitioners, and physician assistants are given HCV training and education so that identified HCV patients are educated and informed in turn. During weekly provider meetings, the clinic provider will follow up with providers to assess barriers to implementation and make any necessary changes. Furthermore, the clinic provider would now also like to have the educational PowerPoint put into a SharePoint file for all the organization to have continued access to. As HCV guidelines evolve, the clinic provider will make necessary updates to the PowerPoint.

Measurements

Outcome Variables

HCV knowledge was defined as the total number of questions answered correctly on the HCV Knowledge test. The 10-item HCV Knowledge test is an instrument that was

created by the clinic provider to assess the patient's HCV knowledge at baseline and post intervention. The test was given twice, once before the educational session and again right after the educational session was finished. The clinic provider delivered the test to the participants in person. The test focused on HCV information that was pertinent to opioid treatment programs and their patients. The tests included information on HCV pathogenesis, risk factors, transmission, treatment options, and vaccine availability (see Appendix B).

For each item, participants answered with "yes" or "no." Each participant's score was determined by the number of items correctly answered on the test. Each item on the test was worth one point each, therefore participant scores could range from 0 to 10. Participants who had a higher posttest score indicated an increase in HCV knowledge and participants who scored lower or the same on the posttest indicated no increase in HCV knowledge. There was no cost for this instrument and the total time to complete took about 10 minutes.

Willingness to utilize HCV care (yes/no) was determined by the participant contacting their PCP for HCV services as answered on the follow-up survey. The follow up survey asked if the participant had inquired or scheduled an appointment for HCV services ("yes" or "no"). If no, the reason was chosen from the following list: "forgot," "did not think it was important," "transportation," "insurance," or "other." The follow-up survey took place once, at two weeks post intervention, either by telephone or face-to-face visit. Participants who did inquire or scheduled an appointment for HCV services indicated an increased willingness to utilize HCV care. The total time to conduct the follow up was about 5 minutes (see Appendix C).

Patient Demographics

The 11-item survey collected participant demographic characteristics such as age (in years), gender (male, female, transgender, non-binary/nonconforming or prefer not to answer),

ethnicity (Hispanic, or Latino, Black or African American, White, American Indian, or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Other, or prefer not to answer), and educational level (<HS, HS/GED, Associates/some college, Bachelors, or Graduate/Professional). The survey also collected data on drug use behaviors (intravenous use of any illicit substance in lifetime/treatment history), years at the clinic (number of years participant has been receiving services at the clinic) insurance coverage (whether a patient is covered by health insurance and by what type), current primary care provider (whether participant has a regular healthcare provider that they see for medical care), prior HCV education (Whether participant has received HCV education/information in the past), usual source of HCV information (main source of HCV information), and willingness to be treated for HCV (whether participant is willing and ready to initiate HCV treatment at baseline). The total time to administer was about 5 minutes (see Appendix D).

Procedures

The clinic provider created an educational session via PowerPoint, patient survey handouts and a Hepatitis C Virus Knowledge Test (pre/post-test), The clinic provider then presented the quality improvement project, including the PowerPoint and other materials to the organization's Chief Medical Officer, Chief Legal Officer, clinic staff and other organizational staff at the regional town hall meeting during the first month of the project in July. The same week, the clinic provider had the practice mentor and Chief Medical Officer review the PowerPoint, surveys, HCV Knowledge test, and handouts for validity and clarity. The patient demographic surveys were collected once at baseline. The HCV knowledge test was given twice, once pre-intervention and once post-intervention. The follow-up survey was be collected once, at two weeks post-intervention and was conducted face-to-face.

Staff Training

Once the project materials were reviewed, any needed changes were made to the materials before the final forms were completed. Once the final form was completed, staff training began, and patient recruitment followed. The clinic staff assisting with the project included three dispensing nurses and three medical assistants. The medical assistants were tasked with scheduling the participant's initial in person visit and setting up patient phone call and text reminders.

The medical assistants also put an alert in the participant's chart to notify the dispensing nurses; this was done in case a participant decided to dose instead of attending their session. The dispensing nurses reminded the patient of their appointment and then sent a message to the clinic provider. The medical assistants or dispensing nurses did not need additional training, as scheduling and setting alerts and reminders were tasks that they normally did.

Participant Recruitment

The clinic provider conducted a chart review to identify the number of participants in the clinic who were HCV positive in early August. Twelve participants were recruited for the DNP project. Participants who met eligibility criteria were informed one week prior to the start of the intervention. Participants were recruited voluntarily when the participant came into the clinic to dose. The purpose of the project and protocol were explained to the participants by the clinic provider when they came to the clinic to dose.

Participants were informed that the project would take about 45 minutes and would include a pretest, educational session, and post-test. To ensure confidentiality, all data collected was coded. When filling out the forms, patients used their first and last initial along with their four-digit date of birth. Participants were assured that their participation or declination to

participate would not negatively impact their status in the opioid treatment program.

Those who chose to participate in the project signed the consent and gave the provider a preference for a day and time for the session to be scheduled. The session took place before the patient's usual, scheduled visit. Participants were compensated with a $20 gift card from Walmart. The funds for the gift cards came from the clinic provider's own money. Participants were reminded that participation was voluntary, and that they could withdraw from the project at any time without any impact on their opioid treatment.

Analysis

Descriptive statistics were used to describe the outcome and categorical variables. The Intellectus software program was used to conduct data collection and analysis. Paired t tests were used to determine if participants' HCV knowledge scores increased on the posttest compared to the pretest HCV knowledge scores after implementation of the HCV educational intervention. Baseline sociodemographic data from the participants was also collected and analyzed.

Ethical Considerations

The clinic provider completed the Collaborative Institutional Training Initiative (CITI) module for research ethics and compliance. Institutional Review Board approval was sought from San Jose State University and approved. The clinic provider also adhered to the Health Insurance Portability and Accountability Act guidelines to protect patient privacy rights. Adherence to Code of Federal Regulations (42 CFR Part 2 regulations), which specifically protects substance use disorder patient records and privacy by federally assisted programs for the treatment of substance use disorders was also practiced. To secure all patient data collected remained, the second initial of the participants first name and the last initial of the participants

remained, the second initial of the participants first name and the last initial of the participants last name along with their six-digit date of birth was used as an identifier.

The initials along the with participant's six-digit date of birth in reversed order was used to form the participant's assigned code. A code book was created to store patient data. All electronic files and data collected containing patient identifiers were stored on a password-protected laptop with two-factor identification that only the project manager had access to. Data stored on the laptop was permanently deleted after project completion. Minimal risk of patient exposure had been accomplished. However, participants may have perceived risks associated with the fear of loss of personal information. There may have been no benefit to the participants from their involvement. However, participating may have increased their knowledge and awareness of their condition. There was no cost to the participants for care or participation in the project. Patients were compensated with a one-time $20 gift card regardless of completion of the project.

Results

Demographics

There was a total of twelve participants that completed this study. Tables 1 and 2 display the characteristics of the participants. The most frequently observed gender was male (n=7, 58.33%) and the remaining were female (n=5, 41.67%). The average age of participants was 58.42 (SD=10.67). Most participants reported their ethnicity as Not Hispanic or Latino (n=8, 66.67%) and the most frequently observed category of race reported was White (n=10, 83.33%). More than 50% of the participants had been in treatment for less than one year (n=7, 58.33%). Most patients reported that they had a PCP (n=10; 83.33%) and most of the patients reported

that they received information about HCV from a doctor (11, 91.67%).

Table 1
Frequency table for demographic variables

Variable	*n*	*%*
Gender		
Female	5	41.67
Male	7	58.33
Ethnicity		
Hispanic or Latino	4	33.33
Not Hispanic or Latino	8	66.67
Race		
White	10	83.33
African American	2	16.67
Education Level		
High School	4	33.33
Some College	4	33.33
College Degree	1	8.33
No High School	2	16.67
GED	1	8.33
Treatment Time		
Less than 1 year	7	58.33
More than 1 year	5	41.67
Previous HCV Education		
No	6	50.00
Yes	6	50.00
Primary Care Provider		
Yes	10	83.33
No	2	16.67
HCV Information		
Other	1	8.33
Doctor	11	91.67

Note. Due to rounding errors, percentages may not equal 100%.

Table 2
Summary Statistics Table for Age

Variable	*M*	*SD*	*n*	Min	Max
Age	58.42	10.67	12	37.00	74.00

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

HCV Knowledge Pre/Posttest Scores

A two-tailed paired sample t-test was conducted to explore if there was a mean difference of HCV knowledge pretest scores and HCV knowledge posttest scores after the HCV education intervention. The results of the two-tailed paired t tests were significant based on an alpha of 0.05, t (11) = -4.30, p= 0.001. These findings suggest that the difference in the mean of the pretest and the mean of the posttest was significantly different from zero. The mean pretest score (m= 7.67, SD= 1.15) was significantly lower than the mean posttest score (m= 9.00, SD= 1.21). These results suggest that the HCV educational intervention improved participants HCV Knowledge scores post intervention. Results of the pre/posttest ae presented in Table 3 and a bar plot of the means are presented in Figure 1.

Table 3

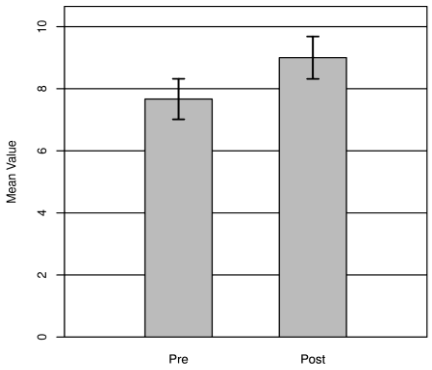
Two-Tailed Paired Sample t-Test for the Difference Between HCV Knowledge Pretest and HCV Knowledge Posttest

Pre		Post				
M	*SD*	*M*	*SD*	*t*	*p*	*D*
7.67	1.15	9.00	1.21	-4.30	.001	1.24

Note. N = 12. Degrees of Freedom for the *t*-statistic = 11. *d* represents Cohen's *d.*

Figure 1

The means of HCV Knowledge Pretest and HCV Knowledge Posttest with 95.00% CI Error



Willingness (of PCP Follow Up)

For post intervention follow, five participants (41.67%) reported that they followed with their PCP post intervention to seek HCV care services and seven (58.33%) did not. The most reported reason for not following up with a PCP was Other (n=4, 57.14%). The frequencies and percentages are presented in Table 4 and Table 5 respectfully.

Table 4

Frequency Table for Post intervention PCP Follow up for HCV services.

Variable	*n*	*%*
PCP Follow up		
No	7	58.33
Yes	5	41.67

Note. Due to rounding errors, percentages may not equal 100%.

Table 5

Frequency Table for Reason for not following up with a PCP.

Variable	*n*	*%*
Reason for no PCP follow up		
Transportation	1	14.29
Forgot	2	28.57
Other	4	57.14

Note. Due to rounding errors, percentages may not equal 100%.

Discussion

Providing HCV education to patients in opioid treatment programs is crucial to combating HCV and improving patient's HCV knowledge and awareness. This study aimed to assess the effects of the implementation of an HCV education intervention on patient's HCV knowledge and awareness. After the HCV education intervention, analysis of the paired t tests indicated that there was a statistical difference between the HCV Knowledge pretest scores and HCV Knowledge posttest scores. The study participant's posttest scores were higher than pretest scores and this indicates that the HCV intervention was successful at addressing the

study's primary aim and 41% of participants increased their willingness to follow up with care.

These findings support what was highlighted in the literature review: that simple, HCV educational interventions for patients in opioid treatment programs greatly increases and improves their HCV knowledge and associated positive behaviors. The secondary aim of the study was to assess participants' willingness to follow up with a PCP for HCV care. Although the results found that most participants did not follow up with their PCP post intervention, it was still clinically significant that some patients did follow up.

Limitations

This study did have several limitations. The HCV education intervention and tools used were self-developed. Using self-developed tools can affect the validity of the results (Dowrick et al., 2015). However, the practice mentor, Chief Medical Officer, and other providers reviewed the HCV education curriculum, surveys, pre/posttest handouts for validity and clarity. Convenience sampling was used and there was a small sample size of participants, which can limit the generalizability of the study to the general population. The study follow up was two weeks post intervention and this could have affected the results of the secondary aim of the study. It would be beneficial to provide a longer follow up window (i.e., 3, 6, 9, 12 months) to better ascertain the long-term effectiveness of the HCV education and its impact on PCP follow up post intervention. Despite these limitations, the study highlighted the importance of targeted HCV education in high-risk populations.

Conclusion

This study showed that providing HCV education to patients in an opioid treatment program was successful at improving their HCV knowledge and awareness. Therefore, at minimum, opioid treatment programs should offer HCV education to all patients as a standard of

care. Providing HCV education to vulnerable, high-risk populations such as those in opioid treatment programs is essential to addressing the HCV public health issue.

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Appendix A

Research Study Recruitment Letter

Name of Study: Nurse Practitioner-Led Hepatitis C Virus Education in a Central Valley Opioid Treatment Program

Researcher: Nikiesha Thomas, MSN, FNP-C, PHN- Doctoral Student

Email: nikiesha.thomas@sjsu.edu

Dear Potential Participant,

My name is Nikiesha Thomas, and I am a nursing student in the doctorate nursing program at San Jose State University. I am writing to invite you to participate in my research study as part of my doctoral dissertation to assess the effects of the implementation of a hepatitis c virus (HCV) educational session on opioid treatment program patient's HCV knowledge. You are eligible to be in this study because you fit the designated criteria.

If you decide to participate in this study, you will be tested on your HCV knowledge, specifically as it relates to being a patient in an opioid treatment program. You will sign the consent form prior to the start of the study. Then you will be scheduled for an individual educational session that will take place in the clinic provider's office. You will first fill out the demographic survey. After the demographic survey, you will take the HCV knowledge pre- test. Then you will receive an HCV PowerPoint educational session. After the educational session, you will take the HCV knowledge posttest. The total time to complete the intervention will take approximately 45 minutes. Two weeks later, you will be contacted by the researcher (in person or by phone) to answer a one-question follow-up survey, which will take less than five minutes. You will be compensated with a $20 Walmart gift card if you complete the study. The data will help create awareness on patient's HCV knowledge.

Your participation is voluntary and confidential; it is your choice whether or not to participate. If you would like to participate, or if you have questions or concerns, please contact me at nikiesha.thomas@sjsu.edu. Thank you very much.

Sincerely,

Nikiesha Thomas, MSN, FNP-C, PHN

Doctoral Student

Appendix B

Hepatitis C Virus Knowledge Pretest

1. Hepatitis C virus is a disease that affects the liver? True or False
2. Hepatitis C virus is the number one cause of liver failure, liver cancer and liver transplant? True or False
3. Hepatitis C virus can be cured? True or False
4. You can get Hepatitis C virus from touching, hugging, or kissing someone with hepatitis c virus? True or False
5. You can get Hepatitis C virus by sharing needles or tattoo piercings? True or False
6. The most common risk for Hepatitis C virus is injection drug use? True or False
7. There is a vaccine for Hepatitis C virus? True or False
8. Most people with Hepatitis C virus do not have symptoms? True or False
9. Some people can spontaneously clear the Hepatitis C virus without treatment? True or False
10. You can get Hepatitis C virus treatment while in a drug treatment program or actively using? True or False

Appendix C

Follow Up Survey

(Two-Weeks post intervention)

Did you inquire about Hepatitis C virus services or make an appointment for Hepatitis C virus services after the educational session? Yes or No

If No, then why not?

- Forgot
- Did not think it was important
- Transportation
- Insurance
- Other

Appendix D

Demographic Survey

Age (in years) _____

Gender (Male/Female/Transgender/Non-binary-non-conforming/Prefer not to answer) circle one

Ethnicity (Hispanic or Latino/Not Hispanic or Latino) circle one

- Race circle one
American Indian or Alaska Native
Asian
Black or African American
Native Hawaiian or Other Pacific Islander
White

What is your education level? a) no high school, b) high school/GED, c) some college, d) college degree or higher e) other _____

How many years have you been attending this clinic for treatment services? _____

Have you ever attended an educational program about Hepatitis C virus? Yes or No

Would you be willing to be treated for Hepatitis C virus? Yes or No

Do you have a usual primary care provider (PCP)? Yes or No

Do you have health insurance? Yes or No If yes, Medi-Cal, Medicare, Private insurance (circle one)

What is your source of Hepatitis C virus information? doctor, television, internet/social media, family, friends, other (circle one)