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PERCEPTIONS OF EMERGENCY ROOM NURSES REGARDING NEEDLE EXCHANGE PROGRAMS

by

Theresa Murray

A Thesis Submitted in Partial Fulfillment
Of the Requirements for a Degree with Honors
(Nursing)

The Honors College

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ABSTRACT

Objective: In 2018, over 586,000 US citizens were reported to be addicted to intravenous heroin. It was reported by the Centers for Disease Control (CDC) that in 2017, 70,237 people ages 25 years to over 65 years died from a drug overdose in the United States; analogous to roughly the number of people residing in Portland, Maine. Needle exchange programs have been found to be effective at reducing needlestick injuries in the community, reducing associated health care costs and improving the short-term and long-term health of people who use injection drugs (PWUID). Of all health care providers, emergency department nurses who work in the emergency department are most likely to provide care to PWUID and have the opportunity to provide resources and compassionate care for individuals struggling with injection drug use, thus they are uniquely positioned to inform PWUID of the availability and benefits of needle exchange programs. The purpose of this study is to describe the perceptions of emergency department nurses regarding the needle exchange program in Bangor, Maine and to see how to increase the utilization of NEPs.

Methods: An anonymous survey to determine perceptions of needle exchange facilities was distributed to emergency department nurses (ED) in Bangor, Maine. There are 75 nurses in total who work in the ED in one hospital in Bangor, ME and out of these 75, nine surveys (12 %) were returned. One nurse did leave their contact information to set up an interview, however the interview was not able to take place due the inability to get in contact with them.

Results: Of the 9 nurses surveyed, 3 (33%) were unaware of the Needle Exchange Program in Bangor. Of the 9 nurses surveyed, only 3 (33%) believed that harm reduction programs like NEPs reduced the rates of infectious diseases in PWUID and in the community. Therefore, in order to make strides to increase NEP utilization, more ED nurses should be educated on the specific needle exchange services located in the area.

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LITERATURE REVIEW

Introduction

Intravenous (IV) substance abuse is a serious public health problem in the United States (Charms, 2017). In 2015, 586,000 U.S. citizens over twelve had a heroin use disorder (American Addiction Centers, 2019). In 2017, 70,237 people ages 25 years to over 65 years died from a drug overdose in the United States; analogous to roughly the number of people residing in Portland, Maine (Sternberg, 2017). This represents a 17% increase from the previous year, illustrating this growing nationwide epidemic (Sternberg, 2017). In 2016, the national average of overdose deaths was 19.8 per 100,000 individuals (NCHS, 2018) According to the Centers for Disease Control (CDC), states with the highest rates of drug overdose mortality per 100,000 individuals included West Virginia (52), Ohio (39.1), New Hampshire (39), Pennsylvania (37.9), Kentucky (33.5), Maryland (33.2), Massachusetts (33), Rhode Island (30.8), Delaware (30.8) and Maine (28.7) (NCSH, 2018).

Between 2011-2014, there was a 34% increase in IV drug related overdose deaths in Maine (Diomede, 2015). These IV drugs included heroin or injectable water-soluble drug such as amphetamines, buprenorphine, benzodiazepines, barbiturates, cocaine, or methamphetamine (Baciewicz, 2017). Heroin represented 25% of IV drug overdoses (Charms, 2017). Differences in the incidence of IV drug related overdoses in Maine varies by county. The county with the highest incidence of IV drug related overdose deaths per 100,000 residents was Washington County with 19.7 followed by Androscoggin County (17.7), Cumberland County (16.1), Kennebec (15.9), Somerset

(14.2), Waldo (13.7), Lincoln (13.7), York (13.4), Penobscot (12.8), Knox (12.6), Aroostook (9.5), Sagadahoc (8.6), Hancock (8.5), Franklin (7.7), Piscataquis (5.4), and Oxford (5.2) (Charms, 2017; Diomede, 2015).

Consequences of IV Substance Use

IV drug abuse presents a multitude of problems for the addicted individual, their family and friends, and the community (Moses, Woodcock, Lister, Lundahl & Greenwald, 2018). For the individual, there are health consequences such as infection and social consequences. These health consequences can be both short and long term. For the community, safety may be jeopardized due to exposure to infection from dirty needles left in public places.

Health Consequences

Health consequences of heroin use may include acute heroin toxicity, overdose, infection with blood borne pathogens, and infection and damage to the skin and soft tissue at the injection site. Acute heroin toxicity is a health consequence experienced by PWUID. Symptoms of acute heroin toxicity result when heroin crosses the blood-brain barrier. Heroin metabolizes into morphine and binds with opioid receptors in the brain to produce a "high" (OSHA, 2018). Beyond the desired high, acute symptoms that occur include respiratory irritation, bronchospasm, meiosis, diplopia, nausea, vomiting, constipation, euphoria, dizziness, sleepiness, coma, respiratory depression, pulmonary edema and death (OSHA, 2018). Additionally, severe itching, warm flushed skin, runny nose, watery eyes, sensation of heaviness in limbs, muddled thinking and dilated pupils can also occur (American Addiction Centers, 2019). These acute symptoms can interfere

with the individual's ability to think and act clearly. Hence, there is the potential that this inability to think and act clearly may interfere with performance of daily work tasks and family responsibilities (Daley, 2013).

Heroin is rapidly absorbed and effects are experienced in under sixty seconds beginning with euphoria. Heroin users inject around two to four times a day since the euphoric effects only last for three to five hours (OSHA, 2018). Because of this short lived "high", PWUID cycle between feeling the effects of euphoria and then feeling the often physically tortuous symptoms of withdrawal (OSHA, 2018).

A potential acute lethal consequence of heroin use is an overdose. Heroin specifically targets the central and peripheral nervous system but may affect all body systems. Heroin, effects the central nervous system as it rapidly crosses the blood-brain barrier and is metabolized into morphine. Morphine binds to opioid receptors in the brain and spinal cord. When morphine binds to these opioid receptors two physiologic effects occur; the sensation of pain is blocked and increased amounts of dopamine are released. Dopamine is a neurotransmitter that causes euphoria (Drugbank, 2019). Respiratory depression is the underlying cause of heroin overdose deaths. Heroin effects the respiratory center of the brain by causing respiratory depression and death (World Health Organization, 2019).

PWUID are also at increased risk of acute infection from blood borne pathogens such as hepatitis B, C, or D and HIV resulting from methods of injecting these substances. Equipment to inject IV drugs includes syringes, cookers, cotton, and bands. Syringes are the means of injection. Cookers may be spoons or bottle caps in which the powdered heroin is placed, heated, and melted into a liquid that can be drawn up in a

syringe for injection. Cotton serves as a filter to strain impure solids that did not melt during the heating or "cooking" process. The band is wrapped around the extremity in which the person will inject the heroin. It can be a rubber band, shoelace or any item that can act as a tourniquet (American Addiction Center, 2018).

PWUID may use dirty needles or share needles which is a major risk factor for blood borne infections **(**Fox, Oliver, & Ellis, 2013). PWUID use hypodermic needles that are often times dirty, meaning used by another person or previously used by themselves. When surveyed, 28% of PWUID reported actively share syringes with other users thus spreading serious diseases like HIV and hepatitis B and C. Twenty-one percent of IV drug users are hepatitis B positive and 50% are hepatitis C (HCV) positive (Fox, Oliver, & Ellis, 2013).

In order to avoid the transmission of blood borne pathogens, it is suggested that a new syringe and injecting equipment should be used each time. Bleach has been proven to significantly decrease transmission rates but it is not one hundred percent effective (Abdala, 2001). For example, bleach does have the ability to kill HCV 99% of the time. Furthermore, if the bleach used to clean the equipment is expired, its efficacy is reduced. HCV can live in a syringe for 63 days, in water for 21 days, on surfaces for 42 days, and on cotton filters for 24 hours. Hence, despite cleaning, many syringes have dead space where blood stays in the syringe and serves as a reservoir for HCV. Cookers may also be shared and serve as a primary means of transmission of HCV (Reynolds, 2016).

Hepatitis B (HBV) and Hepatitis C (HCV) are transmitted by sexual contact as well as sharing equipment used to inject drugs. Some people who are infected with HBV and HCV can completely recover from the disease with no long-term sequelae. The

majority of these individuals will then have lifelong immunity to HBV and HCV. HBV has a higher rate of full recovery than HCV. Ninety percent of all adults with HBV will fully recover and 10% will go on to develop chronic infection. However, 75% to 85% of those infected with HCV will develop chronic infection (CDC, 2019). Chronic infection with HBV and/or HCV is the most common cause of liver cancer and cirrhosis (Underferth, 2017).

PWUID are also at increased risk of skin and soft tissue infections (SSTI) when they reuse needles. Repeatedly using the same needle leads to dulling of the bevel of the needle which results in damage to skin, soft tissue and the vein. This damage increases the likelihood of abscess formation (Reynolds, 2016). SSTI's frequently lead to hospitalization for associated complications such as of bacteremia which can lead to sepsis, endocarditis, and osteomyelitis. These complications of SSTI's requires hospitalization for monitoring and treatment with intravenous antibiotics (Tookes, Diaz, Li, Khalid, & Doblecki-Lewis, 2015). Other health conditions associated with intravenous heroin use include thrombosed veins, pneumonia, rhabdomyolysis, acute renal failure, irregular menses in females, intense aggression and irritability, seizures, impaired attention, learning, memory, reaction time, impulse control and compartment syndrome ((Fox, Oliver, & Ellis, 2013; OSHA, 2018).

Consequences of tolerance and addiction

The act of withdrawing from heroin has unique health consequences separate from overdose, blood borne infection, and skin and soft tissue infection. In order to understand the concept of and physiologic effects of drug withdrawal, an understanding of tolerance and addiction is required. Both tolerance and addiction can harm the body

but in different ways. Tolerance is defined as needing more of a certain substance to achieve the same effect (Fox, Oliver, & Ellis, 2013). In the case of heroin, tolerance poses a further threat to the health of the individual because in smaller concentrations heroin would be less toxic to body systems. When increasingly higher doses of heroin are required to achieve the desired effects, the level of toxicity to body systems increases. Tolerance and addiction do not mean the same thing however, because a person could develop tolerance to pain medications as a result of long-term use. For example, tolerance would be present when a person with pain requires increased dosages to achieve the desired effect of reduced pain. People who have a tolerance to a substance do not necessarily experience symptoms of withdrawal from the substance. However, the need for increased amounts of heroin to achieve the desired effect results in organ damage because of toxicity from higher concentrations of the substance (American Addiction Centers, 2018).

Addiction can also damage body systems but in a different way than tolerance. A person who is addicted to a substance experiences physiologic symptom of withdrawal when the substance is stopped because the body is no longer in a state of homeostasis. Addiction affects the neurological pathways (Fox, Oliver, Ellis, 2013). Dopamine is a neurotransmitter in the brain which is involved with rewarding behaviors. When someone experiences something positive, their brain releases dopamine which prompts the person to partake in that particular behavior again. However, heroin also has this same effect because it causes a rush of dopamine into the brain which creates the euphoric effects. As a consequence, the individual is prompted to continue the same behavior because of the positive reaction they received from their brain (Drugbank.org, 2019). Heroin increases

the amount of dopamine released to ten times the normal amount (Fox, Oliver, Ellis, 2013). When dopamine levels drop, as a result of discontinuation of heroin intake, physiologic symptoms of withdrawal occur because the brain no longer produces the needed amounts of dopamine because of the heroin use creating such an excess of dopamine (Fox, Oliver, Ellis, 2013).

Heroin withdrawal typically lasts for a week with the most intense symptoms during the first six- to twelve hours. During this period of withdrawal, the PWUID would experience severe drug cravings which may lead to a relapse, abdominal pain, nausea, sweating, shaking, nervousness, agitation, depression and muscle spasms (American Addiction Centers, 2018). After the first week, there is a period of time called the Post-Acute Withdrawal Stage in which some symptoms can persist from weeks to months to even years, depending on the individual. Generally, the symptoms one experiences while in withdrawal are not life threatening, however, some symptoms can be very severe depending on the situation and duration of the drug use which could result in complications that could be dangerous and life threatening and result in death.

Social consequences

Substance use can negatively impact family relationships. There is an increased incidence of domestic violence and child abuse in families of PWUID. In fact, 80% of child abuse cases and 75% of all foster care placements are reported to result from drug or alcohol abuse (Keller, 2018). It has been reported that only ten percent of children born to untreated heroin users are still with their birth mother at the age of five (Keller, 2018). Children of parents with substance use disorders are consequently more likely to be abused or neglected, have poor behavior, have physical problems, have poor

emotional regulation, and are more at risk to suffer from psychiatric and substance use problems themselves (Daley, 2013). IV drug use can also place financial burden on the family. PWUID must divert family funds or personal income to purchase these substances (Daley, 2013). Daily cost of heroin can range from $150 to $200 a day or $54, 750 to $73,000 a year (Keller, 2018).

Societal consequences

The impact of IV drug use also has negative effects on the general population. Societal consequences include (1) increased healthcare costs, (2) increased stress on the legal and criminal justice system, and (3) compromised public safety. In one year, it has been reported that more than 180 billion dollars go towards drug use health care related costs. Twenty percent of all Medicaid dollars go towards drug related health care (Tookes, et. al., 2015). Additionally, many PWUID are uninsured yet require higher levels of care related to addiction. Consequently, those who have private insurance will have higher premiums to cover the costs of healthcare for those who are uninsured. Healthcare costs are also increased by the level of service PWUID use. PWUID are more likely to use the emergency room and less likely to attend outpatient appointments such as for primary visits. This increases costs especially because emergency department and inpatient services cost more than outpatient care (French, Mcgeary, Chitwood & Mccoy, 2000). On average, PWUID are responsible for $1000 more in healthcare costs than people who do not use injection drugs (French, et. al, 2000). One reason that PWUID may not use primary care is because they do not have health insurance. Delay or omission of primary care can result in an existing health issue becoming worse over time. The

health issue can then escalate to a level that requires emergency care (French, et. Al., 2000).

When hospitalization or emergency care is required, PWUIDs who have SSTIs and other chronic health conditions resulting from injection drug use typically have hospital stays longer in duration that other individuals and thus if compared with other hospitalized patients, PWUID have an overall cost per hospitalization of $4,449 which is far above the average (Tookes, et. al., 2015). In a study done in Florida, researchers found that out of the 349 PWUID that were admitted to the hospital, 92% relied on publicly funded programs or were uninsured. Other hospitals in places such as Seattle and San Francisco also found similar results in their economic expenses where the majority of funds were billed to Medicaid (Tookes, et. al, 2015). One solution may be to find ways to make health insurance financially feasible to individuals who may not have insurance (French et. al., 2000).

IV drug use also stresses the legal and criminal justice systems. PWUID are more likely to be incarcerated which creates the need for more money to be spent on keeping these individuals in prisons (Daley, 2013). Legal fees required by PWUID are increased because nearly half of the federal prison population and twenty percent of the state prison population is made up of individuals who are incarcerated on drug related charges. The cost of incarceration is estimated to be $45 billion dollars for state prisons and $144 million for federal prisons. Both state and federal prisons are funded through taxes (Keller, 2018).

Public safety is also at risk because the equipment used to inject the substances can harbor dangerous bacteria and diseases which can be spread to non-drug users

(McGuire, personal communication, October 2018). For example, if a used syringe is encountered in a public place and someone picks it up or steps on it, the individual is at high risk for contracting HBV, HCV, or HIV (McGuire, 2018), Community acquired non-occupational needlestick injuries (CANSI) rates from 2001-2008 have decreased slightly from 0.7 per 100,000 individuals to 0.5 per 100,000 individuals (Jason, 2013). The cost of treating these CANSIs annually amounts to around 1.1 million for emergency care and 9.8 million for the combination of emergency and follow up care (Jason, 2013). Overall, the prevalence of CANSIs is relatively small, but these injuries are still of a concern as they have the potential to infect community members with HBV, HCV, and HIV (Jason, 2013).

An additional impact on society from IV drug use is the number of babies born with neonatal abstinence syndrome (NAS) as a result of mothers using IV drugs while pregnant (Keller, 2018). NAS is characterized by hyperactivity of the central nervous system of the infant as well as respiratory problems, gastrointestinal problems, and dysfunction of the autonomic nervous system (Jones, 2010). These symptoms can lead to potentially life-threatening consequences because of the risk for seizures, feeding difficult and diarrhea because of the hyperactive effects occurring on the gastrointestinal tract (Jones, 2010). The incidences of babies born with NAS has tripled from 1999-2013 which further depicts the current opioid epidemic (Keller, 2018). Research is being conducted that is looking into buprenorphine versus methadone when assisting opioid dependent mothers on how to mitigate the negative effects of IV drug use (Jones, 2010). A study found that when comparing these two drugs involved in MAT, that the infants of mothers who were in the buprenorphine group needed less morphine and had shorter

hospital stays which averaged 10 days versus 17.5, than the infants of the mothers who received methadone during their pregnancy (Jones, 2010). Therefore, buprenorphine has been shown to be a viable option for pregnant women who use IV drugs because it decreases the likelihood that they will participate in risky injection behaviors in addition to having the least impact on the neonate (Jones, 2010).

Potential Solutions to the Consequences of IV Drug Use

Overall, addiction is a complex process that affects the brain. Treatment for addiction and the individual, social and societal consequences is multidisciplinary. Harm Reduction methods have been reported to reduce the negative consequences. Harm Reduction is defined as "a set of practical strategies and ideas aimed at reducing negative consequences associated with drug use" (Harm Reduction Coalition, 2018). It acknowledges that some ways of using drugs are safer than others, recognizes that there is a spectrum of drug use ranging from total drug abuse to complete abstinence, focuses on improving the quality of life of drug users. Harm reduction in no way aims to minimize the dangers and threat that drug use poses, rather it accepts that although unfortunate, drug abuse is prevalent in our society so instead of pretending it does not exist, it aims at creating ways to lessen the negative consequences to both the user and the general public (Harm Reduction Coalition, 2018).

A major goal of harm reduction is returning autonomy to the individual. Because addiction can be described as "an element of loss of control" (Vearrier, 2018), it is important to find methods to give back autonomy to the individual. For example, often times, PWUID may not be ready to stop using the illicit drugs, which is when a NEP (one method of harm reduction) can be implemented and tailored to the goals of the PWUID.

For example, if the PWUID has a goal to decrease their risk of contracting HCV, then a NEP may be a good fit for them. Furthermore, harm reduction programs aim at giving control to PWUID as a way to give back their autonomy and promote beneficence (Vearrier, 2018). There are several initiatives in the literature reported to decrease negative health, social and societal effects of IV drug use such as overdose deaths, financial burden for the individual and society and risks to the community of infectious disease from needle stick injuries. In order to address these negative consequences, addressing addiction is essential. There are several initiatives that have the potential to decrease these consequences. These initiatives include rehabilitation programs, medication assisted treatment, fentanyl test strips, naloxone training, decriminalization, safe injection facilities, prison-based treatment programs, and NEPs.

Rehabilitation programs

There are a variety of rehabilitation programs which may range from weeks to years. Some rehabilitation programs are faith based while others are not and are solely focused on detox. In particular, one medication free residential rehabilitation program found that out of the 100 participants, 47% left the treatment facility prematurely, 30% were expelled and 18% successfully completed the program of either a 1 month stay or a 3-6 month stay **(**Darke, Williamson, Ross, & Teesson, 2006). Out of the 18% who finished, 71% were not using heroin at the 1-month mark and 18% were not using heroin for the duration of the follow up period (Darke, et. Al., 2006).

Faith based programs also offer a variety of options for the duration of treatment and they can vary in program specifics. In addition to helping PWUID to cease their drug use, faith-based treatment programs also have been reported to positively affect the

individual's life in other ways such as decreasing depression rates, improving self-esteem and increasing physical activity levels (Lashley, 2018). Thus, this holistic approach to treatment leads to positive effects on the individual's well-being in addition to assisting the individual to stop their drug use.

Another type of rehabilitation program combines a faith-based approach with medication assisted treatment. This program incorporated mental health interventions in combination with Islamic spiritual interventions in order to overcome their addiction (Rashid, 2014). This program in particular used a Mosque as a space where individuals struggling with IV drug use could go, obtain their methadone for free and be able to participate in spiritual programs. Out of the total participants, 80% were actively participating in both aspects of treatment at the 12-month point. These statistics are actually better than the overall retention rates from non-spiritual methadone programs in the area where the study took place (Rashid, 2014). In combination with an increased rate of abstinence for IV drugs, participants reported significant improvements in overall satisfaction with life, general health and social functioning (Rashid, 2014).

Medication assisted treatment

Replacement therapies, or opioid agonist therapies began in 1965, when two researchers named Dole and Nyswander conducted a methadone replacement study on individuals with chronic heroin use. They found that participants reported "craving relief, a blockade of euphoria associated with subsequent heroin use, a Lazarus-type effect on psychosocial functioning, with treated subjects resuming schooling, work and relationships" (Wakeman, 2016). Medication assisted treatment is a long-term treatment plan with methadone or buprenorphine as a replacement for heroin. Controversy exists

regarding replacement therapies purporting that methadone or buprenorphine to combat injection drug use is not a legitimate method of treatment because one drug is simply being substituted for another drug. However, the World Health Organization recognizes these mediations to be crucial, naming both methadone and buprenorphine to their list of essential medications for the treatment of addiction (Frimpong, Shiu-Yee, & D'Aunno, 2017; Wakeman, 2016). It has been reported that 60-80% of individuals receiving methadone or buprenorphine therapy, when dosed adequate, remain in treatment when compared to traditional behavioral interventions. In a study looking at the duration of methadone treatment in relation to continued heroin use, at the six month mark, 67% of individuals continued to use heroin, however, out of individuals who continued to receive methadone treatment for 4.5 years, only 8% continued to use heroin; thus depicting how methadone treatment success increases with duration of time treated (Wakeman, 2016). In a twelve-year study examining buprenorphine as opioid agonist treatment, the findings were similar to the statistics reported from using methadone. When buprenorphine is used long term to aid the individual in maintaining their abstinence from injection drug use, individuals report a greater quality of life decreased opioid use and decreased hospitalizations and emergency department visits (Weinstein, et. al, 2016). When individuals were prescribed and followed the proper dosage of buprenorphine for greater than one year, they were significantly less likely to cease use and relapse to injecting heroin versus those individuals who had been treated for less than a year (Weinstein, et. al., 2016). There was also a correlation with increased adherence to the program with females, individuals with psychiatric diagnoses and individuals of older age. One reason for a higher rate of compliance among females may be the ease of access to clinics being

preferred over a long-term treatment facility program if the woman has children. However, the reason for individuals with psychiatric diagnoses having higher rates of compliance is intriguing and warrants further examination (Weinstein, et. al., 2016).

Medication assisted treatment (MAT) programs lessen the financial impact hospitals and other healthcare organizations often are faced with when caring for PWUID. In fact, these programs decrease healthcare costs 50%-62% because as a result of treatment, the individual is less likely to need outpatient, inpatient or emergency department services. Additionally, for example, it is estimated by treating 10% of currently untreated individuals in New England with MAT, it would generate "550 million regional societal savings" (Wakeman, 2016). This monetary savings would positively and definitively impact the community as a whole (Weinstein, et. al., 2016). Medication assisted treatment has also been reported to decrease the incidence of overdoses. After the introduction of methadone and buprenorphine therapy as a treatment option, there was a steady decline in the number of overdose deaths (Schwartz, et. al, 2013). In a 12-year study is was reported that deaths from overdose were reduced for PWUID who received methadone and buprenorphine therapy as this was associated with successful recovery from heroin addiction (Wakeman, 2016).

Fentanyl test strips

Fentanyl is fifty times more potent of a drug than heroin. Recently, it has been reported than some heroin supply has been laced with fentanyl, making overdose more prevalent because the individual does not know there is fentanyl in their heroin (Dowell, Noonan, & Houry, 2017). Test strips that can let an individual know if there is any trace of fentanyl in their heroin and is extremely beneficial in decreasing the number of

overdose deaths from injection drug use with fentanyl laced heroin. NEPs often times have fentanyl test strips available to their clients (HEAL, 2018).

Naloxone

Another way to combat heroin overdoses is with a drug called naloxone (Narcan®). Naloxone is an opioid antagonist that reverses heroin and fentanyl induced respiratory depression. Traditionally, Naloxone was solely used in the hospital setting to revive someone who overdosed or if someone received too much pain medication. Making naloxone available outside the hospital setting where overdose from heroin is more likely to occur could potentially prevent mortality from a drug overdose (Strang, 2015). The concept is similar to the use of epinephrine (EpiPen) for anaphylaxis. Epinephrine once primarily available only in the hospital setting for treatment of anaphylaxis was made available to individuals who had a history of anaphylaxis when exposed to certain antigens. Access to epinephrine outside of the hospital setting significantly decreased anaphylaxis related mortality just as Narcan availability in the community significantly reduces opioid related mortality (Strang, 2015). Access to naloxone and administration training is often available through NEPs and they offer PWUID the opportunity to become trained in naloxone administration. It has been reported that 80% of PWUID use in the company of others, which makes training PWUID to be able to administer naloxone to others reasonable and worthwhile (Strang, 2015). In a study in which 3,500 ten dose vials of naloxone were distributed to trained PWUID there were 319 peer reversals with only one unsuccessful event (Maxwell et al., 2006).

Prison-based MAT treatment.

In addition, another way to reduce overdose deaths is by implementing prison-based treatment. Unfortunately, 56-90% of PWUID go to prison at some point in their lives. While in prison many individuals often times do not have the ability to continue to use heroin so they are forced into cold turkey detoxification. This process significantly decreases their tolerance to the drug as they are unable to use the drug for an extensive amount of time while in jail. Consequently, when the individual is released from prison, their tolerance is very low which places them in a very susceptible position for overdosing when released from prison. This is because if they use the same amount of the drug that they would typically use prior to being in prison, their body is no longer use to it, making the risk of overdose very high (Crowley, & Van Hout, 2017). The risk of relapsing is often high in individuals getting out of prison since they are usually then faced with the triggers and situations in which they used in before (Crowley, & Van Hout, 2017).

One method of combating heroin deaths after prison release is through the implementation of medication assisted therapy (MAT) opioid substitution treatment (OST) for opioid dependent inmates. The United States does not have many programs OST programs. In Australia OST are available. It was reported that between 2000 and 2012 researchers tracked post release mortality of 16, 453 inmates enrolled in OST. They found that when individuals completely adhered to their OST, the crude mortality rate (CMR) within the first week was 10.9 per 1000 individual's verses 59.5 per 1000 individuals (Degenhardt, et. al., 2014). The CMR pattern followed a similar pattern in weeks 2-4 of post release inmates as well. Overall, treating inmates with opioid dependence with OST in this prison in Australia using a multifactorial model resulted in

an 83% less risk of mortality following release from prison (Degenhardt, et. al., 2014). Therefore, MAT programs, whether they are used in the community or in prisons, are one method of reducing overdose death in PWUID.

Safe injection facilities

Safe injection facilities (SIF) or supervised consumption services allow an individual to use IV drugs they have obtained elsewhere, in a safe, legal and controlled facility with trained professionals around. These trained professionals are present if someone overdoses and needs naloxone and provide sterile supplies which includes syringes, needles, cookers, alcohol wipes, cotton, and tourniquets (We are the drug policy alliance, 2018). SIF allows for proper disposal of used needles which then has the ability to reduce the number of needles on the street. In a study at the first SIF in North America in Vancouver established in 2003, individuals who utilize these sites were more likely to self-initiation addiction services which then is positively correlated with cessation of IV drug use (Vearrier, 2018), (Debeck, et. al., 2011). Out of the randomly selected participants, 57% of participants were enrolled in addiction treatment. Overall, even though SIF programs do not require initiation of addiction treatment, they promote harm reduction by facilitating a safe environment with clean supplies. By accessing these services, it has the ability to open the door for to PWUID to begin to seek treatment services (Debeck et. al., 2011). Some cities in the US are now examining ways to implement SIF, however, such initiatives are meeting resistance from neighbors who do not want a facility like this in their neighborhood. Despite the impending difficulties, thirteen cities are looking for ways to have SIFs available to their citizens (Allen, 2018).

These facilities also can decrease the amount of injection equipment that is left in public places because of the incentives that these facilities offer for bringing in used needles in exchange for clean ones (Debeck, et. al., 2011). SIF are safe and monitored and in addition to decreasing incidences of SSTIs from providing sterile equipment, they also have nurses at the facility who are able to intervene if there is a critical situation (Vearrier, 2018). SIF help foster therapeutic relationship between nurses who work at SIF and the PWUID. This relationship can positively impact how the PWUID sees healthcare professionals as well as decreasing the rates of hospitalizations because of the frequency in which the nurses can assess the overall health of the clients of the SIF (Vearrier, 2018).

Decriminalization

Implementing the decriminalization associated with injection drug use has the ability to positively impact PWUID. Currently, there are felony convictions for drug use and possession charges. As a result, PWUID who were charged with a felony have immense difficulty finding jobs, finding housing and obtaining professional licenses (Vearrier, 2018). In addition, a felony charge can also affect having custody of children, having a driver's license and loss of state and/or federal assistance for education. Decriminalizing certain possession charges to a misdemeanor has the potential to greatly impact PWUID and could help them in many aspects (Vearrier, 2018).

Decriminalization of possession charges also decreases societal costs in terms of court and prison costs. Drug related charges play a substantial role in the current "mass incarceration" trend, thus by decreasing the amount of felony charges this would greatly reduce costs associated with drug enforcement measures (Vearrier, 2018).

The Law Enforcement Assisted Diversion (LEAD) program that the NEP in Bangor (HEAL) has initiated aims at doing just this. Rather than arresting and charging someone for a minor possession charge, police officers in Bangor who are trained in the LEAD program are able to refer the individual to HEAL. The goals of this program are to supply help to the individual if that is what the individual wishes (HEAL, 2018).

Needle exchange programs

Needle exchange programs (NEP's) can decrease health consequences associated with infection from injectable drugs for PWUID. Needle exchange programs are aimed at decreasing the transmission of HIV, Hepatitis B, Hepatitis C and other blood borne infections (Sawangjit, Khan, & Chaiyakunapruk, 2016). It has been reported expanding NEP's is the gateway to decreasing HIV rates in the US (Kulikowski & Linder, 2018). Because PWUID who utilize a NEP are five times more likely to enter a treatment program, these exchanges correlate with decreasing HIV and Hepatitis C infection rates as well as overall cessation of heroin use (Kulikowski & Linder, 2018). In Europe, in 29 cities which had NEP programs, HIV rates decreased by 5.8% per year while the 52 cities without NEPs, HIV rates increased by 5.9% (Wilson, Donald, Shattock, Wilson, & Fraser-Hurt, 2015).

NEP's are intended for PWUID who access the service however, if a PWUID is unable to go to the exchange or is not ready to, they may still benefit from the NEP. Some PWUID operate a secondary exchange for their peers and collect their friend's needles to be swapped for sterile ones. A NEP in Baltimore, Maryland described how the NEP aids even more people than just their clients that walk through their door because

the NEP clients often times collect many people's used needles and then redistribute the clean needles they obtain from the NEP (Voytek, Sherman & Junge, 2003).

NEPs also improve the safety of the community by getting used needles off the streets. Because these programs are run by collecting used needles in exchange for sterile ones, it encourages PWUID to turn in their used needles rather than leaving them somewhere in the community (Kulikowski & Linder, 2018). Overall, the needle exchange programs work by reducing the time the needles and syringes are in circulation in the community and therefore reduce the risk of the public coming in contact with dirty needles. According to the North American Syringe Network, in the U.S. there are an estimated 200 needle exchanges in thirty-three states (Ackerman, 2016). Michael Botticelli, Director of the Office of National Drug Control Policy, states that not only do these services reduce rates of infection, but they also provide a "transition into treatment for people in the community" (Ackerman, 2016). The programs often also offer sex education and prevention materials, referrals to medical care, legal and social services, and drug treatment referrals (Alcabes, Drucker, Lurie & Wodakt, 1998).

In theory, because NEPs work to decrease infection rates in PWUID, this trend has the potential to overall decrease the infection burden in all individuals regardless of injection drug use history because there will be less people that have these bloodborne infections in general. Similar to herd immunity with immunizations, if more and more people are taking precautions against blood borne infections, this puts the general community at a less risk of becoming infected as well (Sawangjit, Khan, & Chaiyakunapruk, 2016).

Lastly, NEPs are cited as one of the least costly harm reduction methods, costing an average of $23-71 dollars per person per year (Wilson, et. al., 2015). In fact, NEPs are said to be “one of the most cost-effective public health interventions ever funded” (Wilson, et. al., 2015).

There are five counties in Maine that offer needle exchange services; these include (1) Portland Needle Exchange in Cumberland County, (2) Health Reach Harm Reduction in Augusta, in Kennebec County, and (3) the Down East AIDS Network/ Health Equity Alliance (HEAL) with locations in Ellsworth, Bangor and Machias in Hancock, Penobscot and Washington County (CDC, n.d.).

Specifically, the focus of this thesis is the Bangor Down East AIDS Network/ Health Equity Alliance (HEAL) and will explore perceptions and knowledge of nurse who work in the emergency department regarding NEPs. Perceptions and knowledge of emergency room nurses regarding NEP can impact utilization by clients. In Bangor, HEAL offers syringe exchange, free Narcan administration training, a free health clinic, case management, Law Enforcement Assisted Diversion, a food pantry and LGBTQ services (Health Equity Alliance, 2018). However, the Health Equity Alliance syringe exchange program continues to be underutilized in Bangor, Maine (T. McGuire, October 9, 2018).

Background

Needle exchange programs have been found to be effective at reducing needlestick injuries and improving the health of PWUID (Jezek & Weedle, 2018). It is reported that there are misconceptions and resistance to needle exchange programs among the lay public, health care workers and police officers (Beletsky, et al., 2015). In comparison to other developed countries, the United States uses syringe exchange programs far less than Australia, Canada and various European countries ((Kulikowski &

Linder, 2018). There are many reported social and political forces that may influence the success of these programs. Opposition to needle exchange programs (NEP) includes the thought that these programs enable drug use and perpetuate the existing problem. In contrast, NEP's have been found to actually reduce drug usage because clients who utilize NEP services are five times more likely to enter treatment programs (Kulikowski & Linder, 2018).

In terms of funding, from 1988-2015, there was no federal funding towards NEPs. The state and local government was in charge of providing the totality of resources needed to operate NEPs (Showater, 2018). It was not until 2016 that the United States Congress passed legislation that supported federal funding. Consequently, states can now get funding for costs related to running NEPs such as salaries and counseling, just not the actual needles (Mcleaver, 2016). States and local government funding are still needed to obtain the clean needles; however, the addition of federal funds means that many small exchanges have the potential to provide additional services with the added funding (Mcleaver, 2016).

THE STUDY

In order to address how NEPs can be better utilized, it is important to identify who is on the front lines interacting with PWUID. Of all health care providers, emergency department (ED) nurses are most likely to come in contact with IV drug users and have the opportunity to provide resources and compassionate care to individuals struggling with injection drug addiction (Kulikowski & Linder, 2018). It has been reported that if the PWUID senses a lack of compassion on the part of the healthcare professional when seeking care, they may avoid seeking care in the future. Consequently, this may result in a missed chance for education and referral to treatment (Bartlett, Brown, Shattell, Wright, & Lewallen, 2013). Thus, if nurses can be educated on the benefits of harm reduction services provided through NEP's, they may be more likely to make a referral.

Emergency department nurses are uniquely positioned to inform IV drug users of the availability and benefits of needle exchange programs. Further, they are prime candidates to advocate for creation of needle exchange programs in their community if they are not available. Thus, it would be insightful to understand the beliefs, values and perceptions of ER nurses in regard to need exchange programs in Bangor. The purpose if this study is to describe the perceptions of emergency room nurses of the barriers regarding the full utilization of needle exchange programs in Bangor, Maine.

Methods

This study is a non-experimental descriptive design. An anonymous survey to determine perceptions of needle exchange facilities were distributed to emergency room nurses in Bangor, Maine at St. Joseph's Hospital (Appendix C). Participants were invited to participate in an interview in addition to completing the survey. Those nurses who wish to participate in the interview were asked to provide their contact information on the consent form by printing their name and contact information (Appendix B). This study was approved by the University of Maine IRB.

Results

The 75 nurses employed at this ED in Bangor, ME were given the opportunity to participate in the survey. Nine surveys were returned and the results were examined. The amount of nurses surveyed was 12% of the amount of ED nurses employed at this hospital. Out of the nurses' surveys, 88% of them reported that they interact with PWUID daily. Three (33%) of nurses who completed the survey nurses that said they had heard of HEAL. Only one out of the nine (10%) nurses surveyed reported actually making a patient referral to HEAL. Thirty-three percent of nurses surveyed felt that needle exchange programs have the ability to reduce the rate of infectious diseases in PWUID and in community members. Study participants were provided the opportunity to write comments on the survey. Four participants commented on the survey. Comments included voiced that resources in Bangor are limited, that the individual must want treatment in order for a referral to a detox program to be made, and that they do not see a lot of success with treatment other than the occasional referral and administering Narcan which is not considered long term treatment. One nurse commented that PWUID need

someone who can provide them with compassionate care and empathy, will not judge them and will support their medical needs and decisions at the time they are seeking treatment.

Discussion

Overall, the results from this survey indicate there may be a lack of awareness of NEP programs among nurses who have the ability to promote their utilization. Furthermore, in order to increase the utilization of NEP programs, educational sessions for frontline medical professionals could be implemented. If nurses are not aware of HEAL (the NEP in Bangor) utilization of this program will likely be diminished. When nurses in the emergency department establish a rapport with PWUID and are aware of the full range of NEP services, they can communicate this to PWUID. They can also provide PWUID with accurate information on how to access theses services.

Increased utilization of HEP could be facilitated if nurses who are aware of these services communicate this to their nursing colleagues as well as other healthcare providers. Additionally, other ways to increase the utilization of NEP programs could be further advertising in public places, posters in hospital ED waiting rooms in addition to increasing the amount of people who know about what they are and what they can do overall.

Education of ED and floor nurses specific to NEP programs and benefits could also be useful in order to implement hospital wide knowledge of local services offered in the greater Bangor area. Hospitals and walk-in-care places could implement mandatory trainings in which employees are trained in multiple aspects of caring for PWUID and offering referral options when appropriate. If more professionals are aware of the benefits

of NEP services, utilization may be increased. Additionally, a pamphlet that lists all of the services for PWUID in the Bangor area such as methadone or suboxone clinics, detox programs, where to obtain Narcan training and kits, and NEP locations may increase utilization of these services. Although such a list may be available online, many PWUID may not have access to a computer particularly if they have unstable housing. Increasing awareness for all healthcare professionals of services for PWUID could create a more streamlined process where every patient would have an equal chance to obtain services.

Limitations of the research include a small sample size because out of the 75 employed ED nurses, 9 surveys were collected, which comprises 12% of the total amount of nurses in the ED in this study. Future research is needed to encompass a larger sample size in order to draw in more data. This study could be replicated on a larger scale to further examine the prevalence of knowledge regarding local NEP services.

Conclusion

Needle exchange programs have been found to be effective at reducing needlestick injuries and improving the health of PWUID (Jezek & Weedle, 2018). Results of this study suggest that many nurses who work in the emergency department are unaware of the existence and scope of services of the NEP located in Bangor. Additionally, many nurses do not recognize the potential that NEPs have of reducing harm for PWUID such as decreasing infection and overdose rates and increasing the likelihood of entering treatment programs. Further research is needed to examine how the underutilization of NEPs could be addressed. A starting point may be to begin mandatory hospital personnel education particularly emphasizing the role of ED nurses regarding this topic since 88% of ED nurses who participated in this study reported that

they interact with PWUID daily while at work. NEPs have the potential to significantly decrease the number of needles in public places, decrease infection rates in PWUID as well as in community members, and are the gateway to further treatment. Examination of the perceptions of ED nurses who participated in this study gives rise to opportunities to engage nurses in supporting programs that address the opioid epidemic in the Bangor area as well as in the state of Maine.

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APPENDICES

Appendix A

Presentation Script Regarding the Nature of the Study

Hello. My name is Theresa Murray and I am a senior nursing student in the honors program at the University of Maine. Mary Tedesco-Schneck Ph.D., RN. CPNP is my faculty sponsor and supervising this study.

I have been researching the impact of needle exchange programs for persons who use IV drugs on the health of the individual as well as the local community. I am seeking to more fully understand:

Interactions between emergency room nurses and persons who use IV drugs.

Perceptions of emergency room nurses regarding programs for persons who use IV drugs.

If you would like to participate in the anonymous survey I am asking you to please fill it now. This anonymous survey should take between 5-10 minutes to complete. If you would also like to participate in the short interview (approximately 30 minutes), please print your name on the consent form with contact information.

I will contact you and arrange for a mutually agreed upon time to conduct the interview. The interview can be conducted in a private room in the St. Joseph's Healthcare Emergency Department or the office of Mary Tedesco-Schneck at the University of Maine, Dunn Hall, Room 218, Orono, Maine. I will conduct the interviews but they will not be recorded. Themes from the conversation will be jotted down in a notebook. The

notebook will also be kept in a locked filing cabinet in the office of Mary Tedesco-Schneck until May 16, 2019. On May 16, 2019 all surveys, consents, and notebook entries will be shredded.

Appendix B

Consent for Survey Regarding Needle Exchange Programs and the Law Enforcement Assisted Diversion Program

You are invited to participate in a research project being conducted by Theresa Murray, an undergraduate nursing student at the University of Maine in the School of Nursing. Mary Tedesco-Schneck Ph.D., RN, CPNP is the faculty sponsor from the University of Maine in the School of Nursing. The purpose of the research is to understand the perceptions of emergency room nurses regarding needle exchange programs in Bangor, Maine. You must be at least 18 years of age to participate.

What Will You Be Asked to Do?

If you decide to participate, you will be asked to complete an anonymous survey that will not have any personal identifiers. It should take you about 5-10 minutes to complete the survey. Please keep the consent form. After completing, please put your survey in envelope #1.

If you are willing to participate in the short interview (approximately 30 minutes): You will need to write down your contact information on the end of the consent form, tear it off, and put it in envelope #2. During the interview you will be asked to comment further on the questions that are included on the survey. The interview will be conducted in a private room in the St. Joseph's Healthcare Emergency Department or the office of Mary Tedesco-Schneck at the University of Maine, Dunn Hall, Room 218, Orono, Maine. The principal investigator (Theresa Murray) will conduct the interviews but they will not be recorded. Identifiers of the interviewee will not be recorded only themes from

the conversation will be jotted down in a notebook. We would let you know of the time and place of the interview within 1-2 weeks following collection of your survey.

Risks

The risks to completing this survey are your time and possible inconvenience. You may skip any questions that you do not wish to answer.

Benefits

While this study will have no direct benefit to you, this research may help us learn more about the perceptions of emergency room nurses regarding needle exchange programs in Bangor, Maine. This can help us understand how Needle Exchange Programs can be better utilized and if there are additional resources for persons that use injectable drugs and the community that should be considered.

As a result of this research additional resources suggested by participants may be implemented in the future.

Confidentiality

There will be no identifiers on the survey or interview notes linking you to the data. The signed consents, surveys and notebook will be kept in a locked filing cabinet in the office of Mary Tedesco-Schneck until May 16, 2019. On May 16, 2019 all surveys, consents, and notebook entries will be shredded.

Please do not write your name on the survey, for they are anonymous. However, due to the nature of an interview, if you chose to be interviewed, they would be confidential.

Voluntary

Participation is voluntary. If you choose to take part in this study, you may stop at any time. You may skip any questions you do not wish to answer.

Contact Information

If you have any questions about this study, please contact me (Theresa Murray) at theresa.murray@maine.edu . You may also reach the faculty advisor (Mary Tedesco-Schneck) on this study at 207-581-3427 or mary.tedescoschneck@maine.edu . If you have any questions about your rights as a research participant, please contact the Office of Research Compliance, University of Maine, 207/581-2657 (or e-mail umric@maine.edu).

Please keep this consent form

(Tear off below information and give to Theresa Murray if you would be willing to participate in an interview)

For participants who would be willing to participate in an interview:

I will contact you in 1-2 weeks to schedule and interview time.

Please provide contact information

here: _____

_____ ____/___/19

Printed Name of Participan

Appendix C

Anonymous Survey

Please rate how frequently you interact with persons who use IV drugs when you are on duty by circling one of the following responses.

About once a month	About twice a month	About once a week	More than once a week	Daily

Please choose any interventions you implement when working with persons who use IV drugs. You may circle more than one option.

Referral to health services	Referral to needle exchange program.
Referral to treatment programs	Referral to social services.
Other:	I do not implement any interventions.

Please describe the impact you believe your interventions have on persons who use IV drugs.

Do you feel that needle exchange programs help to reduce that rate of infectious diseases among persons who use IV drugs? ____ Yes ___ No

Do you feel that needle exchange programs help to reduce that rate of infectious diseases among community members who may be exposed to used needles? ____ Yes ___ No

Please circle one of the following choices in regards to person who use IV drugs and the Health Equity Alliance (HEAL)

I have never heard of HEAL.
I have heard of HEAL but have never made a referral.
I have heard of HEAL and have made a referral.

Please feel free to share any other comments regarding needle exchange programs and/or your interventions with persons who use IV drugs.

Please circle one of the following choices in regards to person who use IV drugs and the Law Enforcement Assisted Diversion (LEAD) program

I have never heard of LEAD.
I have heard of LEAD but have never made a referral.
I have heard of LEAD and have made a referral.

Thank you for your time and for sharing your thoughts.

Theresa Murray

Appendix D

Interview Script

Thank you for providing me with the opportunity to interview you regarding perceptions of nursing interventions and programs for person who use injection drugs. The purpose if this study is to describe the perceptions of emergency room nurses regarding needle exchange programs in Bangor, Maine. This information may facilitate understanding of how Needle Exchange Programs can be better utilized and if there are additional resources for persons that use injectable drugs and the community that should be considered.

There are no identifiers linking you to the data from this interview. The interview is not recorded; only themes from the conversation will be jotted down in a notebook. Therefore, this interview is confidential.

The notebook will be kept in a locked filing cabinet in the office of Mary Tedesco-Schneck until May 16, 2019. On May 16, 2019 all surveys, consents, and notebook entries will be shredded.

1. Do you have any questions before we begin?
2. Can you share with me the interventions you choose to implement when working with persons who use injectable drugs?
3. What impact do you believe your interventions have on persons who use IV drugs?
4. What are your thoughts about needle exchange programs?

5. What are your thoughts about the Health Equity Alliance (HEAL) program?
6. What are your thoughts about the Law Enforcement Assisted Diversion (LEAD) program?
7. Are there any other thoughts regarding your perceptions of nursing interventions and programs for person who use injection drugs?

Thank you for time and sharing your thoughts.

AUTHOR'S BIOGRAPHY

Theresa Murray was born and raised in Burlington, Massachusetts and graduated from Burlington High School in 2015. At the University of Maine, Theresa studied Nursing with a minor in psychology. On campus, she was involved in Operation H.E.A.R.T.S., a medical service group and Alternative Breaks. Through both organizations she has completed over 200 volunteer hours and has volunteered with many organizations such as Habitat for Hummabity of Richmond, VA, Frankie's World in Philadelphia, PA, REACH in Roanoke, VA, Thrive DC, Special Olympics and many organizations in Maine. She was also on the Umaine Women's Club Lacrosse team.

After graduation, Theresa will be working as a Registered Nurse at Mercy Hospital in Portland, Maine. One day she plans on working in the Neonatal Intensive Care Unit as a Neonatal Nurse Practioner and taking care of the tiniest of humans.