Improving Confidence Levels in Wound Care Education:

A Harm Reduction Strategy for People Who Inject Drugs

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Abstract

People who inject drugs (PWID) are at high risk for disease transmission and bacterial invasion of the blood and/or skin. PWID are a marginalized population who often delay medical treatment or substitute self-care treatment due to increased fear, barriers, or stigmatization in traditional healthcare settings. These delays often create multifaceted complications that eventually cost the healthcare system billions of dollars. This leads to poorer health outcomes in PWID. There is evidence that community-based interventions are effective in reaching this population of people in order to promote better health outcomes. To address this gap in care, an evidenced based project centered on increasing the confidence levels of community lay workers when providing general wound education to PWID was conducted. The project was implemented at a rural harm reduction agency site in Northern Arizona. Utilizing the theoretical framework of the Adult Learning Theory, a convenience sample of 22 participants received a general wound education intervention consisting of a PowerPoint presentation with a written brochure over multiple sessions. Adapted questions from the new general self-efficacy (NGSE) scale, which has demonstrated valid internal consistency, were utilized to measure confidence levels of participants and a scored checklist was used to measure teaching performance. Confidence levels significantly increased from baseline to week four (p = .001). Teach-back performance scores also increased from baseline to week two and four. Providing a general wound education intervention to community lay workers improved confidence levels and teaching performance which can promote better health outcomes in PWID.

Keywords: skin and soft tissue infections, substance abuse, abscess, cellulitis, harm reduction

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The current opioid crisis in the United States is a multifaceted problem. It had its beginnings in prescription opioids but has quickly disseminated into illicit opioid misuse and overdose. For the first time in the United States (U.S.), the odds of dying from an accidental overdose are now higher than dying from a motor vehicle accident (National Safety Council, 2019). Illicit drugs can be injected, snorted, or smoked. In some cases, the same drug can be utilized in all three mediums. People who inject drugs (PWID) are at high risk of developing invasive bacterial infections of the skin or blood including abscesses and/or cellulitis. PWID are a marginalized population who often delay traditional medical treatment and substitute self-care treatment for their wounds, thus leading to poorer health outcomes. There is evidence that shows the efficacy of reaching PWID through community-based interventions and peer driven education programs. The purpose of this manuscript is to review the results of an evidence-based project aimed at increasing confidence levels of delivering basic wound care education to PWID by peers with lived experiences.

Background and Significance

Skin and soft tissue infections are common complications in PWID often caused by the introduction of bacterial, fungal, or viral contaminants found on the skin, in drug adulterants, or on the paraphernalia used to cook and inject the drug (Wurcel et al., 2018; Kaushik, Kapila, & Praharaj, 2011). Behavioral risks of abscess formation in PWID include the type of drug injected, route of injection, frequency of injection, and reuse of syringes (Ciccarone, Unick, Cohen, Mars, & Rosenblum, 2016). Summers, Struve, Wilkes, & Rees (2017) note that injection of cocaine or heroin-cocaine is an independent risk factor for skin infections, whereas

methamphetamine injections have lower skin infection rates when compared to cocaine or heroin-cocaine combinations. The authors further describe that different types of heroin have varying rates of skin infection. In the Western U.S., most injectable heroin is black tar heroin (BTH). It is viscous, non-water soluble, and requires more handling to prepare and inject when compared to the powdered, more refined, white heroin seen in the Eastern U.S. (Summers et al., 2017). BTH has been identified as a higher risk for skin infection and abscess formation due to the impurities and caustic solvents found in the drug (Wurcel et al., 2018).

The pathophysiology of skin abscesses in PWID includes a subcutaneous mass filled with purulent discharge or debris. This is a result of the body's defenses against the introduction of an infectious agent, such as Staphylococcus aureus, through uncleaned skin with unsterile injection equipment (Fink et al., 2013). The standard treatment of uncomplicated abscesses includes lancing and draining coupled with possibly oral antibiotics, however, if left untreated they may lead to necrosis, cellulitis, endocarditis, osteomyelitis, and surgery requiring hospitalization and longer treatment durations (Fink et al., 2013; Wurcel et al., 2018). Surveillance data from the Centers for Disease Control and Prevention (CDC) Emerging Infections Program estimate that PWID are 16.3 times more likely to develop methicillin-resistant Staphylococcus aureus (MRSA) infections (Jackson et al., 2018).

PWID experience higher rates of stigmatization and are less likely to seek initial medical attention leading to higher utilization rates of emergency room visits and hospitalization due to complications (Ciccarone et al., 2016; Tookes, Diaz, Li, Khalid, & Doblecki-Lewis, 2015; Robinowitz, Smith, Serio-Chapman, Chaulk, & Johnson, 2014). The number of hospitalizations related to opioid use with an associated infection nearly doubled between 2002 and 2012 (Ronan & Herzig, 2016). Costs associated with these hospitalizations more than tripled in 2012, reaching

just over $700 million (Ronan & Herzig, 2016). Most of these cases were either uninsured or where the primary payor source was Medicaid (Ronan & Herzig, 2016).

People Who Inject Drugs

In the U.S., drug use is highest among young adults in their late teens and early twenties, but drug use among people in their late fifties and early sixties is quickly rising (National Institute on Drug Abuse, 2015). According to data collected in 2016 by the Institute for Health Metrics and Evaluation, substance use disorder is more prevalent among males than females (Ritchie & Roser, 2018). Bluthenthal, Wenger, Chu, Bourgois, and Kral (2017) define the term "time to injection initiation" (TTII) as the years in which people who use drugs transition from non-injection methods of use to injection use. The authors go on to note that the rise of prescription opioids has decreased the TTII of young adults thus intensifying the need for interventions to decrease risky drug use behaviors in efforts to create better health outcomes (Bluthenthal et al., 2017).

Harm Reduction Interventions

Harm reduction strategies are defined as interventions intended to help preserve the life and health of those who are not yet ready to enter treatment for substance use disorder or opioid use disorder (U.S. Department of Health and Human Services, 2018). For those who are injecting drugs, the focus of harm reduction interventions would include strategies to prevent skin or soft tissue infections, the transmission of communicable diseases such as Hepatitis C and Human Immunodeficiency Virus (HIV), and overdose. Examples of such interventions would include syringe services programs (sometimes called needle/syringe exchange programs), overdose prevention education, and barrier-free access to medication that can reverse an opioid overdose (U.S. Department of Health and Human Services, 2018). Examples of interventions to prevent

skin or soft tissue infections include skin cleansing before injection, hand cleansing prior to handling equipment, sterile supply use, and injection location rotation (Phillips et al., 2012; Summers et al., 2017).

Current Self-Care Practices of PWID

Harris, Richardson, Frasso, and Anderson (2018b) report PWID who do not have stable housing are more at risk of developing a skin or soft tissue infection. When housing is unstable, PWID are forced to decide to inject where they feel the safest from arrest, harassment, and violence. These locations are typically in unsanitary abandoned buildings, places of isolation, or outdoors in parks and/or parking lots (Harris et al., 2018b). Due to the increased fear of violence or being discovered by someone in the community, injections are hasty thus increasing the risk of forming an abscess. Medical care among PWID is often delayed as evidenced by the high rates of complex infections (Harris, Richardson, Frasso, & Anderson, 2018a). This is understandable given PWID experience barriers to medical treatment due to high stigmatization, marginalization, and lack of resources to pay for healthcare (Harris et al., 2018a). Since PWID are delaying or forgoing medical treatment, they often substitute their own personal practices of wound care. These include self-lancing of abscesses with used needles, withdrawing abscess fluid, unsterile instrument usage to pick or nick abscesses, and use of over the counter triple antibiotic ointment (Harris et al., 2018a).

Better Health Outcomes for PWID

The desired clinical result in PWID includes not only addressing the potential complications of injection drug use but the underlying issues of addiction as well (Thakarar, Weinstein, & Walley, 2016). Although the best evidence to prevent skin and soft tissue infections among PWID points to stop injecting drugs, many are not yet ready to take that step

(Phillips et al., 2012). It is in these cases where harm reduction interventions of evidenced based wound care and prevention strategies would be applied. Infection prevention would lead to better health outcomes for the individual as well as lessen the overall burden to the healthcare system. Prevention strategies that are delivered by peers with lived experiences with drug use have been shown to be effective in reaching PWID (Callon, Charles, Alexander, Small, & Kerr, 2013). The advantages of peer-driven education programs among PWID include the use of already established relationships to connect with hard to reach people, perceived increased credibility of information, and the ability to provide information or supplies at times when high-risk behavior is most likely to occur (Callon et al., 2013). Additionally, peer driven education programs are often more cost effective than traditional outreach programs (Callon et al., 2013).

Internal Evidence

In a harm reduction agency located in the Southwestern United States, efforts have culminated into regular weekly gatherings of volunteers who provide safer injection practice education, distribution of sterile injection supplies, and distribution of lifesaving opioid overdose reversal medication. Participants are welcomed in a friendly, non-judgmental, and non-stigmatized fashion that gives them the freedom to express their needs openly if desired. Referrals to drug treatment centers, stable housing, and food security are often rendered. Soft data collected includes frequent verbal reports from participants at weekly gatherings who currently have (or have had) abscesses. Many participants discuss self-substituted treatments and have a great need for clean/sterile wound supplies. The agency has no defined method for wound care education and interventions are provided by nonclinical volunteers with lived experiences rather than evidenced based practice knowledge. Volunteers are willing to share their personal knowledge but often verbalize their uncertainty and apprehension when asked to provide clinical

advice. Hard data is not feasible in this agency as the participants are considered a vulnerable population, and complete anonymity is necessary to protect participants, volunteers, and paid staff members. The agency displays a strongly vested interest in PWID and work tirelessly to create trust through connection and community. This relationship equity creates an open avenue for PWID to receive health education and supplies. Volunteers are interested in providing evidenced based education regarding wound care but lack the knowledge and confidence to do so.

Problem Statement

Wounds occurring in PWID can not only contribute to increased hospitalizations and emergency room visits but also cause public health concerns (if open and draining), contribute to antibiotic resistance and possibly increase self-medication rates related to increased pain (Fink, Lindsay, Slymen, Kral, & Bluthenthal, 2013). A combination of stigmatization and lack of resources within the healthcare industry lead PWID to perform self-care treatments on skin abscesses, often leading to more systemic infections like endocarditis, osteomyelitis, or septic arthritis. These conditions may require long term intravenous antibiotic use in a person with an already compromised venous system (Ciccarone et al., 2016; Ronan & Herzig, 2016; Phillips, Stein, Anderson, & Corski, 2012). Despite these potential complications, skin infections in PWID can possibly be prevented. This is an important factor in public health for disease prevention/transmission and health promotion strategies in an already marginalized population. This led to the clinically relevant PICO question: in persons who inject drugs, how does preventive wound care education given by non-clinical volunteers compared to no preventive wound care education affect the prevention of skin infections/abscesses?

Evidence Synthesis

Search Strategy

A literature review was conducted to identify articles discussing wound care education within this population. The review included a search of the following databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, and PsycINFO. Keywords included: *substance abuse, intravenous complications, prevention, education, harm reduction, soft tissue, abscess,* and *intravenous drug use.* The initial search of *substance abuse AND intravenous complications AND prevention* yielded a total of 521 results in CINAHL, 2340 results in PubMed, and 18 results in PsycINFO. Search limits were set to include publication dates between 2014 – 2019, research articles, and the English language. This resulted in a yield of 56 in CINAHL, 346 in PubMed, and two in PsycINFO. To further narrow the search a combination of the keywords was changed to include *substance abuse, soft tissue infection, prevention, education,* and *abscess* to yield a final result of 11 in CINAHL, 59 in PubMed, and nine in PsycINFO. Grey literature of government publications from the Centers for Disease Control and Prevention and Arizona State government policies were also searched.

After reviewing the abstracts and titles of the final yield, inclusion criteria included articles addressing drugs used via injection routes only. Rapid critical appraisals were then completed for 20 articles, and the final 10 articles were then chosen for this literature review (Appendix A and B). This included four qualitative studies, one observational study, one randomized controlled trial, one non-randomized clustered intervention, one cross-sectional study, one mixed method study, and one retrospective chart review. Exclusion criteria included articles written before 2014, articles that addressed drug use via oral ingestion, smoking, or snorting, and articles addressing harm reduction interventions other than wound care.

Critical Appraisal and Synthesis of Evidence

Ten studies were retained for this literature review including four qualitative studies and six quantitative studies (Appendix A and B). Each study's strength and quality of evidence were determined through the utilization of a Melnyk and Fineout-Overholt (2015) rapid critical appraisal tool. Levels of evidenced (LOE) varied slightly throughout the studies. Six studies had an LOE of VI, two studies with LOE V, one study with LOE III, and one study with LOE I (Appendix C). While study participant ages ranged from 30-50 years old, there was homogeneity in the population since every study's participants identified as PWID (Appendix A and B). There was slight heterogeneity within the measurement tools and consisted of either an interview or a survey. The exception was Tookes et al. (2015) which focused solely on hospital chart reviews. Most studies list a recall bias based on self-reporting data or demographics from participants. Eight out of the ten studies had sample settings within the community. Study locations within the community centered on traditional community centers, a harm reduction agency, and a syringe exchange program. Primary outcomes focused on SSTI or complications at the injection site, safer injection techniques, and barriers to seeking medical care or accessing harm reduction (HR) interventions (Appendix C).

Conclusions from Evidence

The literature demonstrates the efficacy of community-based interventions suggesting the need to improve health outcomes of PWID by meeting outside of traditional healthcare settings. This need is also supported through the evidence of the presence of barriers to utilizing HR interventions that lead PWID to substitute self-care treatment or delay medical treatment. Delayed or self-care treatment of SSTIs in PWID leads to worsening complications that, in turn, increase the overall cost of treatment. Since it is demonstrated in the literature that a community education intervention leads to safer injection techniques and less overall SSTIs in PWID, this

leaves room for community lay workers to provide such education strategies. Since community lay workers are viewed as trustworthy (Callon et al., 2013), they can help to eliminate the multidimensional and structural barriers that are present for PWID. An evidence-based pilot project was implemented with the purpose of improving confidence levels of community workers when providing basic wound education to their peers who inject drugs. Improving their confidence through evidence-based knowledge rather than relying on their lived experiences can potentially translate into fewer SSTIs within the community.

Theoretical Framework

The theoretical framework chosen for this project was Malcolm Knowles' 4 principles of andragogy also known as the adult learning theory (Appendix D) (Pappas, 2013). In this theory, Knowles posits adult learners are involved, draw from experience, have the readiness to learn relevant to their personal developmental tasks of their social role, and are problem-centered (Merriam, Baumgartner, & Caffarella, 2007). Consistent with this theory, the recruited participants were assessed for their level of lived experiences with injection drug use, wounds related to injection drug use, and types of treatment rendered to wounds (either professional medical treatment or self-treatment). This information was assessed via a participant questionnaire and helped to establish the basis for the learning activity implemented in the basic wound care education intervention. According to Knowles' theory, participants were more likely to be engaged in learning basic wound care education since it had an immediate impact on their personal lives.

Implementation Framework

In addition to the adult learning theory, the Star Model of Knowledge Transformation helped to guide the implementation of this project (Appendix E) (Stevens, 2013). This evidence-

based practice (EBP) model helps to transform knowledge into decision making through the five stages of discovery research, evidence summary, translation to guidelines, practice integration, and outcome evaluation (Stevens, 2012). Since healthcare is presumed to be based on the most recent knowledge, the Star Model incorporates both old and new concepts (Stevens, 2012). This model paired well with the adult learning theory since adult learners draw from experiential knowledge. In the application of this EBP model to this project, step one involved a literature search that produced a critical appraisal of ten applicable studies that led to step two of summarizing the evidence discovered. This summary led to the conclusion of a community-based intervention to reach PWID. Step three involved designing a health literate wound care education intervention in the form of a PowerPoint presentation and wound care pamphlet containing pictorial instructions. The intervention focused on the recognition, signs and symptoms, treatment, and prevention of abscesses and cellulitis. Step four involved the implementation of the project, including the measurement of pre and post intervention confidence levels. The final step included the collection, analyzation, and synthesis of data to evaluate the process outcome.

Methods

A correlational design was used to answer the following project questions: In community lay workers, do confidence levels of delivering basic wound care education to PWID increase after receiving a wound care education intervention? In community lay workers, do confidence levels of delivering wound care kits increase after receiving a wound care education intervention? Do confidence levels increase after two weeks post education intervention? Do confidence levels increase after four weeks post education intervention?

Ethics

High ethical standards were utilized in the design of basic wound care education intervention materials, the recruiting and consenting of participants, and the safe handling of collected data. The wound care brochure (Appendix F) was designed without medical jargon, and utilized relevant illustrations, short sentences, and a conversational style of writing in order to maintain health literacy (Badarudeen & Sabharwal, 2010). The information included on the wound care brochure was the same information contained on the wound care educational PowerPoint. All materials were supplied in English including the recruitment script, consent, wound education participant questionnaire, and pre and post wound education survey. All written materials were kept in a folder and out of plain view when not in use and were stored in a secure location in a locked file drawer. All data collected on paper (including consents, demographics, and pre and post surveys) was scanned into computer files on the Arizona State University secure server and password protected. Once scanned, the papers were immediately shredded. Participant identification remained anonymous and was linked via a reproducible identification in which participants were instructed to pick the first three letters of their mother's name and the last four digits of their telephone number. This anonymous identification was used to collect and analyze data.

Approvals. Site approval (Appendix G) was received from the agency executive director. The agency did not require internal IRB approval. Arizona State University IRB approval (Appendix H) of this project along with all educational materials used, methods, data collection procedures, compensation to participants, privacy and confidentiality, and training were received. There was no approval needed for the use of the adapted new general self-efficacy scale (Chen, Gully, & Eden, 2001).

Project risks and benefits. There were no foreseeable risks to participants noted in this project. Participant benefits included learning evidenced based wound care education for themselves, thus increasing their confidence in wound recognition, basic treatment of injection related wounds, and utilization of a wound care kit. Participants were compensated for their participation with a $5.00 gift card to a local fast food restaurant after the initial visit, week two visit, and week four visit. Funding was provided by a stipend provided through a federal Health Resources and Services Administration grant.

Recruitment and consent. Potential participants presenting to a harm reduction agency were invited orally to participate utilizing a recruitment script (Appendix I). For those who expressed interest in participating, consent was obtained in a private room at the harm reduction site to protect privacy and maintain confidentiality. Consent was obtained utilizing the implied consent form (Appendix J).

Setting and Organizational Culture

The setting for this project took place at a harm reduction agency site in Kingman, Arizona. This site is one of four main sites located throughout Arizona that advocates for people in Arizona that are affected by drug use. The agency provides community training on overdose, Hepatitis C, and HIV prevention. This agency also provides the only barrier free access to the opioid overdose reversal agent, Naloxone. Their mission is “to end health disparities faced by those made vulnerable by drug use and other high-risk behaviors in Arizona through harm reduction focused education, advocacy, and evidence-based programming” (Sonoran Prevention Works, 2019). The agency executive director and site leader expressed strong enthusiasm for the implementation of the project since there are limited staff members with clinical knowledge. It

was verbalized that wound care education, supplies, and treatment options were a gap in their clients' care; thus, this project was welcomed warmly.

Collaborative Efforts

The evidence within the literature revealed that community-based interventions were successful in reaching PWID. Since this population has high levels of distrust of the medical community due to experiences of stigmatization and marginalization, it was imperative to collaborate with the site leader to increase levels of relationship equity. Open-ended conversations, active listening, and therapeutic presence were used to gain the trust of the site leader and volunteer staff. After trust was established, the site leader then introduced this author to the community. Since the site leader is highly valued within the community, this author was established as trustworthy as well. As a result of this established trust, project recruitment and implementation were successful. The impact of established trust led to open and honest conversations regarding the injection practices of clients. This positive relationship presented the opportunity to deliver education outside of traditional healthcare settings to PWID. Adding increased confidence levels of basic wound care education with the distribution of wound care kits to the range of harm reduction services already available allows this agency to continue to fulfill its mission statement.

Participants

Adults with a current or former injection drug use status, friends, or family members of injection drug users, community educators, or healthcare volunteers were recruited for this project. Inclusion criteria included: age 18 years or older, ability to speak, read, write, and understand English, and the ability to provide consent. There were no exclusion criteria.

Procedures

A wound educational intervention consisting of a 10-minute PowerPoint presentation titled “Wound Care Education: The Basics of What You Need to Know” was developed by this author. The presentation included education on the description, signs and symptoms, treatment, and prevention of injection-related skin or soft tissue infections. A corresponding wound care brochure (Appendix F) was developed containing information from the PowerPoint presentation.

Participant recruitment and project implementation was completed over five weeks. After verbal consent was obtained, participants then filled out a wound education participant questionnaire (Appendix K) that included basic demographic information. Participants then filled out a pre wound education survey (Appendix L) consisting of eight questions regarding confidence levels in providing wound education to peers, the recognition and evidenced-based treatment of skin or soft tissue infections, and the description and delivery of a wound care kit. Next, the wound education PowerPoint was orally presented simultaneously while viewing. The PowerPoint included education on the description, signs and symptoms, treatment, and prevention of injection-related skin or soft tissue infections. At the conclusion of the PowerPoint presentation, the participant then performed a teach back session of wound care education to this author utilizing the wound care brochure (Appendix F) if needed. This author recorded the steps of the education teach back session utilizing the wound teaching checklist (Appendix M). The participant then completed the post wound education survey (Appendix N). Based on the results of the wound teaching checklist (Appendix M) and any question(s) scoring three or less on the post wound education survey (Appendix N) received an immediate focused reteach session.

At week two, participants performed a teach-back session of the wound education to this author utilizing the wound care brochure (Appendix F) if needed. This author recorded the steps of the education teach-back session utilizing the wound teaching checklist (Appendix M).

Participants then filled out a week two wound education survey (Appendix O). Any missing checklist items and question(s) scoring three or less received an immediate focused reteach session again.

At week four, participants performed a teach back session of the wound education to this author utilizing the wound care brochure (Appendix F) if needed. This author recorded the steps of the education teach back session utilizing the wound teaching checklist (Appendix M). Participants then filled out a week four wound education survey (Appendix P). Any missing checklist items and question(s) scoring three or less received an immediate focused reteach session again.

The total time for all three visits was 20 minutes. After each visit, participants received additional copies of the wound care brochure (Appendix F) along with a wound care kit (Appendix Q) to deliver to peers while providing wound care education. Each kit contained small and large gauze pads, alcohol prep pads, band-aids, skin cleansing cloth, and coban. Visit two was scheduled two weeks after the initial visit and visit three was scheduled four weeks after the initial visit.

Outcome Measures

The outcomes measured in this project included confidence levels and teach back performance after receiving a wound care educational intervention, the number of peers that participants provided education to, and the number of wound care kits that were delivered. Confidence levels were measured at the initial visit, week two, and week four visit. Adapted questions from the new general self-efficacy (NGSE) scale developed by Chen, Gully, and Eden (2001) were utilized. This eight-item Likert scale is intended to measure how confident the respondent is that he or she can perform effectively (Chen, Gully, & Eden, 2001). Answers

range from 1 (strongly disagree) to 5 (strongly agree), and the total score is calculated by adding the respondents' answers to each item then dividing the sum by the total number of items on the scale (Stanford University, 2019). The NGSE has demonstrated good internal consistency (α = .87, α =.88, and α =.85) (Chen, Gully, & Eden, 2001). Wound education teach back performance was measured by a 10-item checklist created by the author. The checklist steps followed the flow of the PowerPoint presentation, and the written wound care brochure provided to the participant. Participants could use the written brochure for reference when performing the teach-back steps.

Data Collection and Analysis Plan

All data was collected on paper by this author including demographic information (age, sex, language preference, race/ethnicity, drug user status, time of last drug use, and frequency of wounds related to drug use), wound education survey (pre, post, week two, week four), wound teaching checklist (baseline, week two, week four), the number of peers that participants provided wound care education to, and the number of wound care kits delivered. All data were first entered into an Excel spreadsheet for preservation purposes. Data was then uploaded into Intellectus Statistics™ software with multiple checks for accuracy. Descriptive statistics were used to analyze demographic information, wound education surveys, and wound teaching checklists. The Friedman test was conducted to examine the median total scores of the pre, post, week two, and week four wound education surveys. The total scores for the wound teaching checklist were hand counted for the frequency of scores ranging from 1-6, 7-8, 9, and 10.

Budget

The budget for this project (Appendix R) totaled $2232.16. This included the cost of printed materials, wound care kits, compensation gift cards, and travel expenses. There was funding provided via stipend money provided to this author through a federal Health Resources

and Services Administration grant for participation in the Rural Health Professions Program and Area Health Education Center programs.

Project Results

Demographic Data

A convenience sample (N = 22) of participants was obtained. There was a range of ages among participants (20 to 63 years) with a mean age of 39.18 (SD = 11.13) years. There were 12 (54.55%) females and 10 (45.45%) male participants who all spoke English. There were 19 (86.36%) Caucasians, 2 (9.09%) Hispanics, and 1 (4.55%) Asian. The majority of participants identified as current injection drug users (77.27%) with the time of last injection use within the last day (54.55%). When asked the frequency of wounds related to injection use, 7 (31.82%) responded with "often" or "sometimes." Nearly half of the participants (45.46%) report self-substituting wound care, and most participants (77.27%) reported helping others with self-treatment.

Outcomes

Wound Education Survey. A Friedman test revealed significant results based on an alpha value of 0.05, $\chi^2(3) = 16.07$, $p = .001$, indicating there were significant differences in the median values of the pre-intervention, post-intervention, week two, and week four wound education survey total scores. The average total scores were 31.32 (*SD* = 7.05), 37.18 (*SD* = 3.5), 36.38 (*SD* = 3.67), and 38.86 (*SD* = 2.18) respectively (Appendix T). By week four (*n* = 14), 12 (86%) participants increased their total confidence score, 1 (7%) remained equal, and 1 (7%) decreased (Appendix U). When each question was further analyzed, all participants (*n* = 14) responded as either "agree" or "strongly agree" by week 4 (Appendix V). These findings suggest

that confidence scores increased over time when participants were given a wound education intervention.

Wound Teaching Checklist. A Friedman test revealed insignificant results based on an alpha value of 0.05, $\chi^2(2) = 3.71$, $p = .156$, indicating no significant differences in the median values of post-intervention, week two, and week four wound teaching checklist. Despite the insignificant statistical findings, the total wound teaching checklist scores increased over time (Appendix W). On the first visit, 64% ($n = 22$) of participants successfully completed all 10 steps (Appendix X). In comparison, by week 4, 93% of all participants ($n = 14$) successfully completed all 10 steps (Appendix X). This was an overall increase of 29%. These findings suggest that a participant's ability to perform a wound teach-back increased over time after receiving a wound education intervention.

Wounds Care Kits and Education. Over the course of the project, participants delivered wound care education to a total of 89 peers and distributed a total of 66 wound care kits. These findings demonstrate a participant's ability to disseminate basic wound care education and wound care kits to their peers.

Impact and Sustainability of Project

These findings showed both statistical and clinical significance. Over four weeks, participants were able to increase their confidence levels of disseminating basic wound care education to their peers after receiving a wound care education intervention. This was also reflected in participants' abilities to successfully perform a teach-back session prior to the end of the intervention. Qualitative comments were offered throughout the project as additional displays of confidence. Many participants reported having positive experiences performing teaching to their peers as they distributed the wound care kits. Since the findings were consistent with

increased levels of confidence in participants of this rural harm reduction agency, it would be feasible to provide the same educational intervention to the agency's staff and volunteers at other sites in order to provide sustainability of this project. Since this harm reduction agency has many community partners and additional locations throughout the state this educational intervention could be widely disseminated.

Discussion

This project focused on increasing participant's confidence levels of delivering basic wound education to their peers who inject drugs. The literature indicates that outreach programs that utilize peers with lived experiences injecting drugs are beneficial and effective in lowering mortality rates, combating risky behaviors, and improving overall health (Morgan, Lee, & Sebar, 2015; Stengal et al., 2018; Jozaghi, Lampkin, & Andresen, 2016; Marshall, Dechman, Minichiello, Alcock, & Harris, 2015; Thomson, Lampkin, Maynard, Karamouzian, & Jozaghi, 2017). The evidence also points to the importance of training volunteers with lived experiences in sessions regarding peer education by utilizing their positive peer relationships that potentially foster behavioral changes (Marshall et al., 2015). The internal qualitative data from the harm reduction agency reported many volunteers who staff harm reduction sites have lived experiences injecting drugs and recognizing simple skin infections. However, they often report lacking evidence-based knowledge and confidence to disseminate this information to their peers. Consequently, this project focused on the development of a basic wound care education intervention with the goal of increasing participants' confidence levels when providing education and wound care supplies to their peers. It has been shown that mixed-method strategies delivered over time are effective in increasing knowledge in chronic diseases such as heart failure and diabetes (DeWalt et al., 2012; Kim & Lee, 2016). This knowledge led to the development of an

educational intervention delivered over multiple visits in four weeks while utilizing oral, written, and electronic forms of communication. The written and electronic materials were developed in accordance with recommendations from the Office of Disease Prevention and Health Promotion (2016) to keep the language simple, use pictures to substitute for words, and use shortlists or bulleted points to ensure understanding. Oral communication utilized clear language and a teach-back method to verify understanding (Kim & Lee, 2016). This project demonstrated a clinical and statistical increase in confidence levels as well as an increase in teach-back efficacy. This could be explained by the focused re-teach sessions delivered for any low scoring survey questions or missed steps during the teach-back time. This allowed for an even more targeted approach to ensure complete understanding. Since participant's confidence levels increased regarding providing wound care education and a wound care kit to their peers, this project's findings align with literature evidence of the efficacy of peer-led prevention strategies among people who inject drugs (Callon et al., 2013; Phillips et al., 2012; Summers et al., 2017).

Impacts

Participants. As a result of this project, participants benefited from the wound care education interventions, as evidenced by their increased confidence scores. By week four, all participants scored confidence questions as "agree" or "strongly agree" and nearly all participants successfully completed all ten steps in the teach-back session. They were able to learn evidence-based techniques in recognizing skin and/or soft tissue infections while also understanding the dangers of self-substituted treatment practices. This not only impacts their own health as a person who injects drugs but also potentially impacts the health of their peers. Understanding basic wound care treatments, utilizing the wound care kit supplies, and confidently teaching peers may foster behavior changes in each group (Marshall et al., 2015).

Agency. This project supports the harm reduction agency's mission statement "to end health disparities faced by those made vulnerable by drug use and other high-risk behaviors in Arizona through harm reduction focused education, advocacy, and evidence-based programming" (Sonoran Prevention Works, 2019). Utilizing this educational intervention promotes the use of evidence-based wound care techniques rather than riskier self-substituted ones. This intervention focused on education, which in turn can lead to peer advocacy among people who inject drugs. The significant results at this site could then be disseminated to other sites throughout the state, leading to a more substantial effect on health outcomes within this vulnerable population.

Policy. Since harm reduction strategies encompass an array of options, this project could help to support policy changes within the agency. Currently, there are no policies in place regarding the education of volunteers or employees surrounding wound care or wound care supplies. Yet, this was a verbalized gap from the internal evidence of this project. Knowing this basic wound care education intervention increased confidence scores in community lay workers, it is reasonable to assume the confidence of staff members, whether volunteer or paid, could increase as well. This intervention could easily be introduced at orientation, ongoing staff meetings, or among additional sites.

Limitations

There were noteworthy limitations to this project. The participant demographics were not diverse in ethnicity or language. Most participants were Caucasian, and all spoke English. This limits the generalizability to other ethnicities and languages and did not allow for any variants of cultural sensitivity. Another limitation included study attrition. While the baseline visit recruited 22 participants, only 14 completed the study. While this still showed statistical significance, the

varied population size prevented further statistical analysis. Additionally, while the survey tool was considered valid and reliable, the teach-back checklist tool was not. There were no attempts to further identify validity and reliability. More research needs to be completed in implementing this intervention in diverse ethnicities, languages, and locations.

Conclusion

People who inject drugs often substitute self-treatment practices that are not evidence-based. This, in turn, can lead to poorer health outcomes, increased emergency room visits, and prolonged hospital admissions. The future desired state is that wounds related to injection drug use be prevented. Through education, harm reduction strategies help to protect the health of those not yet ready to stop injecting drugs. Findings from this project found that when community lay workers are provided a basic wound care education intervention through a targeted, mixed media approach, they can confidently teach their peers this harm reduction strategy. This supports the literature findings that peer-led programs are beneficial in reaching this vulnerable population. Empowering community lay workers to provide educational harm reduction strategies helps to reach people who inject drugs outside of the traditional healthcare setting. Meeting them there serves not only as a health promotion strategy but also as a preventative health measure.

References

Badarudeen, S., & Sabharwal, S. (2010). Assessing readability of patient education materials: Current role in orthopaedics. *Clinical Orthopaedics and Related Research, 468*(10), 2572-2580. doi: :10.1007/s11999-010-1380-y

Bluthenthal, R., Wenger, L., Chu, D., Bourgois, P., & Kral, A. (2017). Drug use generations and patterns of injection drug use: Birth cohort differences among people who inject drugs in Los Angeles and San Francisco, California. *Drug and Alcohol Dependence, 175*, 210-218. doi: 10.1016/j.drugalcdep.2017.04.001

Boucher, L.M., Marshall, Z., Martin, A., Larose-Hebert, K., Flynn, J.V., Lalonde, C., …Kendall, C. (2017). Expanding conceptualizations of harm reduction: Results from a qualitative community-based participatory research study with people who inject drugs. *Harm Reduction Journal, 14*(18), 1-18. doi: 10.1186/s12954-017-0145-2

Callon, C., Charles, G., Alexander, R., Small, W., & Kerr, T. (2013). 'On the same level': Facilitators' experiences running a drug user-led safer injecting education campaign. *Harm Reduction Journal, 10*(1), 4. doi: 10.1186/1477-7517-10-4

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*(1), 62-83. doi: 10.1177/109442810141004

Ciccarone, D., Unick, G., Cohen, J., Mars, S., & Rosenblum, D. (2016). Nationwide increase in hospitalizations for heroin related soft tissue infections: Associations with structural market conditions. *Drug and Alcohol Dependence, 163*, 126-133. doi: 10.1016/j.drugalcdep.2016.04.009

Dahlman, D., Håkansson, A., Kral, A. H., Wenger, L., Ball, E. L., & Novak, S. P. (2017). Behavioral characteristics and injection practices associated with skin and soft tissue

infections among people who inject drugs: A community-based observational study. *Substance Abuse, 38*(1), 105–112. doi: 10.1080/08897077.2016.1263592

DeWalt, D. A., Schillinger, D., Ruo, B., Bibbins-Domingo, K., Baker, D. W., Holmes, G. M., . . . Pignone, M. (2012). Multisite randomized trial of a single-session versus multisession literacy-sensitive self-care intervention for patients with heart failure. *Circulation, 125*(23), 2854-2862. doi:10.1161/CIRCULATIONAHA.111.081745

Fink, D. S., Lindsay, S. P., Slymen, D. J., Kral, A. H., & Bluthenthal, R. N. (2013). Abscess and self-treatment among injection drug users at four California syringe exchanges and their surrounding communities. *Substance Use & Misuse*, *48*(7), 523–531. doi: 10.3109/10826084.2013.787094

Harris, R., Richardson, J., Frasso, R., & Anderson, E. (2018a). Experiences with skin and soft tissue infections among people who inject drugs in Philadelphia: A qualitative study. *Drug and Alcohol, 187,* 8-12. doi: 10.1016/j.drugalcdep.2018.01.029

Harris, R., Richardson, J., Frasso, R., & Anderson, E. (2018b). Perceptions about supervised injection facilities among people who inject drugs in Philadelphia. *International Journal of Drug Policy, 52,* 56-61. doi: 10.1016/j.drugpo.2017.11.005

Ivan, M., Rodgers, C., Maher, L., & van Beek, I. (2016). Reducing injecting-related injury and diseases in people who inject drugs: Results from a clinician-led brief intervention. *Australian Family Physician*, *45*(3), 129–133. Retrieved from https://www.racgp.org.au/afp/2016/march/reducing-injecting-related-injury-and-diseases-in-people-who-inject-drugs-results-from-a-clinician-led-brief-intervention/

Jackson, K. A., Bohm, M. K., Brooks, J. T., Asher, A., Nadle, J., Bamberg, W., …See, I. (2018). Invasive methicillin-resistant staphylococcus aureus infections among persons who inject

drugs — Six sites, 2005–2016. *Morbidity and Mortality Weekly Report, 67,*625–628. Retrieved from https://www.cdc.gov/mmwr/volumes/67/wr/mm6722a2.htm?s_cid=mm6722a2_x

Jozaghi, E., Lampkin, H., & Andresen, M. (2016). Peer-engagement and its role in reducing the risky behavior among crack and methamphetamine smokers of the downtown eastside community of Vancouver, Canada. *Harm Reduction, 13*(19), 1-9. doi: 10.1186/s12954-016-0108-z

Kaushik, K., Kapila, K., & Praharaj, A.K. (2011). Shooting up: The influence of microbial infections and drug abuse. *Journal of Medical Microbiology, 60,* 408-422. doi: 10.1099/jmm.0.027540-0

Kim, S. H., & Lee, A. (2016). Health-literacy-sensitive diabetes self-management interventions: A systematic review and meta-analysis: Health-literacy-sensitive diabetes interventions. *Worldviews on Evidence-Based Nursing, 13*(4), 324-333. doi:10.1111/wvn.12157

Krug, A., Hildebrand, M., & Sun, N. (2015). "We don't need services. We have no problems": Exploring the experiences of young people who inject drugs in accessing harm reduction services. *Journal of the International AIDS Society, 18*(2Suppl1). doi:10.7448/IAS.18.2.19442

Marshall, Z., Dechman, M.K., Minichiello, A., Alcock, L., & Harris, G.E. (2015). Peering into the literature: A systematic review of the roles of people who inject drugs in harm reduction initiatives. *Drug and Alcohol Dependence, 151*, 1-14. doi: 10.1016/j.drugalcdep.2015.03.002

Melnyk, B.M., & Fineout-Overholt, E. (2015). *Evidence-based practice in nursing & healthcare: A guide to best practice* (3rd ed.). Philadelphia, PA: Wolters Kluwer

Merriam, S., Baumgartner, L., & Caffarella, R. (2007). *Learning in adulthood a comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass

Morgan, K., Lee, J., & Sebar, B. (2015). Community health workers: A bridge to healthcare for people who inject drugs. *International Journal of Drug Policy, 26*, 380-387. doi: 10.1016/j.drugpo.2014.11.001

National Institute on Drug Abuse. (2015). Nationwide Trends. Retrieved from https://www.drugabuse.gov/publications/drugfacts/nationwide-trends

National Safety Council. (2019). Injury facts: Odds of dying. Retrieved from https://injuryfacts.nsc.org/all-injuries/preventable-death-overview/odds-of-dying/

Pappas, C. (2013). The adult learning theory- andragogy- of Malcolm Knowles. Retrieved from https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles

Phillips, K., Stein, M., Anderson, B., & Corski, K. (2012). Skin and needle hygiene intervention for injection drug users: Results from a randomized, controlled Stage 1 pilot trial. *Journal of Substance Abuse Treatment, 43*(3), 313-321. doi: 10.1016/j.jsat.2012.01.003

Ritchie, H., & Roser, M. (2019). Substance use. Retrieved from https://ourworldindata.org/substance-use

Robinowitz, N., Smith, M. E., Serio-Chapman, C., Chaulk, P., & Johnson, K. E. (2014). Wounds on wheels: Implementing a specialized wound clinic within an established syringe exchange program in Baltimore, Maryland. *American Journal of Public Health, 104*(11), 2057–2059. doi:10.2105/AJPH.2014.302111

Ronan, M. V., & Herzig, S. J. (2016). Hospitalizations related to opioid abuse/dependence and associated serious infections increased sharply, 2002-12. *Health Affairs*, *35*(5), 832–837. doi: 10.1377/hlthaff.2015.1424

Roux, P., LeGall, J., Debrus, M., Protopopescu, C., Ndiaye, K., Demoulin, B., …Carrieri, M. (2016). Innovative community-based educational face-to-face intervention to reduce HIV, hepatitis C virus and other blood-borne infectious risks in difficult-to-reach people who inject drugs: Results from the ANRS–AERLI intervention study. *Addiction, 111*(1), 94-106. doi: 10.1111/add.13089

Sonoran Prevention Works. (2019). Our mission. Retrieved from https://spwaz.org/

Stanford University. (2019). New general self-efficacy scale. Retrieved from http://sparqtools.org/mobility-measure/new-general-self-efficacy-scale/#all-survey-questions

Stengal, C.M., Mane, F., Guise, A., Pouye, M., Sigrist, M, & Rhodes, T. (2018). "They accept me because I was one of them": Formative qualitative research supporting the feasibility of peer-led outreach for people who use drugs in Dakar, Senegal. *Harm Reduction Journal, 15*(9), 1-12. doi:10.1186/s12954-018-0214-1

Stevens, K. R. (2013). The impact of evidence-based practice in nursing and the next big ideas. *OJIN: The Online Journal of Issues in Nursing, 18*(2). doi: 10.3912/OJIN.Vol18No02Man04

Summers, P., Struve, I., Wilkes, M., & Rees, V. (2017). Injection-site vein loss and soft tissue abscesses associated with black tar heroin injection: A cross sectional study of two distinct populations in USA. *International Journal of Drug Policy, 39*, 21-27. doi: 10.1016/j.drugpo.2016.08.006

Summers, P. J., Hellman, J. L., MacLean, M. R., Rees, V. W., & Wilkes, M. S. (2018). Negative experiences of pain and withdrawal create barriers to abscess care for people who inject

heroin. A mixed methods analysis. *Drug & Alcohol Dependence, 190*, 200–208. doi: 10.1016/j.drugalcdep.2018.06.010

Thakarar, K., Weinstein, Z., & Walley, A. (2016). Optimizing health and safety of people who inject drugs during transition from acute to outpatient care: Narrative review with clinical checklist. *Postgraduate Medical Journal, 92*(1088), 356-363. doi: 10.1136/postgradmedj-2015-133720

The Office of Disease Prevention and Health Promotion. (2016). Health literacy online: A guide for simplifying the user experience. Retrieved from https://health.gov/healthliteracyonline/

Thomson, E., Lampkin, H., Maynard, R., Karamouzian, M., & Jozaghi, E. (2017). The lessons learned from the Fentanyl overdose crisis in British Columbia, Canada. *Addiction, 112*(11), 2068-2070. doi: 10.1111/add.13961

Tookes, H., Diaz, C., Li, H., Khalid, R., & Doblecki-Lewis, S. (2015). A cost analysis of hospitalizations for infections related to injection drug use at a county safety-net hospital in Miami, Florida. *PLoS One, 10*(6), e0129360. doi: 10.1371/journal.pone.0129360

U.S. Department of Health and Human Services. (2018). Facing addiction in America: The surgeon general's spotlight on opioids. Retrieved from https://addiction.surgeongeneral.gov/sites/default/files/OC_SpotlightOnOpioids.pdf

Wurcel, A., Burke, D., Skeer, M, Landy, D., Heimer, R., Wong, J., …Stopka, T. (2018). Sex work, injection drug use, and abscesses: Applications in women, but not men. *Drug and Alcohol Dependence, 185*, 293-297. doi: 10.1016/j.drugalcdep.2017.12.028

Appendix A

Table 1

Evaluation Table for Qualitative Studies

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/Setting	Major Themes Studied/ Definitions	Measurement	Data Analysis	Findings/ Themes	Decision for Use
Boucher et al., (2017). Expanding conceptualizations of harm reduction: Results from a qualitative community-based participatory research study with people who inject drugs **Country**: Canada **Funding**: Canadian Institutes of Health Research and Social Research Centre for HIV Prevention **Bias:** None listed	Rhodes' risk environment framework	**Design**: phenomenological **Purpose:** Explore how PWID think about and practice daily HR strategies	**N=**24 **M**:14 **F**:9 **MA**: 50 years **Median time injecting drugs:** 29 years **Attrition**: 1 **Setting**: Private rooms in 3 community health centers **Sample**: Street based purposive sampling **Inclusion criteria**: 18 years old, live in Ottawa, self-identify as PWID in last 12 months	**Themes:** Q1-Why do PWID use HR strategies? Q2- What types of HR strategies were used? Q3- What is an obstacle to performing HR strategy? **Definitions**: PRA (Peer research associates)- Researchers with lived experiences of current or past drug use HR- The ways you reduce risks in your routines as an injection drug user	**Measurement** Semi-structured interviews by PRA with interview guide, Vidaview Life Story Board, audio recorder	Qualitative content analysis Triangulation Credibility ensured through consistency criterion of reliability	Q1- HR strategies expand beyond health and social service use Q2-HR strategies were multidimensional Q3- Structural factors inhibited or promoted use of HR strategies	**LOE**: VI **Strengths**: Culturally interpreted results **Limitations**: difficulty drawing temporal references based on injection use timeline, unclear answers preventing confident interpretation, PRAs and participants knew each other **Application**: One size does not fit all in HR strategies, de-medicalizing services to improve relevancy to everyday life, need to increase health and social services to PWID

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/Setting	Major Themes Studied/ Definitions	Measurement	Data Analysis	Findings/ Themes	Decision for Use
Harris et al., (2018a). Experiences with skin and soft tissue infections among people who inject drugs in Philadelphia: A qualitative study **Country**: United States **Funding**: University of Pennsylvania Schools of Nursing and Public Health **Bias**: None reported	Inferred to be the Health Belief Model	**Design**: Phenomenological **Purpose**: To understand how PWID experience SSTI	**N**= 19 **M**: 9 **F**: 10 **MA**: 39 years **Median time injecting drugs**: 14 years **Attrition**: 0 **Setting**: SEP in Philadelphia **Sample**: Purposive sampling **Inclusion criteria**: None stated	**Themes**: Q1- Understand how PWID experience SSTI Q2-Decision making process to seek medical treatment Q3- Decision making process to delay medical treatment	Semi structured interviews by trained nurse practitioners with interview guide, audio recorder	Qualitative Content Analysis	Q1- Exhibited basic knowledge of SSTIs Q2- Barriers to applying knowledge and experiences with clinical care Q3- Substituted self-care	**LOE**: VI **Strengths**: Sampling was drawn from SEP that is known to provide HR interventions **Limitations**: Small sample with no inclusion/exclusion criteria **Application**: Despite knowledge of SSTIs, there are structural factors that delay seeking treatment causing risky self-care; shows need to train medical staff to minimize stigma when PWID seek treatment

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Citation	Theory/ Conceptual Framework	Design/ Method	Sample/Setting	Major Themes Studied/ Definitions	Measurement	Data Analysis	Findings/ Themes	Decision for Use
Ivan et al., (2016). Reducing injecting-related injury and diseases in people who inject drugs: Results from a clinician-led brief intervention **Country**: Australia **Funding**: None stated **Bias**: None stated	Inferred to be Physiologic Theory	**Design**: Phenomenological (before and after study) **Purpose**: To assess the impact of a clinician-led intervention and demonstration of safer injecting techniques	**N**= 45 **M**: 34 **F**: 24 **MA**: 35 **Attrition**: 13 (22%) **Setting**: a targeted primary healthcare facility **Sample**: Convenient sampling **Inclusion criteria**: all patients who self-identified as PWID and underwent serological testing	**Themes**: Injecting behaviors **Definitions**: Injecting behaviors: never missed vein, did not cleanse hands, applied tourniquet firmly, applied pressure to stop bleeding for 1-2 minutes	Surveys administered by clinicians at facility (Intervention performed by clinician during routine serological testing)	A McNemar test for paired proportions using Stata12 software	Never missed vein: before (14) after (250 Did not cleanse hands: before (14) after (7) Applied tourniquet firmly: before (11) after (17) Applied pressure for 1-2 minutes: before (6) after (15)	**LOE**: VI **Strengths**: Provides initial evidence that intervention led to safer injection techniques, costs associated with intervention were negligible, intervention easily incorporated into routine practice **Limitations**: small sample size, self-reported data, may not be generalizable to bigger demographic, did not include comparison group **Application**: clinicians can perform intervention with routine care causing no extra work for clinician or patient

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Citation	Theory/ Conceptual Framework	Design/ Method	Sample/Setting	Major Themes Studied/ Definitions	Measurement	Data Analysis	Findings/ Themes	Decision for Use
Krug et al., (2015). "We don't need services. We have no problems": exploring the experiences of young people who inject drugs in accessing harm reduction services **Country**: 14 countries (Indonesia, Kenya, Kyrgyzstan, Lebanon, Mauritius, Mexico, Nepal, Nigeria, Portugal, Romania, Slovenia, Ukraine, United States, Vietnam) **Funding**: United Nations Joint Programme on HIV/AIDS (UNAIDS) **Bias**: Recall bias and respondent bias caused by self-reporting	Inferred to be Health Belief Model	**Design**: Phenomenological **Purpose**: To better understand how young PWID experience accessing a comprehensive package of harm reduction	**N**= 132 **M**: 97 **F**: 34 **Genderqueer:** 1 **Ages:** 18-20 (n=49) 21-25 (n=63) 26-30 (n=20) **Attrition**: 0 **Setting**: different settings depending on the country (outdoors on the street/offices) **Sample**: Combined criteria and maximum variation sampling strategy **Inclusion criteria**: experience injecting drugs under the age of 18, age range 18-30 **Exclusion criteria**: Under the age 18	**Themes**: Barriers to accessing comprehensive harm reduction package **Definitions**: Comprehensive harm reduction package: needle/syringe programs, opiate substitution therapy, HIV testing/counseling, Antiretroviral therapy, STD prevention/condom distribution, prevention viral hepatitis, prevention tuberculosis	Community consultations administered by local youth RISE members (-semi structured discussion guide and facilitator guide)	Collaborative qualitative data analysis with inter-rater reliability	Initiation to injecting drugs: age 15-18 Structural barriers- age and fear Social barriers-fear of being exposed as PWID Lack of youth friendly services Lack of information and risk perception Require support beyond the HR package	**LOE**: VI **Strengths**: Consistency of responses across all 14 countries **Limitations**: difficulty recruiting participants due to fear of exposure, no process to verify if injected under the age of 18, **Application**: Reaching young people before they start injecting is an opportunity to prevent initiation of injecting, identified needed area of education

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Appendix B

Table 2

Evaluation Table for Quantitative Studies

Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Dahlman et al., (2017). Behavioral characteristics and injection practices associated with skin and soft tissue infections among people who inject drugs: A community based observational study **Country:** United States **Funding:** National Institute on Drug Abuse **Bias**: None stated	Inferred to be Health Belief Model	**Design**: Observational study **Purpose**: To investigate whether behavioral factors related to skin/equipment hygiene/injection practices are associated with SSTIs among PWID	**N**= 201 **M:** 155 **F**: 46 **MA**: 44 Targeted sampling **Setting**: Community field sites in San Francisco **Inclusion Criteria**: Injection drug use in the past 30 days, 18 years or older **Attrition**: 0	**IV**: Injection and hygiene practices **DV**: SSTI in past 30 days	Surveys were read to participants by trained staff and participants entered answers (coded) into computer	Chi square test for dichotomous variables and Mann-Whitney tests for testing means between bivariate groups for continuous variables	SSTIs in the last 30 days were associated with: -Needle licking (OR= 3.36, 95% CI, *p* =.01) -Infrequent skin cleansing prior to injection (OR= 2.47, 95% CI, *p* = .04) -syringe needle sharing (OR=7.97, 95% CI, *p* <.001) -injection of non-powder drugs (OR= 3.57, 95% CI, *p* = .01) -being injected by another person (OR= 2.63, 95% CI, *p* = .04)	**LOE:** VI **Strengths**: Findings support importance of sterile syringes **Limitations**: sample only from San Francisco, SSTIs based on self-report, possible under reporting due to embarrassment, small sample size **Application:** SSTI prevention can focus on education of safer injection practices, SSTIs are preventable based on injection behaviors

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Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Phillips et al., (2012). Skin and needle hygiene intervention fro injection drug users: results from a randomized, controlled stage I pilot trial. **Country:** United States **Funding:** National Institute on Drug Abuse **Bias**:	Information-Motivation-Behavioral skills	**Design**: Randomized controlled trial **Purpose**: Evaluate the feasibility of teaching a skin and needle cleaning skill to IDUs	**N**=48 **M:** 36 **F:** 12 **MA**: 43 **Setting**: research office at study site **Inclusion Criteria**: 18 years or >, injection of heroin in last week and last 3 months, visible track marks/puncture sites, + urine drug screen for heroin **Exclusion criteria**: actively psychotic, unable to provide emergency contact information for at least 2 people for follow up, plans to move out of the area **Attrition**: 15% at 6 month follow up	**IV**: educational intervention **DV**: skin and needle cleansing behaviors	Structured interview with some questions asked via Audio Computer Assisted Self-Interview Skin and needle cleansing behavioral skills were videotaped (4 times total--at baseline prior to training with intervention, at baseline after training, after 1 month follow up, and after 6 months follow up Bacterial Infections Risk Scale for Injectors (BIRSI)	Descriptive statistics, *t* test, Cox regression	Participants randomized to the intervention had significantly larger improvements on the skin cleansing demonstration between baseline and 6 month follow up (t = 3.21, p = .003) Participants randomized to the intervention had 15.4% improvement on the needle cleansing demonstration at 6 months follow up compared to 2.8% improvement of control group	**LOE:** I **Strengths**: first study to evaluate whether IDUs could be instructed in skin cleansing skills and retain skills to lower risk of infection **Limitations**: Provision of transportation for participants, financial incentive for participants, small sample size, only heroin injectors **Application:** Serves as a brief intervention to reduce bacterial and viral contaminants associated with IDU

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Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Roux et al., (2015). Innovative community-based educational face-to face intervention to reduce HIV, hepatitis C virus and other blood-borne infectious risks in difficult-to-reach people who inject drugs: Results fro the ANRS-AERLI intervention study **Country:** France **Funding:** French National Agency for Research for AIDS and Hepatitis **Bias**: social desirability bias based on self-reporting history	Self-Determinant Theory	**Design**: non-randomized clustered intervention **Purpose**: Determine the impact of an education intervention on unsafe injection practices in terms of infectious diseases and venous damage in PWID	**N**=240 **n**= 144 (intervention group) **n**=127 (control group) **M:** 187 **F:** 53 **MA**:30 **Setting**: Drug users' services community centers **Inclusion Criteria**: 18 years or older, injected drugs at least once in the past week, willing to provide follow up via telephone call **Exclusion criteria**: pregnant women **Attrition**: intervention group: 38 (34%) and control group: 35 (28%) at month 6 and 69 (61%) and	**IV**: educational intervention **DV**: complication at injection site	Computer assisted telephone interviews administered by interviewer not involved in educational services. Interviews at inclusion, 6 months and 12 months	2 step Hickman model	Exposure to the educational intervention at least once was associated with at least one less complication at the injection site at month 12 (95% CI, $p < .05$)	**LOE:** III **Strengths**: supervised by trained community staff or medical professional, supervision helped to decrease stigma **Limitations**: self-reported history, non-randomized clustering, high levels of homogeneity, high attrition rates **Application:** Intervention is not costly and can be implemented in many contexts where PWID receive help for injection

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			56 (44%) at month 12. **Definitions:** Complications at the injection site- bruise, abscess, edema, burn, infection, necrosis at least once in the prior 4 weeks					
Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Summers et al., (2017). Injection-site vein loss and soft tissue abscesses associated with black tar heroin injection: A cross-sectional study of two distinct populations in the USA **Country:** United States **Funding:** None reported **Bias**: Potential bias of results to PWID who regularly engage in HR services	Physiologic Theory	**Design**: Cross-sectional study **Purpose**: To determine if differing populations of PWID had higher rates of abscesses and vein loss based on type of heroin injected	**N**=145 **n**= 71 from Sacramento **n**=74 from Boston/Cambridge **Setting**: PWID in Sacramento, CA and Boston/Cambridge, MA who were engaged in services at a HR facility **Inclusion Criteria**: Self-reported heroin injection in the preceding month	**IV**: Type of heroin injected (Black tar versus powder) **DV1**: abscess formation **DV2:** Vein loss	Structured surveys administered in a one on one interview	*t*-tests for continuous data, Chi-squared tests for categorical data, Multivariate regression models, Linear regression models, two-tailed test, and data analyzing software STATA 13	99% participants in Sacramento used black tar heroin 96% participants in Boston/Cambridge used powdered heroin Black tar heroin was independently associated with having increased abscesses (AOR 7.68, 95% CI, *p* <0.001), greater number of injection site vein loss (AOR 1.22, 95% CI, *p* 0.022),	**LOE:** VI **Strengths**: Generates many new hypotheses regarding modifiable risk factors including health outcomes **Limitations**: Survey responses not recorded, causation cannot be determined, relatively small sample sizes **Application:** Can target HR interventions specifically to PWID where black tar heroin is prevalent

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

	Exclusion criteria: Inability to speak English fluently, and < 18 years old **Attrition**: Every participant who agreed to participate completed the survey, but response rates not recorded **Definitions**: Injection site vein loss- occlusion of a vein previously used for injection Abscess- painful, hot, swollen skin with pus inside Soft tissue injection- episode of injecting not intravenously	and soft tissue injection when difficulty accessing vein (AOR 4.68, 95% CI, *p* 0.001)

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Summers et al., (2018). Negative experiences of pain and withdrawal create barriers to abscess care for people who inject heroin. A mixed methods analysis. **Country:** United States **Funding:** University of California, Davis medical student research grant **Bias**: recall bias potential due to retrospective and cross-sectional data	Health belief Model and Conceptual Model of Medical Care Avoidance	**Design**: Mixed methods **Purpose**: to better understand factors associated with delayed care in PWIH	**Quantitative** **N**=145 **MA**: 46 **M:** 108 **F:** 37 Convenience sampling **Setting**: needle exchange facilities **Qualitative** **N**=12 Purposive sampling **Setting**: Private rooms within a harm reduction agency **Inclusion Criteria**: actively using heroin in the last month **Exclusion criteria**: non-English speaking, < 18 years old **Attrition**: none reported	**IV**: PWIH **DV**: Factors in delaying care	**Quantitative**: Multiple choice survey read to participants **Qualitative**: Interviews conducted by researchers with semi-structured script	Microsoft Excel database analyzed in Stata 13 Thematic analysis approach	Experience, aversion to, and fear of opioid withdrawal Inadequately addressed acute pain	**LOE:** V **Strengths**: identified bidirectional mistrust between PWIH and providers and need for increased education to providers in how to reduce stigma of PWIH **Limitations**: small sample size from two separate populations in different geographic location **Application:** Pain and withdrawal can be safely managed if stigma is reduced, treatment protocols developed, and improving communication

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

			Definitions: Leaving against medical advice- departing from care prior to being medically cleared or discharged Delay- the time when participant felt they needed medical attention but did not seek care					
Citation	Theoretical Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use
Tookes et al., (2015). A cost analysis of hospitalizations for infections related to injection drug use at a county safety-net hospital in Miami, Florida **Country:** United States **Funding:** Infectious Diseases Society of America Medical Scholars Program, Jackson Memorial Hospital Department of Internal Medicine	None stated	**Design**: Retrospective chart review **Purpose**: Estimate the mortality and cost of injection drug use-related bacterial infections over a 12-month period	**N**=349 **M**: 248 **F**: 101 **MA**: 47 **Setting**: Jackson Memorial Hospital **Inclusion Criteria**: patient ages 18-65, ICD-9 codes for illicit drug abuse and medically related infections **Attrition**: 17 died	**IV**: Number of IDUs with SSTIs **DV**: cost of treatment	Chart review	Wilcoxon rank sums test, 2 tailed test, SAS version 9.2 software	Median charge for hospitalization was $39, 896 Adjusted mean for IDUs with endocarditis $180,314, without endocarditis $71, 581 ($p$ <.0001). Cost of treatment for preventable infections was $11.4 million and 17 deaths (with 92% IDUs being uninsured or	**LOE:** V **Limitations**: number of infections underestimated due to inconsistent documentation/ICD-9 coding and under reporting of infections by IDUs **Application:** Costs associated with acute bacterial infections is substantial. Prevention would add to the cost-effectiveness of syringe exchange programs.

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

Resident Scholarly Activity Program **Bias**: potential misclassification bias	**Definitions**: injection drug use related infection-discharge in the last 12 months from inpatient or emergency room with diagnosis of opiate, cocaine, amphetamine, or sedative abuse and diagnosis of endocarditis, sepsis, osteomyelitis, abscesses, or cellulitis	publicly funded insurance

Abbreviation key: **AOR**-adjusted odds ratio, **CI**-confidence interval, **DV**-dependent variable, **F**- female, **HCV**- Hepatitis C Virus, **HIV**- Human Immunodeficiency Virus, **HR**- harm reduction, **ICD-9**-international classification of diseases, ninth edition, **IDU**- injection drug users, **IV**-independent variable, **LOE**- level of evidence, **MA**- mean age, **M**- male, **n**- number of participants in subset, **N**- number of studies (if SR) or number of participants in study, **PWID**- people who inject drugs, **PWIH**- people who inject heroin, **Q**- question, **SEP**- syringe exchange program, **SR**- systematic review, **SSTI**- skin and soft tissue infections

Appendix C

Table 3

Synthesis Table

AUTHOR	Boucher	Dahlman	Harris	Ivan	Krug	Phillips	Roux	Summers	Summers	Tookes
YEAR	2017	2017	2018a	2016	2015	2012	2015	2017	2018	2015
DESIGN/LOE	Phenom/VI	Obs/VI	Phenom/VI	Phenom/VI	Phenom/VI	RCT/I	NRCI/III	CSS/VI	MM/V	RCR/V
DEMOGRAPHICS										
Mean Age (in years)	50	44	39	35	21-25	43	30	40	46	47
% Male	58	77	47	76	73	75	78	71	74	71
Sample size	24	201	19	45	132	48	240	145	145	349
SAMPLE SETTING										
Community center	x	x			x	x	X			
SEP or HR agency			x					x	x	
Primary healthcare center or Hospital				x						x
MEASUREMENT TOOL										
Interview	x		x		x	x	X	x	x	
Survey		x		x				x	x	
Chart review										x
INTERVENTIONS/MAJOR THEMES IDENTIFIED										
Types of HR strategies and barriers to use	x				x					
Poor injection hygiene practices/behaviors		x								
SSTI knowledge/barriers to treatment			x						x	
Structured education on skin/needle cleansing				x		x	X			
Injected Heroin type								x		
PWID hospitalized with SSTI										x

Abbreviation key: **CSS**-cross sectional study, **HR**- harm reduction, **LOE**- level of evidence, **MM**- mixed methods, **NRCI**- non-randomized clustered intervention, **OBS**- observational study, **PHENOM**- phenomenological study, **RCR**- retrospective chart review, **RCT**- randomized controlled trial, **SEP**- syringe exchange program, **SSTI**- skin and soft tissue infection, ↑- increased, ↓- decreased

OUTCOMES										
Multidimensional/structural barriers	x				x					
SSTI/complication at injection site		↑					↓	↑		
Substituted self-care treatment			↑							
Safer injection techniques				↑		↑				
Delayed medical care									↑	
Cost of treatment										↑

Abbreviation key: **CSS**-cross sectional study, **HR**- harm reduction, **LOE**- level of evidence, **MM**- mixed methods, **NRCI**- non-randomized clustered intervention, **OBS**- observational study, **PHENOM**- phenomenological study, **RCR**- retrospective chart review, **RCT**- randomized controlled trial, **SEP**- syringe exchange program, **SSTI**- skin and soft tissue infection, ↑- increased, ↓- decreased

Appendix D

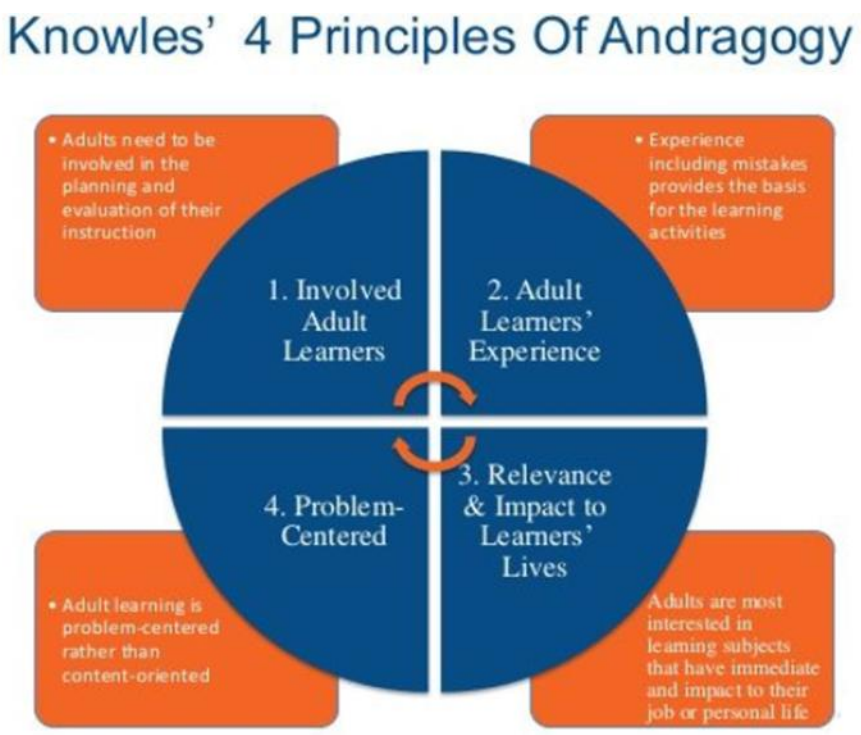


Figure 1. Diagram of Malcolm Knowles' Adult Learning Theory. Reprinted from Christopher Pappas, in eLearning Industry, 2013, Retrieved from https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles. Copyright 2019 by eLearning Industry.

Appendix E

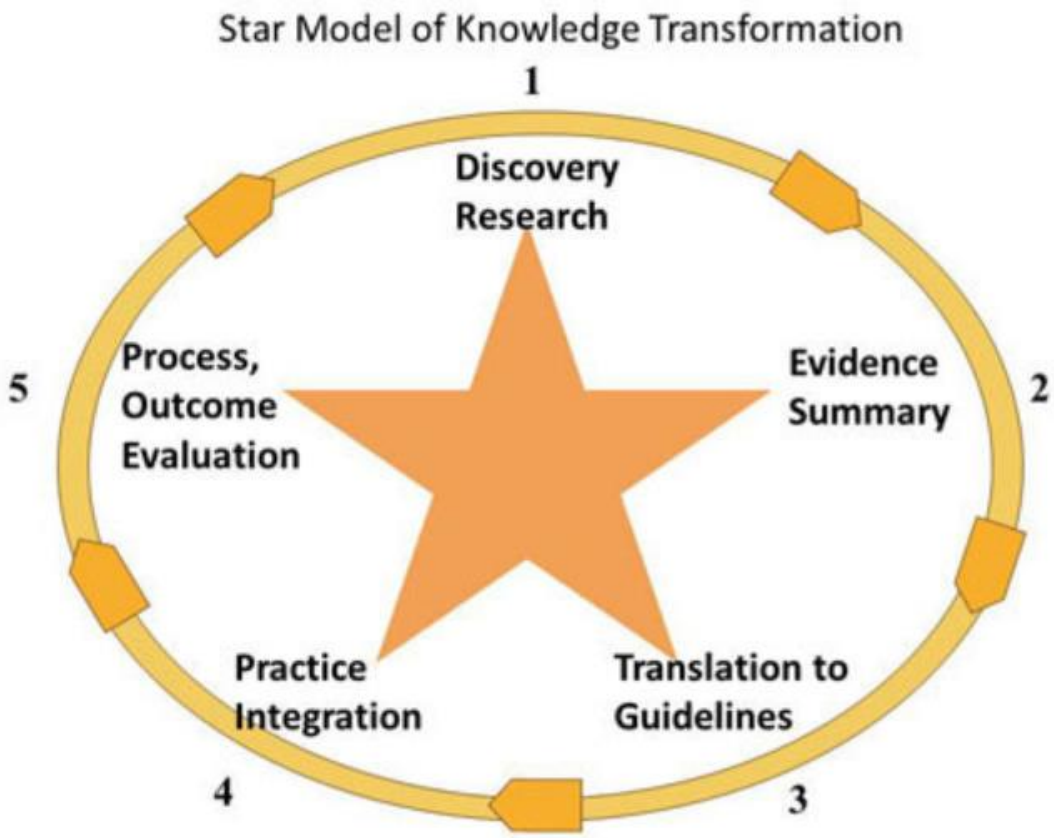
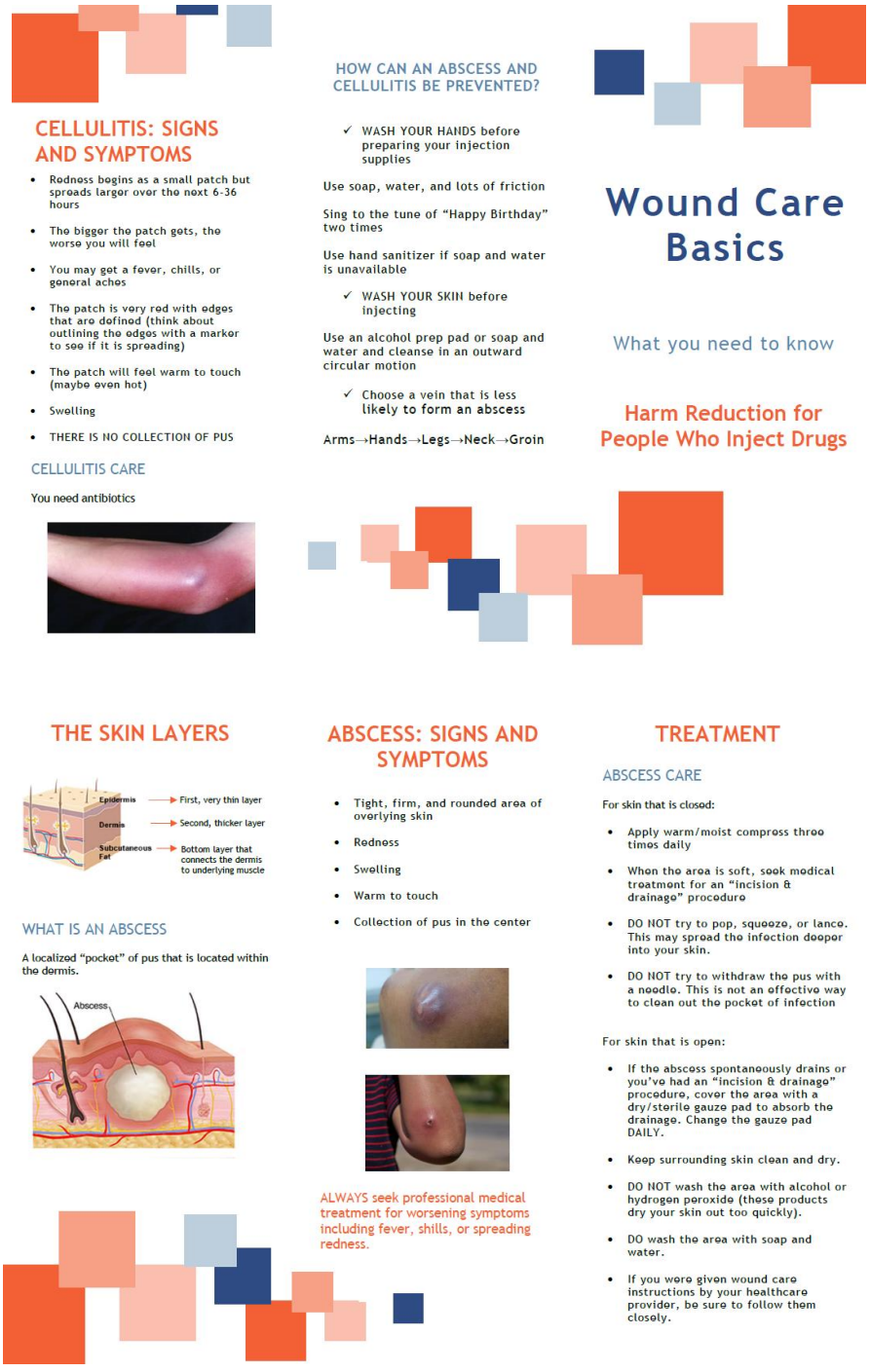


Figure 2. Diagram of the evidence-based practice model ACE Star Model of Knowledge Transformation. Reprinted from "The Impact of Evidence-Based Practice in Nursing and the Next Big Ideas," by K.R. Stevens, 2013, *OJIN: The Online Journal of Issues in Nursing,* 18. Copyright 2004 by Stevens.

Appendix F

Educational Materials

Wound Care Brochure



CELLULITIS: SIGNS AND SYMPTOMS

- Rodness begins as a small patch but spreads larger over the next 6-36 hours
- The bigger the patch gets, the worse you will feel
- You may get a fever, chills, or general aches
- The patch is very red with edges that are defined (think about outlining the edges with a marker to see if it is spreading)
- The patch will feel warm to touch (maybe even hot)
- Swelling
- THERE IS NO COLLECTION OF PUS

CELLULITIS CARE

You need antibiotics

HOW CAN AN ABSCESS AND CELLULITIS BE PREVENTED?

✓ WASH YOUR HANDS before preparing your injection supplies

Use soap, water, and lots of friction

Sing to the tune of "Happy Birthday" two times

Use hand sanitizer if soap and water is unavailable

✓ WASH YOUR SKIN before injecting

Use an alcohol prep pad or soap and water and cleanse in an outward circular motion

✓ Choose a vein that is less likely to form an abscess

Arms→Hands→Legs→Neck→Groin

Wound Care Basics

What you need to know

Harm Reduction for People Who Inject Drugs

THE SKIN LAYERS

Epidermis — First, very thin layer

Dermis — Second, thicker layer

Subcutaneous Fat — Bottom layer that connects the dermis to underlying muscle

WHAT IS AN ABSCESS

A localized "pocket" of pus that is located within the dermis.

Abscess

ABSCESS: SIGNS AND SYMPTOMS

- Tight, firm, and rounded area of overlying skin
- Redness
- Swelling
- Warm to touch
- Collection of pus in the center

ALWAYS seek professional medical treatment for worsening symptoms including fever, shills, or spreading redness.

TREATMENT

ABSCESS CARE

For skin that is closed:

- Apply warm/moist compress three times daily
- When the area is soft, seek medical treatment for an "incision & drainage" procedure
- DO NOT try to pop, squeeze, or lance. This may spread the infection deeper into your skin.
- DO NOT try to withdraw the pus with a needle. This is not an effective way to clean out the pocket of infection

For skin that is open:

- If the abscess spontaneously drains or you've had an "incision & drainage" procedure, cover the area with a dry/sterile gauze pad to absorb the drainage. Change the gauze pad DAILY.
- Keep surrounding skin clean and dry.
- DO NOT wash the area with alcohol or hydrogen peroxide (these products dry your skin out too quickly).
- DO wash the area with soap and water.
- If you were given wound care instructions by your healthcare provider, be sure to follow them closely.

Appendix G

Site Approval

July 22, 2019

To whom it may concern,

On behalf of Sonoran Prevention Works, I am pleased to support the project titled "Improving confidence levels in wound care education: A harm reduction strategy for people who inject drugs" as proposed by Dr. Erin Tharalson and Jodi Bray BSN, RN, graduate student.

Our organization agrees to serve as the project site for wound care education sessions, data collection, distribution of wound care kits, and data analysis.

Thank you for providing the opportunity for Sonoran Prevention Works to be a part of this important project.

Sincerely,

Haley Coles

Executive Director

C: 602-388-9870

hcoles@spwaz.org

Appendix H

Institutional Review Board Approval

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Erin Tharalson
EDSON: DNP
-
Erin.Tharalson@asu.edu

Dear Erin Tharalson:

On 9/5/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Improving confidence levels in wound care education: A harm reduction strategy for people who inject drugs
Investigator:	Erin Tharalson
IRB ID:	STUDY00010601
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• HRP503a_ProtocolTemplateSocialBehavior.docx, Category: IRB Protocol; • ImpliedInformedConsent.pdf, Category: Consent Form; • WoundTeachingChecklist.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • WoundCareBasics_WhatYouNeedToKnow.pdf, Category: Technical materials/diagrams; • PreWoundEducationSurvey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Week2WoundEducationSurvey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Bray_J_CITI Training Certificate.pdf, Category: Other (to reflect anything not captured above); • WoundCareEducation_TheBasicsOfWhatYouNeedToKnow.pdf, Category: Technical materials/diagrams; • (SIGNED)AgencyLetterOfSupport.pdf, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc); • PostWoundEducationSurvey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • WoundCareKit.JPG, Category: Technical materials/diagrams; • Week4WoundEducationSurvey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Week2WoundTeachingChecklist.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Week4WoundTeachingChecklist.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • WoundEducationParticipantQuestionnaire.pdf, Category: Participant materials (specific directions for them); • RecruitmentScript.pdf, Category: Recruitment Materials; • Tharalson_E_(PI) CITI Training Certificate.pdf, Category: Other (to reflect anything not captured above);

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (1) Educational settings, (2) Tests, surveys, interviews, or observation on 9/5/2019.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Jodi Bray
Erin Tharalson
Jodi Bray

Appendix I

Recruitment Script

RECRUITMENT SCRIPT

I am a graduate student under the direction of Dr. Erin Tharalson from the Edson College of Nursing and Health Innovation at Arizona State University. I am conducting a pilot project to evaluate a wound educational program that may improve your confidence in providing basic wound knowledge to your peers.

I am recruiting individuals who would like to learn more about wound recognition, signs and symptoms of wound infection, and basic wound care interventions. Participants will answer 8 questions before and after a brief 10-minute education session. The total time for each visit is approximately 20 minutes and will occur three times over the course of one month. Participants will receive a $5 USD gift card to a local fast food restaurant after the initial visit, week 2 visit, and week 4 visit is completed.

In order to participate, you must be 18 years or older, and be able to read, write, and speak English. Your participation in this study is voluntary. You may choose not to participate in this study or withdraw at any time.

Appendix J

Implied Consent

ID_____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Improving confidence levels in wound care education: A harm reduction strategy for people who inject drugs

Dear Participant,

I am a graduate student under the direction of Professor, Dr. Erin Tharalson, in the Edson College of Nursing and Health Innovation at Arizona State University. I am inviting you to participate in a project regarding increasing your confidence levels of delivering basic wound care education to people who inject drugs.

As part of the project, you will answer an 8-question survey before and after a brief 10-minute education session. The survey will include questions regarding your confidence levels in providing wound care education to your peers, recognizing the symptoms of a skin or soft tissue infection, evidenced-based wound care interventions, and the description and delivery of a wound care kit. After the education session, you will be asked to perform wound care teaching using a wound care brochure that will be provided to you. At the end of the visit, you will be provided a wound care kit to distribute to your peers as you provide wound care education. A follow up visit will occur in 2 and 4 weeks from the initial visit. These follow up visits will consist of filling out the 8-question survey and performing wound care teaching. This information will be used to identify areas where further education is needed. For any areas of knowledge that you are not confident in, a focused re-teach will be provided.

The surveys, education session, wound care brochure, teaching session, and wound care kits will be administered to all recruited participants. The total time for each visit is approximately 20 minutes and will occur three times over the course of one month. There will be additional time to answer any questions you may have regarding the survey.

The information collected will be anonymous. To ensure your anonymity, a reproducible ID will be created by you that will include the first three letters of your mother's name with the last four digits of your phone number. No other identifying information will be recorded in any study materials. The study results could be used in papers, presentations, or publications, but your name will not be reported.

Your participation in the survey is voluntary. You have the right not to answer any questions, skip questions, and to stop participation at any time. If you choose not to participate or withdraw from the study at any time, there will be no penalty. Participants will receive a $5 USD gift card to a local fast food restaurant after the initial visit, week 2 visit, and week 4 visit is completed. To participate, you must be 18 years of age or older, and be able to read, write, and speak English. There is no known risk greater than those that are associated with everyday types of activity.

Completing the surveys will be considered your consent to participate. If you have any questions concerning this program, please contact the following team members:

Dr. Erin Tharalson, DNP, RN, ANP-BC, CWS, ph: 480.206.8076
Jodi Bray BSN, RN, ph: 480-861-2505

This project has been reviewed and approved by the Arizona State University Institutional Review Board. If you have any questions about your rights as a subject/participant in this research, or if you

Appendix K

Wound Education Participant Questionnaire

ID _____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Wound Education Participant Questionnaire

Instructions: Mark your answer with an "X" in the box or write in the space provided.

Age: _____

Sex: ☐ Male
☐ Female

Language preference:
☐ English
☐ Spanish

Race/Ethnicity:
☐ White, non-Hispanic
☐ Hispanic
☐ Black or African American
☐ Asian
☐ Other

Please state your status:
☐ Current injection drug user
☐ Former injection drug user
☐ Family member of injection drug user
☐ Friend of injection drug user
☐ Community educator
☐ Healthcare volunteer

I have used injection drugs within the last:
☐ greater than 10 years
☐ 10 years
☐ 5 years
☐ 1 year
☐ 1 month
☐ 1 week
☐ 1 day
☐ Not applicable: No history of injection drug use

How often have you experienced a wound related to injection drug use?
☐ Always
☐ Often
☐ Sometimes
☐ Rarely
☐ Never
☐ Not applicable: No history of injection drug use

How many times have you ever received professional medical treatment (from a hospital, urgent care clinic, or doctor's office) for a wound related to injection drug use?
☐ none
☐ 1-2
☐ 3-4
☐ 5 or >
☐ Not applicable: No history of injection drug use

How many times have you ever self-treated a wound related to injection drug use without seeking professional medical treatment (from a hospital, urgent care clinic, or doctor's office)?
☐ none
☐ 1-2
☐ 3-4
☐ 5 or >
☐ Not applicable: No history of injection drug use

How many times have you ever helped others self-treat their wounds related to injection drug use?
☐ none
☐ 1-2
☐ 3-4
☐ 5 or >
☐ Not applicable: No history of injection drug use

Appendix L

Pre-Intervention Wound Care Survey

ID_____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Pre Wound Education Survey

Instructions: Please mark your answer with an "X" in the box.

1. I will be able to achieve the goal of teaching my peers basic wound care education.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

2. Even though I am not a wound care expert, I am certain that I will accomplish the goal of providing wound care education to my peers.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

3. In general, I can recognize a skin or soft tissue infection.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

4. I believe I can accurately describe the differences between abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

5. I will be able to successfully recommend evidenced-based treatments for abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

6. I am confident that I can distribute a wound care kit.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

7. I can describe the contents of the wound care kit very well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

8. Even though it may be difficult to teach my peers basic wound care education, I can perform quite well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

Appendix M

Wound Teach Back Checklist

ID _____ Date _____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Wound Teaching Checklist

Instructions: Mark an "X" based on observation.

	Steps	Yes	No
1	Reviewed how abscesses are formed		
2	Reviewed signs and symptoms of an abscess		
3	Reviewed signs and symptoms of cellulitis		
4	Reviewed treatment for an abscess with closed skin		
5	Reviewed treatment for an abscess with open skin		
6	Reviewed treatment for cellulitis		
7	Describes contents of wound care kit		
8	Reviewed techniques to preventing an abscess		
9	Reviewed symptoms of a worsening infection		
10	Reviewed potential complications of delaying professional medical treatment		

Appendix N

Post Intervention Wound Care Survey

ID_____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Post Wound Education Survey

Instructions: Please mark your answer with an "X" in the box.

1. I will be able to achieve the goal of teaching my peers basic wound care education.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

2. Even though I am not a wound care expert, I am certain that I will accomplish the goal of providing wound care education to my peers.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

3. In general, I can recognize a skin or soft tissue infection.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

4. I believe I can accurately describe the differences between abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

5. I will be able to successfully recommend evidenced-based treatments for abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

6. I am confident that I can distribute a wound care kit.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

7. I can describe the contents of the wound care kit very well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

8. Even though it may be difficult to teach my peers basic wound care education, I can perform quite well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

Appendix O

Week 2 Wound Education Survey

ID_____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Week 2 Wound Education Survey

Instructions: Please mark your answer with an "X" in the box.

1. I will be able to achieve the goal of teaching my peers basic wound care education.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

2. Even though I am not a wound care expert, I am certain that I will accomplish the goal of providing wound care education to my peers.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

3. In general, I can recognize a skin or soft tissue infection.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

4. I believe I can accurately describe the differences between abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

5. I will be able to successfully recommend evidenced-based treatments for abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

6. I am confident that I can distribute a wound care kit.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

7. I can describe the contents of the wound care kit very well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

8. Even though it may be difficult to teach my peers basic wound care education, I can perform quite well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

Appendix P

Week 4 Wound Education Survey

ID_____ Date_____
(Please enter the first three letters of your mother's name and the last four digits of your phone number)

Week 4 Wound Education Survey

Instructions: Please mark your answer with an "X" in the box.

1. I will be able to achieve the goal of teaching my peers basic wound care education.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

2. Even though I am not a wound care expert, I am certain that I will accomplish the goal of providing wound care education to my peers.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

3. In general, I can recognize a skin or soft tissue infection.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

4. I believe I can accurately describe the differences between abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

5. I will be able to successfully recommend evidenced-based treatments for abscesses and cellulitis.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

6. I am confident that I can distribute a wound care kit.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

7. I can describe the contents of the wound care kit very well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

8. Even though it may be difficult to teach my peers basic wound care education, I can perform quite well.
☐ Strongly disagree
☐ Disagree
☐ Neither agree nor disagree
☐ Agree
☐ Strongly agree

Appendix Q

Figure 3. Photo of wound care kit contents.

Appendix R

Budget

Direct	Cost
Office Meeting Space	$0 (donated)
Laptop computer	$0 (prior purchase)
Printed Materials	$70.67
Wound Care Kits	$191.49
Gift Cards	$330
Indirect	Cost
Travel expenses	$1640
Subtotal	$2232.16
Funding Available	-$3500
Final Cost	-$1267.84 under budget

Figure 4. Proposed budget for project.

Appendix S

Table 4

Frequency Table for Demographic Data

Variable	Mean	*SD*
Age in years	39.18	11.13
	n	*%*
Sex		
Female	12	54.55
Male	10	45.45
Language		
English	22	100
Race		
Asian	1	4.55
Hispanic	2	9.09
White, non-Hispanic	19	86.36
Status		
Current Injection Drug User	17	77.27
Former Injection Drug User	2	9.09
Family Member of Injection Drug User	9	40.91
Friend of Injection Drug User	11	50
Community Educator	4	18.18
Healthcare Volunteer	4	18.18

Variable	*n*	*%*
Time of last injection use		
10 years	4	18.18
5 years	1	4.55
1 year	1	4.55
1 month	1	4.55
1 day	12	54.55
Not Applicable	3	13.64
Frequency of wound related to injection use		
Often	2	9.09
Sometimes	5	22.73
Rarely	8	36.36
Never	4	18.18
Not Applicable	3	13.64
Number of times professional medical treatment was used		
None	10	45.45
1-2	2	9.09
3-4	3	13.64
5 or more	3	13.64
Not Applicable	3	13.64
Number of times self-treatment was used		
None	5	22.73
1-2	4	18.18
3-4	5	22.73
5 or more	4	18.18
Not Applicable	3	13.64
Number of times helped others with self-treatment		
None	3	13.64
1-2	2	9.09
3-4	7	31.82
5 or more	8	36.36
Not Applicable	1	4.55

Appendix T

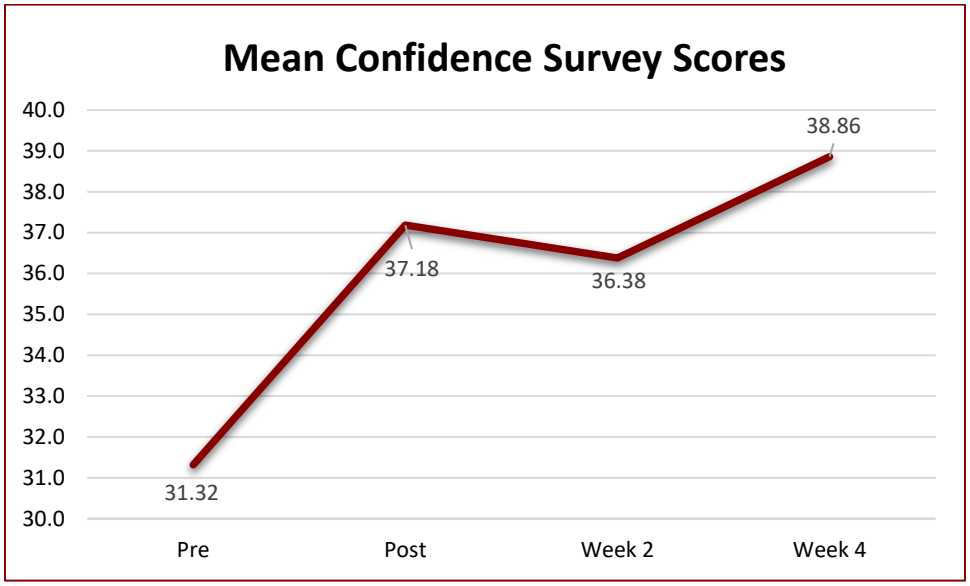


Figure 5. Graph displaying mean total confidence survey scores over multiple visits.

Appendix U

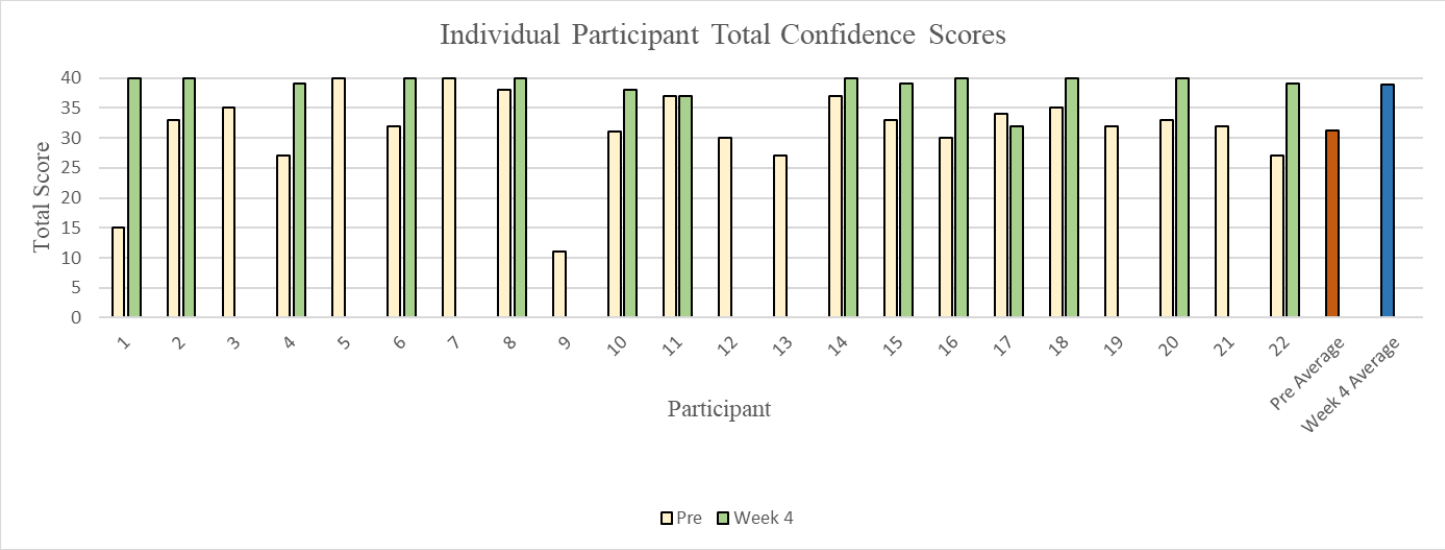
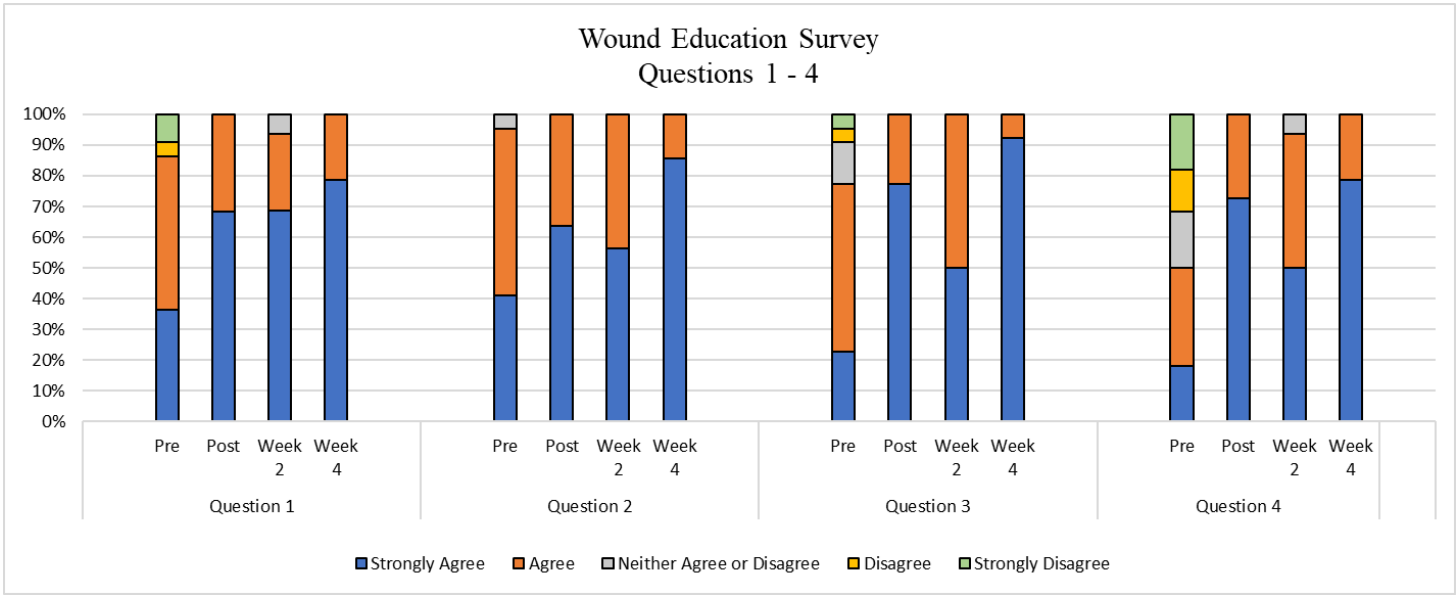


Figure 6. Graph displaying total confidence scores per individual participant.

Appendix V



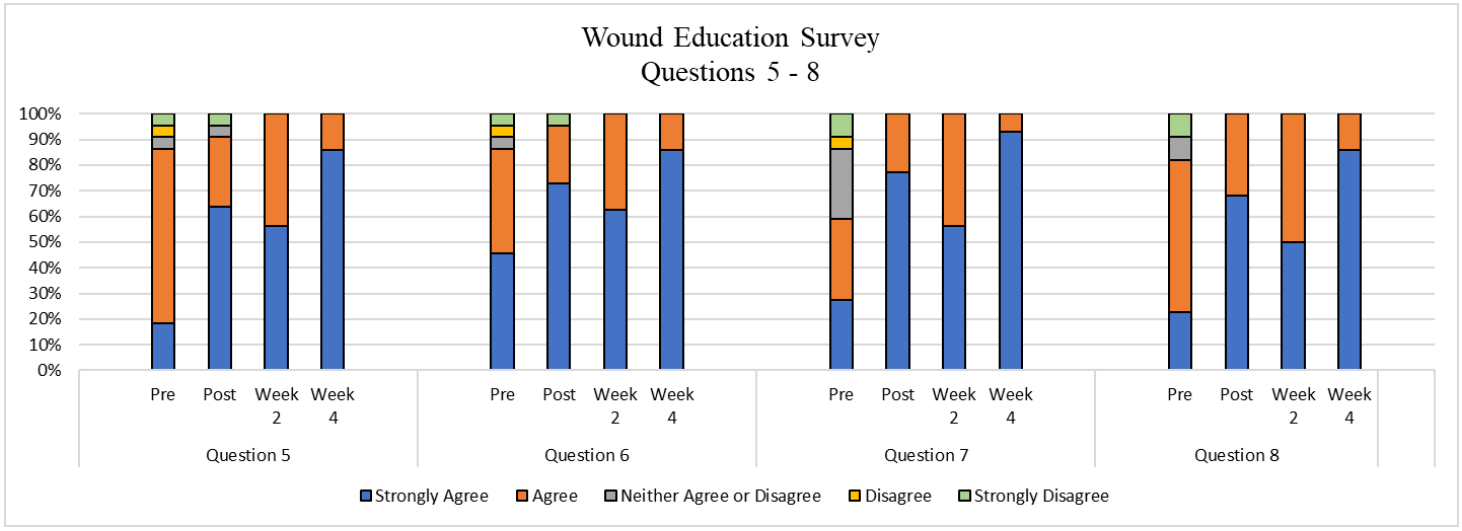


Figure 7. Graph displaying confidence scores per individual question.

Appendix W

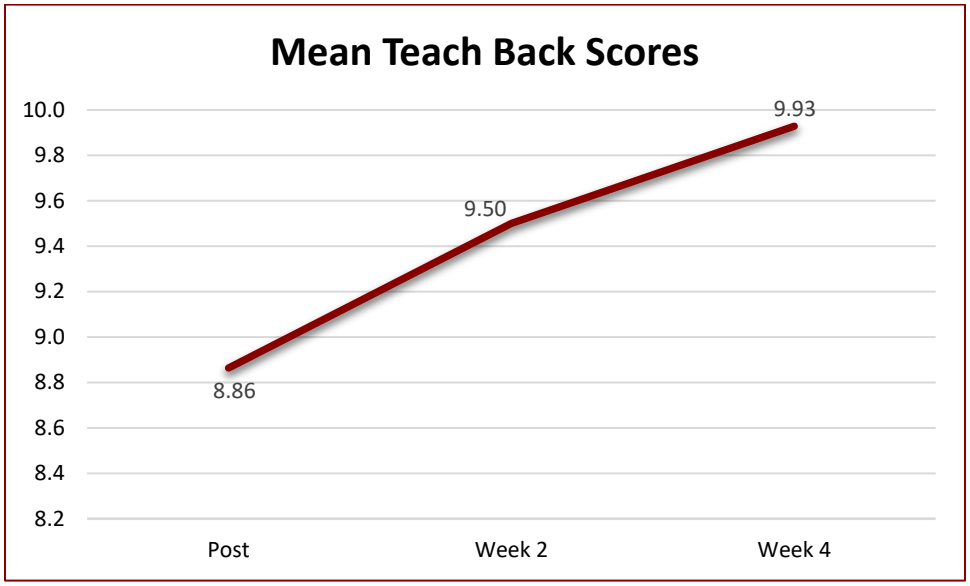


Figure 8. Graph displaying increasing mean teach-back scores over multiple visits.

Appendix X

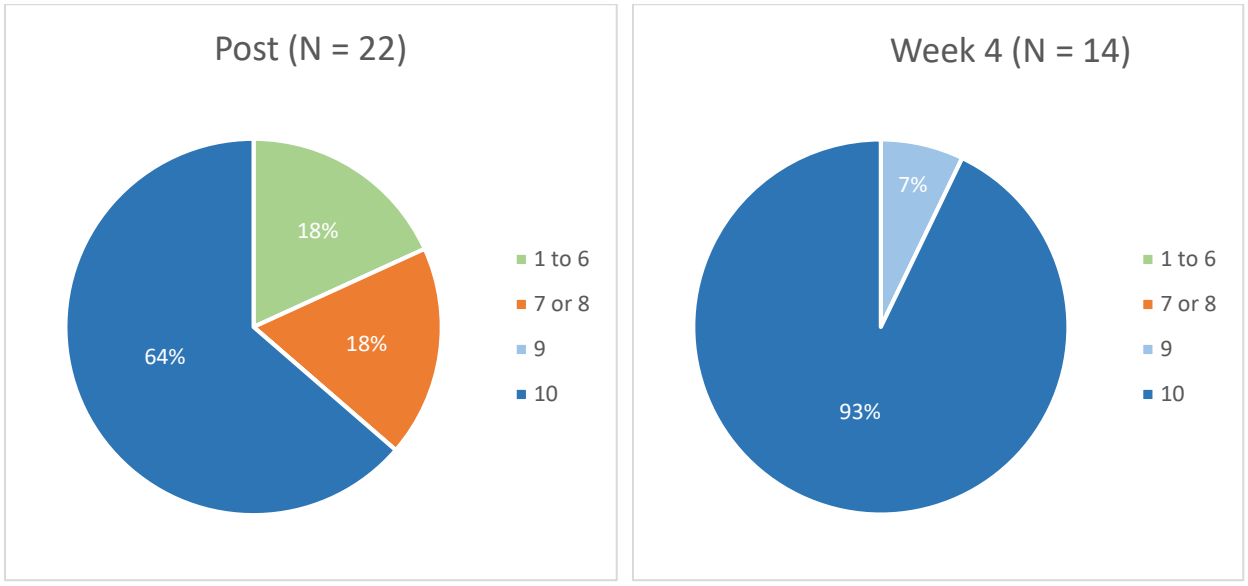


Figure 9. Chart displaying percentage of successfully completed steps.