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Investigating the Effects of an Occupational Safety Course on Needlestick Injury Prevention and Incident Reporting for Emergency Department Registered Nurses: A Quality Improvement Project

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Investigating the Effects of an Occupational Safety Course on Needlestick Injury
Prevention and Incident Reporting for Emergency Department Registered Nurses:
A Quality Improvement Project

A Scholarly Quality Improvement Project Presented to the Faculty
at Florida International University's
Nicole Wertheim College of Nursing and Health Sciences

By

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Special thanks to my mother for your love, hard work, and sacrifices. You are my biggest supporter and advocate. To my family and friends, thank you all for encouraging me to persevere and for reminding me that there is light at the end of the tunnel. To Dr. Deborah Sherman and Dr. Lisa Brown, thank you for the constant feedback, empathy, and for pushing me to continuously strive for improvement. To my angels up above, I hope I've made you all proud. You have all helped turn this project idea into reality.

With God, all things are possible.

Abstract

Background: Needlestick injuries are a well-known hazard in the workplace, especially in healthcare settings. Despite knowledge of the potential consequences after sustaining a needlestick injury, numerous incidents remain unreported by healthcare workers.

Aim: This quality improvement project examined whether an interactive occupational safety course regarding needlestick injury prevention and incident reporting in the workplace would positively influence the knowledge, attitudes, and behaviors of emergency department registered nurses regarding needlestick injury prevention and incident reporting.

Design: Pre and post-test survey design.

Sample and Setting: Five registered nurses staffed in the emergency department of a public 716-bed, pediatric and adult hospital.

Methods: Participants completed a pre and post-test questionnaire regarding their knowledge, attitudes, and behaviors towards needlestick injury prevention and incident reporting. The post-test was administered one week after receiving an occupational safety course.

Results: The intervention was not statistically significant regarding the pre and post-test change scores on knowledge, attitudes, and behaviors regarding needlestick injury prevention and incident reporting.

Implications: With a larger sample size in a next PDSA cycle, the project has the potential to gather positive data that can change nursing practice and enforce the importance of continuous education. Organizational policies can be reviewed and modified based on the interventions and data from this project to increase and improve workplace safety.

Keywords: needlestick injury, prevention, incident reporting, emergency-department, registered nurses, knowledge, attitudes, behaviors

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I. Introduction

As healthcare workers, there are several workplace incidents that one must be on high alert to avoid. The Centers for Disease Control and Prevention (CDC) defines a sharps injury as a percutaneous wound from a needle, scalpel, or other sharp objects that may result in exposure to blood or bodily fluids (Centers for Disease Control and Prevention [CDC], 2019a). This DNP project will be specific to workplace needlestick injuries, or NSIs. Nationally, there's an average of 1,000 NSIs per day for hospital-based healthcare workers (Needlestick Injuries, n.d.). Reporting NSIs can help prevent further occurrences and allow the hospital to correct any issues, yet some cases go unreported. This can endanger the lives of these healthcare workers. This project will examine the knowledge, attitudes, and behaviors of emergency department registered nurses regarding NSI prevention and incident reporting before and after the implementation of an occupational safety course.

Background

Numerous factors can contribute to the cause of NSIs, including long working hours, overuse and unnecessary use of devices, absence of personal protective equipment, recapping needles, engineering defects, lack of device safety, inappropriate disposal of devices, lack of training, staff shortage, and patient behavior (Alfulayw et al., 2021). These are possible issues that nurses encounter during a work shift. Despite sustaining an NSI while working, some nurses do not report it to management or the necessary departments. Reasons why NSIs are underreported in the workplace include fear of punishment, lack of time, inadequate protocols for post-exposure and reporting, and misperception of the risk of bloodborne pathogen exposure (Matsubara et al., 2020).

The Occupational Safety and Health Administration (OSHA) was formed in 1971 to ensure safe and healthy occupational conditions after a rise in injury, illness, and deaths while working (*OSHA at 30: Three Decades of Progress in Occupational Safety and Health*, n.d.). Under OSHA, standards have been enacted to prevent the occurrence of NSIs of healthcare workers. In 2000, OSHA established the Needlestick Safety and Prevention Act that demanded employers to address safety practices, such as inclusion of frontline users when evaluating devices, accessibility to personal protective equipment and Hepatitis B vaccination, and recordkeeping of exposures (Walker et al., 2019). OSHA sets these standards through the use of education and outreach, impacting virtually every safety or health issue (*OSHA at 30: Three Decades of Progress in Occupational Safety and Health*, n.d.). These standards should be readily available for reference for healthcare workers in their respective workplace areas.

Scope of the Problem

A substantial number of healthcare workers are being affected by NSIs. NSIs account for 385,000 sharps-related injuries to hospital-based workers each year (Centers for Disease Control and Prevention, 2015). The recent statistic in 2021 showed an increase in sharps injuries per year to be almost 400,000; (Brenner, 2021) these numbers do not include the number of unreported cases. The estimated cost of a single NSI treatment in the U.S. ranges between \$500- \$4,000 (Wakelam, 2018). The majority of reported NSIs have been by nurses, surgeons, and emergency personnel (Bouya et al., 2020). According to statistics from the CDC, more than half of the individuals affected by sharps injuries are nurses, and only 25% of the statistic applies to non-healthcare workers (Brenner, 2021). There are reasons why a number of these injuries occur to nurses because their job activities may put them more at risk for NSIs. Nurses have frequent patient contact, perform many procedures with sharps such as phlebotomy, intravenous needle

insertions, and medication injections (Bouya et al., 2020). NSI incidences are higher among nurses with low level knowledge of NSI prevention and who did not receive relevant education (Al Qadire et al., 2021). At the hospital facility, education on NSI prevention only occurs during the hiring process and the employee's annual performance review, leaving some workers unfamiliar with the workplace protocol following an NSI.

Significance to Nursing

NSIs are a cause for concern, as a contaminated needle can cause the transmission of a bloodborne pathogen. The first case of human immunodeficiency virus (HIV) transmission through a contaminated needlestick was in 1984 (Waljee et al., 2013). This event triggered the need to further investigate the communicable diseases that these types of injuries can transmit (Waljee et al., 2013). In addition to HIV, NSIs can transmit common bloodborne pathogens such as Hepatitis B (HBV), and Hepatitis C (HCV) (Waljee et al., 2013). Other bloodborne diseases include syphilis, malaria, and herpes (Waljee et al., 2013). The severity of NSIs was recognized, leading to more research on the issue and how to prevent its occurrence. NSIs have been found to cause 1,000 cases of HIV, 66,000 cases of HBV, and 16,000 cases of HCV on an annual basis (Bouya et al., 2020). This is not to say that all needlestick injuries will lead to the transmission of a communicable disease.

Reporting an NSI encourages healthcare workers to receive the appropriate post-exposure treatment, and with the assistance of the facility, prevent recurrence of injury. In 2000, under the Needlestick Safety and Prevention Act, revisions were made to include safer medical devices, such as sharps and needleless systems to eliminate or minimize occupational exposure of bloodborne pathogens through percutaneous injuries (*H.R.5178 - Needlestick Safety and Prevention Act*, n.d.). Yet despite these efforts, the high number of NSIs in the hospital setting

remains an issue. In addition, NSIs are not solely a physical injury, they can bring about psychological distress. These stressors were noticed in a study conducted in the country of Laos. Hospital workers who sustained needlestick and sharps injuries had significantly higher anxiety scores than those who did not, and those scores were higher immediately after the incident (Matsubara et al., 2020). Moreover, Cook and Stephens (2017) identified three studies in which at least 40% of their respective participants suffered from anxiety, ranging from mild to persistent. It has been difficult to gather information on how workers feel after immediate exposure and months after it has happened. Research focuses on how the NSI occurred, rather than the potential impact on the health professional. This increases the cost of NSIs because psychological services may be warranted. Healthcare workers who do not report exposures may silently be suffering from post-traumatic stress disorder.

II. Summary of the Literature

Search Strategy

The search strategy of the literature review began with accessing the Florida International University online library. Two databases were searched, specifically the Cumulative Index to Nursing and Allied Health Literature (CINAHL), with articles that are specific to nursing and allied health, and MEDLINE. The search terms for this literature review included “needlestick injuries or needle stick injuries or sharps injuries,” AND “needlestick injury or sharps injuries prevention,” AND “healthcare workers or nurses or medical workers or healthcare professionals,” OR “prevention approach,” AND “incident reporting or incident report or incident reports,” AND “USA or United States or America or us or united states of America.” Entries included articles published between 2015 and 2022 and in the English language. The CINAHL search yielded 253 results. The initial text box in MEDLINE was shortened to

“needlestick injuries” and the last text box was shortened to “USA.” These specific shortened boxes helped reduce the articles generated in MEDLINE from 10,000 to 203. Articles were selected based on their title and information provided in the abstract. From the titles and abstracts of the 256 articles yielded, articles were excluded if they were not based in the United States or did not discuss NSI prevention approaches. Although the search was intended to exclude articles from outside of the United States, articles from other countries were still generated during the literature search. Some of the more specific and relevant articles that were found will be discussed. Fourteen relevant articles were selected.

NSI Prevention Approaches Within the United States

In a United States health system with more than 10,000 nurses across Utah, Idaho, and Nevada, Friel et al. (2021) conducted a nurse-led educational Quality Improvement (QI) program for sharps-injury reduction, combined with usage of a single type of safety-engineered insulin syringe. While observing injury trends in the health system, the clinical safety assessment team noticed an increased trend in NSI from subcutaneous insulin syringes, thus inspiring the project (Friel et al., 2021). Critical observations made during the research team’s safety assessment encouraged them to standardize a 6-mm insulin needle and create a strategy to monitor insulin injection and needle disposal compliance (Friel et al., 2021). Three sizes of the 6-mm safety insulin syringes were introduced in a four-day pilot project with 12 nurses on the Medical Endocrine Unit because of the unit’s high number of subcutaneous insulin administration each shift (Friel et al., 2021). The nurses were informed about the needles and were recommended to utilize a one-handed injection technique with skin pinching (Friel et al., 2021). Actively including staff members in the changes being made to hospital devices allows for leaders to hear from frontline users to make more informed decisions. Receiving overall positive feedback and

acceptance, the nurses shared potential safety benefits, risks, and anything else they felt was applicable after the pilot project (Friel et al., 2021). The researcher's approach for NSI prevention included developing an educational plan on needle activation and disposal, mini-root cause analyses for employee injuries, and periodic feedback during the study's timeframe of one year (Friel et al., 2021). During pre-intervention, the mean monthly NSI rate was 1.78 per 10,000 injections (for 26, 712), compared to during the study, they recorded a mean monthly NSI rate of 0.88 per 10,000 injections (for 25, 746 injections). The results showed that introduction of an educational program and standardization of the 6-mm insulin syringe decreased the rate of NSIs among nurses within the healthcare system.

At their Magnet-recognized hospital in Pennsylvania, Walker et al. (2019) discovered an increase in NSIs, despite having an unclear number of nursing staff, no modifications to the sharps equipment, and no modifications to safety educational trainings. The researchers found that the majority of injuries were occurring in newly hired registered nurses and the behaviors and practices of these individuals also increased their exposure risk (Walker et al., 2019). The NSI prevention or reduction approach was to increase the nurse's ability to identify situations that put nurses at risk for injury and how to safely and consistently administer medications. The sharps safety task force implemented a sharps-safety-skills station that revised educational strategies, enhanced educational hands-on interactions, revised observations on sharps handling practices, implemented engineering controls on the injection syringes being used, and revised post-exposure data collection to capture handling behaviors and practices that contribute to NSIs (Walker et al., 2019). The result was an overall 30% reduction in NSIs. Based on these results, the sharps safety strategies were taught to experienced nurses and they were given the opportunity to demonstrate their own injection techniques for thorough observation and review

(Walker et al., 2019). Although the researchers identified the target population who needed more instruction on NSI prevention, they expanded their lessons to include the experienced staff to learn about safer work practices. Collective feedback from the sharps educational offerings suggested hosting a sharps-safety-skills station every year (Walker et al., 2019). This approach not only gathered data and introduced the findings to staff, but it allowed for the safety task force to interact with them and facilitate better understanding of NSI prevention.

Although focused on the dermatologic surgical setting, the NSI prevention approach reported by Rizk et al. (2016) focused on everyday preventative techniques that the healthcare worker should follow. The proper technique when utilizing needles in the surgical setting was explained. This includes avoiding touching the patient's skin, using a hemostat with the gauze when blotting wounds, utilizing suture counter boxes and floor-pedal-driven sharps disposable units, and "disarming" needles by placing needle drivers in the neutral zone to avoid contact with the healthcare worker's body (Rizk et al., 2016). Avoidance behaviors were a highlighted action with the preventative techniques including avoiding over-sized gloves, hand passage of sharps, touching suture tips, hand placement in the direction of applied force, bending, and straining (Rizk et al., 2016). Rizk et al. (2016) reported that a major cause of NSIs to surgeons was "awkward position," and it was determined that surgical tables should be at the correct height with the surgical tray and sharps disposal easily accessible to avoid bending and straining. Reinforcing basic NSI prevention techniques is important to reducing this workplace injury that can jeopardize health.

Nadeau's (2020) article featured insight on several sharps safety products that have been newly designed to prevent NSIs and infections. The prevention approach reviewed devices to improve workplace safety and prevent NSI. Products included needleless plastic cannulas that

make it easier to draw medications from a vial, needle free injection technology that ensures consistent medication dosing and proper depth of skin penetration, reducing the incident of repetitive stress injuries, as well, as safety pen needles that covers both ends of the needle, allowing users to keep their fingers behind the needle by eliminating forward motion (Nadeau, 2020). Aside from devices to administer medications, Nadeau (2020) discussed a double-gloving system that ensured the quick spotting of protection breaches from puncture wounds and a bright red neutral zone trays for surgeons to have complete visibility of their sharp instruments. Discussing these new products for NSI prevention and safety informed facilities of the workplace equipment that offer protection.

Persaud and Mitchell (2021) offered recommendations to prevent NSIs and bloodborne pathogen exposure in healthcare, especially during mass vaccination campaigns. Workplace safety health training and raising awareness for healthcare workers on preventing NSIs is needed and changes in organizational policies were recommended (Persaud & Mitchell, 2021). With variable work hours, lower confidence in skills, and a sense of urgency to complete tasks, NSIs are more likely to occur, so workplace specific health and safety training is mandated by employers under The Bloodborne Pathogen Standard (Persaud & Mitchell, 2021). The article was more geared towards policy change and support from management. The policy changes are reducing the feelings of healthcare worker to work excessive hours and the urgent need to complete tasks (Persaud & Mitchell, 2021). Organizational policy changes and unionized leadership can act towards negotiating safer workplaces and needlestick prevention protocols (Persaud & Mitchell, 2021). Persaud and Mitchell (2021) emphasize that contract negotiations, development of labor/ management agreements about needlestick prevent protocols are necessary. Realizing that policy change does not take effect quickly, short-term actions should be

addressed now. Specifically, enhanced annual training and education for healthcare workers is a forum to engage and discuss NSI prevention awareness and skills (Persaud & Mitchell, 2021).

NSI Prevention Approaches Outside of the United States

A retrospective study, with a sample size of 48,615 participants, compared and contrasted sharps injuries in healthcare workers in Shandong Province, China from 2012 to 2019 (Sun et al., 2021). Recapping needles with two hands had the higher number of incidents for both years (Sun et al., 2021). The number of NSIs decreased from 4,526 in 2012, to 549 in 2019 but in the span of those 7 years, recapping needles still proved to be the main cause of sharps injury (Sun et al., 2021). The study mentioned the incorporation of more educational activities, awareness increases of occupational exposures, and improvement in personal protective equipment (PPE) (Sun et al., 2021). Despite this, there was a limitation in the study. Some of the healthcare workers failed to report their injuries or concealed them (Sun et al., 2021). Further research was needed to identify why some of the workers did not report their injuries and what would have changed their mind to do so.

In Saudi Arabia, Alfulayw et al. (2021) conducted a retrospective study of reported NSIs over a span of 26 months. The number of reported NSIs was 181 with most cases occurring on the ward and during use of the needle (Alfulayw et al., 2021). Disposable syringes accounted for 44.8% of the cases and at least one pair of gloves was in use during the incident (Alfulayw et al., 2021). The researchers provided recommendations on a targeted approach to help prevent NSIs in the workplace. Alfulayw et al. (2021) described the targeted approach to include training on standard precautions, use of PPE, prohibiting recapping needles, sharps disposal, immunizations, and post-exposure prophylaxis. The researchers believe that training programs for healthcare

workers and adherence to OSHA work practice and safety engineering controls of needles should be employed (Alfulayw et al., 2021).

A study in Turkey, with a sample size of 144 nurses, was conducted to investigate sharps and NSIs, determine the frequency of incident reporting, and determine different ways to decrease NSIs (Ersin et al., 2016). The training session consisted of risk management discussions, recommendations for safe use of materials, sharps disposal boxes, and the creation of posters for sharps and needle safety to post hang on clinic walls (Ersin et al., 2016). The training also attempted to combat underreporting of NSIs. To facilitate incident reporting, sharp and NSI report forms were created by the researchers and saved on all the computers (Ersin et al., 2016). Online incident reporting forms help prevent delays in reporting and make it easier for healthcare workers to report their NSI. Computers are available throughout the hospital, making it easier for the worker to access them. NSI preventive measure actions of nurses before and after the training increased from 60% to 86.5% (Ersin et al., 2016).

Underreporting of NSIs

Needlestick injuries may be a common occurrence with healthcare workers, but the number of cases have to be reduced. NSIs have the potential to transmit bloodborne pathogens and individuals must report these incidents. Despite this knowledge, numerous NSIs remain unreported and the potential impact of underreporting of NSIs is critical. The aim of reporting these injuries is to receive immediate post-exposure care and for a root cause analysis to be performed for system-based improvements (CDC, 2019b). The rates of underreporting of sharps injuries in healthcare worldwide ranges from 19% to 86% (Sun et al., 2021). This limits the available data for NSIs and how to effectively prevent them. However, when NSIs are reported, action is not taken to follow the cases. This creates a limitation on the available data for NSIs

and how to effectively prevent them. More research is needed to address this knowledge gap and encourage incident reporting of NSIs, as the probability for transmission of a bloodborne pathogen should be taken into serious consideration.

In a survey conducted by Joukar et al. (2018), of 1,010 participants 488 had an NSI but only 10% reported it the hospital's team. The response that was the most popular (27%) was being too busy with work at the time of injury (Joukar et al., 2018). Staff should not feel so overwhelmed and task-oriented that they disregard their own health. Employers should be mindful of these pressures, as well as the importance of having a healthy staff and addressing safety concerns.

In one study, roughly 65% of the dermatologists experienced an NSI but did not report it (Rizk et al., 2016). Their reasonings were based on the belief that the patient was at low risk for a bloodborne pathogen and that the reporting process would take too much time (Rizk et al., 2016). Healthcare workers should not assume that a patient is low risk for a bloodborne pathogen, especially if current hematological information is not present and also because an individual's health status can change at any point. Rizk et al. (2016) emphasized that a significant number of people with HIV and HCV are asymptomatic and unaware of their status. Appropriate labs need to be drawn, prophylaxis medications administered as necessary, and follow-up should be done to monitor the health of the healthcare worker. Complaints of the reporting process being timely does not compare to ensuring that one is safe, as well as not putting others at risk.

The high probability of underreporting of NSIs has also gained the attention of The Joint Commission (TJC). TJC has an approach they believe can support incident reporting of NSIs. They issued a Sentinel Event Alert on developing a "just culture" approach that makes healthcare workers feel safe reporting errors, incidents, injuries, and near misses (AHC Media, 2019). In an

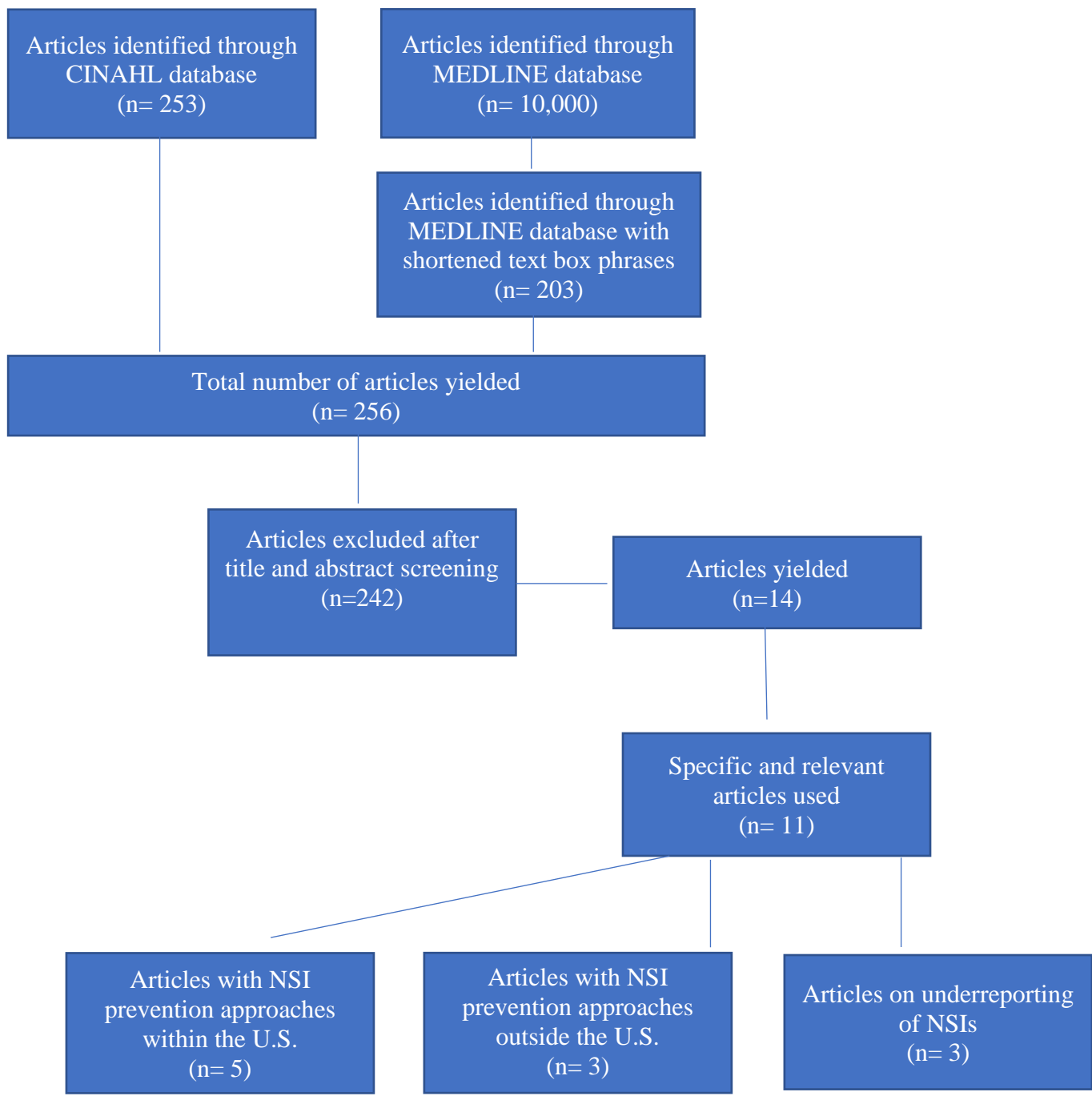
interview with TJC, AHC Media (2019) reports that technology has reduced or eliminated the chances of needlestick injuries over the years, but sometimes the devices are not as effective. Instead of blaming staff, the equipment should be examined to determine whether other equipment would be more effective (AHC Media, 2019). This approach is not just geared towards better equipment to prevent needlestick injuries, but the importance of creating a culture in which healthcare workers feel more comfortable reporting their injuries without the fear of punishment. Underreporting of NSIs influences the data generated on NSIs. When the incident is reported, cases can be analyzed and the facility can make necessary changes.

Knowledge Gaps

Although there is information on the prevalence of NSIs and adopting needless systems, there is a dearth of information on the effectiveness of education in preventing NSIs, as well as incident reporting of these injuries. According to Bahat et al. (2021), 46% of NSIs among healthcare workers were unreported, with the highest rate occurring in the operating room. Yet, there is limited information on how to address the issue. Literature on effective and educational approaches to prevent NSIs, the severity of NSIs, and advocacy for incident reporting is needed. These suggest the need for an intervention such as an occupational safety course.

Literature Review

Figure 1



III. Purpose, PICO Clinical Question, SMART Goals

Purpose

The intent for this DNP Quality Improvement Project was to examine the knowledge, attitudes, and behaviors (K/A/B) of emergency department RNs towards needlestick injury prevention and reporting of the incident following an occupational safety course. The project aims examined whether the occupational safety course regarding needlestick injury prevention and incident reporting in the workplace would positively influence the knowledge, attitudes, and behaviors of ED RNs on needlestick injury prevention and incident reporting. It was important to ensure that they have adequate, evidence-based information to safely practice in the workplace.

PICO Clinical Question

“Will an occupational safety course regarding workplace needlestick injury prevention and incident reporting positively influence the pre to post-test scores regarding knowledge, attitudes, and behaviors of Emergency Department registered nurses regarding needlestick injury prevention and incident reporting.”

(P)opulation: Emergency Department Clinical Registered Nurses (RNs)

(I)ntervention: Occupational safety course on needlestick injury prevention and incident reporting in the workplace

(C)omparison: pre and post-test scores for knowledge, attitudes, and behaviors

(O)utcome: positive influence on the knowledge, attitudes, and behaviors of needlestick injury prevention and incident reporting.

SMART Goals

SMART Outcomes is an effective tool that helps provide clarity, focus, and motivation to achieve goals by encouraging one to define objectives and set a completion date (MindTools,

2016). SMART stands for (S)pecific, (M)easurable, (A)chievable, (R)elevant, and (T)ime bound (MindTools, 2016).

- Conduct a needs assessment at the immersion site by March 30th, 2022.
- Complete CITI training by April 4th, 2022.
- Identify the target population and method of survey distribution by April 15th, 2022.
- Develop a pre and post questionnaire on the knowledge, attitudes, and behaviors of NSI prevention and incident reporting by May 27th, 2022.
- Develop an educational program on NSI prevention and incident reporting by June 3rd, 2022.
- Submit proposal to the IRB Arrival by July 27th, 2022.
- Recruit project participants between September 14th- 20th, 2022.
- Obtain informed consent for participation by September 25th, 2022.
- Distribute the pre-survey questionnaire beginning September 26th, 2022.
- Implement occupational safety course between October 8th - 15th, 2022.
- Distribute the post-survey questionnaire on October 14th 2022.
- Analyze the results gathered from the project by November 18th, 2022.
- Disseminate project findings by November 28th, 2022.
- Have final DNP Project Report professionally edited and reviewed by December 1st, 2022.

IV. Organizational Assessment and SWOT Analysis

Organizational Assessment

The immersion site is a centralized location for the Employee Health (EH) office for a South Florida Hospital District. The process for this centralized office transition was finalized in

September 2021. For the purposes of this project, the immersion site hospital facility is based on a Hospital District that is composed of five hospital facilities that creates one public, non-profit hospital system. Employees in need of EH services visit the immersion site to receive care. Services include annual health reviews, workplace immunizations, medical leave and return to work clearances, and blood and body fluid exposure follow-up. This DNP project will feature data gathered from the centralized EH office and the main hospital facility of this hospital system. The selected hospital facility is the largest of the five in the hospital district. It was selected because of the influx of patients, variety of medical conditions, frequency of medical procedures, and high likelihood of the use of devices with needles. It is a public Level 1 Pediatric and Adult Trauma hospital with a total of 716 beds. The facility currently employs 2,607 individuals.

The hospital is Medicaid and Medicare certified. The patient population ranges from newborns to elderly adults, low-income and/or homeless, and tourists visiting the South Florida area. Specialty services include emergency services, behavioral health, cardiovascular care, comprehensive cancer care, transplant services, women's health, a Level III Neonatal Intensive Care Unit, and more.

SWOT Analysis

A SWOT Analysis is a tool that analyzes the internal and external factors of (S)trengths, (W)eaknesses, (O)pportunities, and (T)hreats to of an organization to analyze what is currently being done and how to develop the right strategies for a successful future (MindTools, 2001). The organization is analyzed below.

Strengths

The main hospital facility is located in South Florida and employs an abundance of diverse individuals. Hospital services are provided to local individuals and tourists who visit the area throughout the year. The diverse background of the healthcare workers is a strength because cultural competence and understanding is necessary to provide effective healthcare. This can allow them to better serve patients. In addition, the diversity of the healthcare workers is a strength because employees can offer different and helpful insight on NSI prevention in the workplace and incident reporting. Diversity is not solely based on the worker's cultural background. These individuals come from all over the world, have different educational backgrounds, and different work and life experiences. All of these factors influence how the healthcare worker learns information, what they actually understand, and how that is translated into practice.

The quantity of available healthcare professionals is a strength. At the hospital immersion site, there are 2,607 employees, many of whom have clinical roles. With the large number in staff, patient loads can be reduced, lowering the amount of stress that the clinical workers experience and can help prevent NSIs.

The offer and utilization of HealthStream at the immersion site is a strength. Using internet-based learning products, HealthStream Incorporated (HealthStream) provides training, certification, and development needs for customers such as healthcare organizations, pharmaceutical, and medical device companies (*HealthStream*, n.d.). HealthStream's goal is to improve healthcare outcomes, while their vision is to improve healthcare quality by developing the people who deliver care (*About HealthStream*, n.d.). The facility provides HealthStream modules for staff to learn about various topics, whether assigned or elective, that can increase

knowledge and help improve practice methods. For example, a Bloodborne Pathogen and a Needlestick Injury Prevention course is offered to help reinforce current practice techniques and possibly teach something new. Many of these interactive and educational HealthStream courses offer quizzes at the end to ensure that the lesson was understood and taught impactful information. Some even offer quizzes at the beginning to gauge current knowledge. This organizational strength encourages healthcare workers to improve their expertise and stay up-to-date with evidence-based research practices.

An organization with the financial capability to operate a 716-bed hospital facility can be seen as a strength because in the event of a workplace incident, finances play a critical factor. The organization's Worker's Compensation Department is in charge of managing NSI claims and any associated expenses. Although an NSI is unwanted and can be highly prevented, one must account for its possibility. It is a strength that the large organization and hospital district has the financial capability to cover the necessary services. Not only in regards to after an NSI, but the organization has the financial capability to provide adequate staff education on workplace safety, needle devices, and other equipment.

Weaknesses

The facility site lacks a "Just Culture." According to Paradiso and Sweeney (2019), "Just Culture" is a safe haven that supports incident reporting and the organization is accountable for the incident, not the individual. Barriers to reporting incidents include negative responses from leaders and risk of discipline (Paradiso & Sweeney, 2019). The immersion site does not openly express attitudes towards creating a "Just Culture" so signs of future support after an error occurs is not widely sensed. The lack of a "Just Culture" can hinder employees who experience NSIs to report the injury because the employee may feel to blame and that they will be punished.

The immersion site does not ensure that all staff are appropriately and adequately informed when there are changes to the needle devices and how to safely utilize them. For clarification, when the hospital introduces a new needle device, a device representative does come in to provide an in-service training. Yet, these trainings are conducted in the middle of the clinical worker's shift where they may not have the time to completely grasp the teaching and ask their questions. If an employee is not present when the in-service is held, they miss proper training and have to learn from fellow employees who, themselves, may not be entirely comfortable with the new device or knowledgeable. The device representative does not ensure that all of the clinical employees on the unit are present for the training and neither does the leadership team. It is a weakness to not have adequate training of a needle device because improper device usage could result in an NSI. In addition, there are times where the hospital facility temporarily introduces new needle devices, such as an insulin syringe, when there is a shortage of the regularly-used device. Unfamiliarity with the syringe and/or its safety activation can lead to an NSI.

Opportunities

Creating a strong public relations presence can be seen as an opportunity. The press/media for the organization gives the facility an interactive and social presence. Hospitals, medical clinics, and countless healthcare providers offer services that are of extreme importance so public relations communications can influence broad community health (Elrod & Fortenberry Jr., 2020). The site has an opportunity to use their public relations communication strategies to catch the attention of the local public and create an accurate and positive narrative about how NSI prevention is handled. Communication on NSI prevention, devices being utilized, and the site's commitment to workplace safety is an opportunity to positively reach current staff, future

staff, and the public. When individuals see positive press, they will become interested and attracted to the site for their healthcare needs. This in turn gives the site more motivation to make a change and work harder to prevent NSIs.

With advancements in technology and medication administration, the site has the opportunity to research and invest in needleless systems. Nadeau (2020) gives readers insight on new products designed for sharps-injury prevention, such as safety pen needles that have dual-protection to cover both ends of the needle for the healthcare worker and patient. Sharps injuries still occur with devices designed for safety (Nadeau, 2020). If the site were to adopt needleless systems, NSI cases would be reduced because issues with device engineering would not really be a factor.

A significant opportunity for NSI prevention and incident reporting at the facility is to increase the frequency of NSI training. Although NSI training is required of each clinical employee on an annual basis, a course NSI prevention should be provided at least twice a year. Over time, there may be safer techniques and methods that are found so those can be reviewed. In addition, some employees may have been using certain needle devices incorrectly or disposing of them incorrectly for a long time. Incorrect techniques can become a habit if not addressed so with the course offered twice a year, employees can learn the correct ways and about NSI prevention and incident reporting.

Threats

The clinical immersion site is a centralized EH office. This centralized process was finalized in September 2021. With the centralization, the hospital facility, where the DNP project data is being conducted, no longer has an EH team onsite. This process is seen as a threat because it may create an obstacle for incident reporting of NSIs. Many of the hospital's

employees are not content with the centralization of EH to be offsite of their facility. Some employees may neglect reporting their NSI or following-up with the department because they do not want to drive the distance to the Employee Health site. Having the Employee Health Department on site is something that the other local hospital systems have and it made it more convenient for employees to visit and utilize the services. After an NSI occurs, if an employee visits the emergency room, they are encouraged to follow-up with EH after. The facility laboratory that processes the blood samples for testing may inform employee health of the incident, but ultimately it is up to the employee to report it to EH and receive all necessary treatment.

Not receiving adequate staff feedback before making significant change poses a threat for the facility. Currently, the site is using the “BD Vacutainer Safety-Lok Sets,” also known as “butterfly needles,” for phlebotomy purposes. In a surveillance survey conducted by Ottino et al., (2019), butterfly needles were the most frequent security devices involved in percutaneous accidents from safety-engineered devices. Complaints have been made regarding the device and its inconvenience or of safety hazards when using it. It does not seem as though the facility asked or received much feedback on the device before utilizing it in the departments. There should be a better process that involves employees who will be using the device to give their thoughts and opinions.

Word-of-mouth can have a huge impact on incident reporting or other things in general. If situations are not handled efficiently, individuals can begin to influence others, as employees converse with each other, and negative comments can cause issues. Though expected in a hospital organization, if the negative press reaches too many people, it may become harder to debunk. Some clinical healthcare workers believe that NSIs are to be expected during their

career. In a survey of 844 healthcare worker respondents, NSIs were unreported by 46% of them (Bahat et al., 2021). Underreporting is often due to an unwritten silence and it is commonly believed that NSIs are part of the job description and reporting them will be detrimental to one's career (Unreported Needlestick Injuries, 2014). This culture of silence is negative because it could make individuals feel as if their NSI does not need to be reported or a cause for concern.

V. Definition of Terms

The key terms used throughout this DNP project are incident report, needlestick injury, prevention, and underreporting. The terms are defined below.

Needlestick injury: Accidental percutaneous piercing wound caused by a contaminated sharps instrument, usually a hollow-bore needle from a syringe (Cooke & Stephens, 2017).

Prevention: The act of stopping something from happening or of stopping someone from doing something (*Prevention*, n.d.)

Incident report: A tool documenting an event that may or may not have caused injury to a person or damage to a company asset (*Incident report guide: All you need to know*, 2021).

Underreporting: To report to be less than is actually the case (Merriam-Webster, n.d).

VI. Conceptual Underpinning and Theoretical Framework of the Project

The theoretical framework that guided this project is the Health Behavior Model (HBM) by Rosenstock et al. (1974). The HBM was developed in the 1950s and designed for disease prevention, and not treatment, to explain preventive health behavior (Rosenstock et al., 1974).

The main aspects of the HBM are "perceived susceptibility," "perceived seriousness," "perceived benefits of taking action and barriers to taking action," "and cues to action," (Rosenstock et al.,

1974). "Cues to action" has not been subjected to careful study yet (Rosenstock et al., 1974) so it will not be correlated with this QI project. Largely, the aspects of the HBM are based on perception and varies from person-to-person.

The ED workplace environment and job activities of the RNs increase their risk of sustaining an NSI. It is a fast-paced environment and an abundance of patients are treated daily, with many treatments involving the use of needles and injections. The rush to get everything completed promptly can cause a pressure build-up and a lack of caution when handling sharps. These alone should make the ED RN realize that they are well susceptible to sustaining an NSI. The burden that can result after an NSI affects the perceived seriousness of the injury to the nurse. An NSI has the potential to lead to serious medical consequences such as a bloodborne pathogen (HIV, Hepatitis B, Hepatitis C, etc.). Even the thought of contracting a disease has the potential to cause emotional arousal. NSIs can lead to emotional distress because the nurse would be worried about becoming sick, missing time off work, and all the stressful factors that may arise. The individual may not think that the occurrence is medically serious but it can be serious if it affects other aspects of their lives, such as family or social relations (Rosenstock et al., 1974). These effects can significantly affect their lifestyle. With the occupational safety course, clinical healthcare workers would receive relevant, evidence-based education on NSI prevention in the workplace and encouragement to report any incidents.

The HBM is strongly dependent on the individual's knowledge and personality. Sustaining an NSI can be seen as a threat and the RN would want to act to prevent it from happening. If an NSI were to occur, the RN would be more aware of the importance of incident reporting and the need to be evaluated by a provider to test for BBPE testing and psychological assistance, if needed. The intervention presents statistics of BBPE after NSI that would hopefully

encourage the need for incident reporting and taking action. By the end of this educational intervention, the RNs will see the benefits of having increased and accurate knowledge of NSI prevention and incident reporting to ensure safety. Taking action to avoid a disease would require the individual to believe that they were personally susceptible to it and that acquiring such disease would have at least a moderate severity on a component of their life (Rosenstock, 1974). The individual would also have to believe that taking action would be particularly beneficial to reducing their susceptibility if the disease were to occur by reducing its severity without having to overcome psychological barriers, such as cost, convenience, or embarrassment (Rosenstock, 1974).

Recognizing that the "barriers to taking action" is a critical step in the HBM. A barrier is recognized as something that keeps people or things apart or as an obstacle (*Barrier*, n.d.). With increased knowledge, barriers could be minimized and the RNs would be more mindful when handling needles. After an NSI, there is no need to be ashamed to report it because mistakes and accidents happen. The RN could avoid significant psychological barriers because they would understand the benefit and importance of incident reporting. The course's content should encourage participants to not see incident reporting as something that would inconvenience them because they are acting to keep their future safe and healthy. Costs of treatment post-NSI are covered under workers' compensation. These can be seen as learning experiences. RNs can always learn from these situations and educate others on future NSI prevention.

The HBM framework also captures the project's intent to facilitate openness and safety for staff to report NSIs. This data from using the HBM in the project would help guide future practice to determine if there are any changes to be made to NSI prevention practices that create

a positive and safe work environment. Assessing these processes from the healthcare workers who deal hands-on with the topic should prove beneficial.

VII. Methodology

Introduction of the QI Methodology: Plan, Do, Study, Act Cycle

This DNP project utilized the Plan, Do, Study, Act (PDSA) cycle as part of its methodology. The PDSA cycle is iterative and focuses on the continual improvement of a process (Taylor, 2013, as cited in Crowfoot & Prasad, 2017). The ‘Plan’ stage introduces the change in need of improvement, the ‘Do’ stage implements the change, the ‘Study’ stage examines the success of the change, and the ‘Act’ stage identifies the next steps to inform a new PDSA cycle (Taylor 2013, as cited in Crowfoot & Prasad, 2017). The PDSA cycle quickly allows one to see whether a change is working or not. The PDSA cycle in connection to this project is detailed as follows.

Plan Stage: A SWOT analysis was conducted to identify areas in need of improvement in the organization. While reviewing data, NSIs were found to be a concern and an area that may benefit from a QI project. The intended outcome of this PDSA cycle was to introduce an educational intervention to educate ED RNs on how NSIs could be prevented and the importance of incident reporting, in the event that one does occur. SMART outcomes were created to keep the DNP candidate focused and oriented on the tasks to be done. These outcomes were modified as necessary. The DNP candidate developed a DNP Proposal and discussed it with their clinical practice lead professor. Revisions were made to develop an appropriate and PICO clinical question for quality improvement. The DNP candidate and lead professor submitted the proposal to the Institutional Review Board (IRB) for approval to implement the QI project. In the

meantime, the DNP candidate presented the proposal to the facility's nursing research council for approval to recruit participants from the facility.

Study Design: Pre and post-test design.

Setting: A public, 716-bed, pediatric and adult hospital in South Florida was used to recruit participants. The participants conducted their QI involvement during their own leisure time as the information was relayed via email and questionnaire completion with the utilization of the online software program, Qualtrics.

Sample: The facility's adult ED appears to have an adequate number of staff members for recruitment. Registered nurses who provide direct patient care were selected as the target population for this project because of the high statistics of NSIs among this group. Non-clinical RNs, RNs without direct patient care, agency staff, and pediatric ED RNs were excluded. RNs without direct patient care most likely do not handle sharps, and agency staff may not be fully aware of facility protocols and their travel arrangements may affect data collection. A convenience sample comprised of five female registered nurses who are employed (full-time, part-time, or per diem staff) in the adult ED and provide direct patient care completed the QI project in its entirety.

Instruments: A Demographic and Professional data form including questions such as age, gender, race, education, and employment status was created. The pre and post-test questionnaire used was an adapted questionnaire with permission from the authors of "Incidence, Knowledge, Attitude and Practice Toward Needle Stick Injury Among Health Care Workers in Abha City, Saudi Arabia" by Alsabaani et al. (2022). "Practices" was substituted with "Behaviors," and grammatical edits were made by the DNP candidate. The questionnaire included 31 items that measured the K/A/B of emergency department nurses regarding NSI prevention and incident

reporting. Content validity of the questionnaire was reviewed by academic experts from King Khalid University, Abha (Alsabaani et. al, 2022).

Intervention: The DNP candidate created the educational intervention. Specifically, an occupational safety course (PPT and voiceover) on NSI prevention and incident reporting. It was shared with the participants via email. The PPT took 30 minutes to review. A recorded PPT was ideal because it could be viewed at home and allowed the ED RNs to view it in an environment where they are not rushing and could be fully alert, avoided variation in presentation of the topic, and allowed for future data presentation and collection on NSI prevention and incident reporting. It also minimized the variability in the content that was presented so all participants would be learning the exact same content.

Some of the content covered in the PPT included: NSI background, bloodborne pathogen exposure (BBPE), what to do after an NSI occurs, BBPE treatment, psychological effects, sharps safety, and incident reporting. There was also a slide on active and passive safety mechanisms of different needle devices used in the hospital and an interactive mini-case study to help reflect and respond to the material discussed.

Data Collection Procedures

IRB Approval from Florida International University (FIU) and hospital were obtained prior to participant recruitment and contact. The DNP candidate spoke to the ED clinical education specialist and manager(s) to arrange times to go to pre-shift huddles and discuss the purpose of the project and elements of informed consent. The goal was to recruit 15 participants. Pre-shift huddles occurred at 7AM, 11AM, and 7PM. The DNP candidate visited various shifts on various days to briefly introduce the QI project and have interested participants contact the DNP candidate via email or phone. The Demographic and Professional Data form and the K/A/B

pre-questionnaire was completed after the signing of the informed consent. Once those were received, participants were asked to complete the K/A/B post-questionnaire one week after the occupational safety course to minimize the Hawthorne Effect.

Data Management

All of the QI project's electronic data was encrypted and stored in a password protected file on the DNP candidate's password protected laptop. The data will be destroyed five years after collection. The DNP candidate was the only one with access to the documents. No names were associated with the study data. To ensure confidentiality, code numbers were used for each participant. All of the study data was encrypted and password-protected. Only the DNP candidate had access to the code book with the names of the participants and their code numbers.

Data Analysis

Descriptive statistics were used to analyze the Demographic and Professional Data Form. Paired *t*-tests were used to compare pre-test and post-test scores regarding RN K/A/B to NSI and incident reporting. After data analysis, any perceived limitations from the quality improvement project was presented and discussed.

Protection of Human Subjects

The DNP candidate completed a basic course on Human Subjects Research through the Collaborative Institutional Training Initiative (CITI). This CITI course helped prepare the DNP candidate on what research with human subjects entails and how to keep them safe from ethical issues. Prospective participants read and agreed to an informed consent form prior to participating in the project. All participants were informed that their participation was voluntary and that they could withdraw from the quality improvement project at any time without negative consequences. All were informed of the benefits and risks associated with the project. Benefits

include increased knowledge on NSIs, confident and proper handling techniques, proper needle disposal, importance of incident reporting, and overall knowledge of NSI prevention in the workplace safety. The mention of sensitive material on needlestick injuries that may trigger participants who have experienced an NSI was disclosed.

Do Stage: The DNP candidate created a recruitment flyer to help recruit prospective nurse participants from the ED. With the IRB and facility's approval, the DNP candidate began the recruitment process. Once recruited, participants were asked to review and sign the Informed Consent Form for participation. The participants were given a Demographic and Professional Data Form asking questions about their background (gender, race, nursing experience, and others). In addition, a pre-test questionnaire on their knowledge, attitudes, and behaviors of emergency department registered nurses regarding NSI prevention and incident reporting was given. A Microsoft PowerPoint (PPT) with voiceover, created by the DNP candidate, served as the educational intervention. This interactive occupational safety course was shared with the participants. One week after receiving the PPT, the participants received the same initial questionnaire as their post-test questionnaire.

Study Stage: Comparing the pre and post-test questionnaire responses, the DNP candidate assessed if there was a positive influence on the knowledge, attitudes, and behaviors of emergency department registered nurses regarding NSI prevention and incident reporting after the occupational safety course. The post-test questionnaire reflected whether any change occurred after reviewing the occupational safety course. The occupational safety course served as a good step toward improving needle safety in the workplace. The data was analyzed, allowing for the findings to be disseminated for discussion on areas needing further improvement after the project's implementation phase. This will be shared with the nursing research council to

keep them up-to-date with the projected plan and aware of how to help the PDSA cycle improve for future use.

Act Stage: After all data was collected and analyzed, limitations to the QI project and dissemination plans were discussed. Modifications, as deemed necessary, were open for discussion by using this PDSA cycle as a foundation. This will encourage the next cycle of change based on what was learned from the QI project.

VIII. Results

Demographic and Professional Data Form

The QI project's sample consisted of five participants. All five of the participants were of female gender (100%). Of the five, one (20%) fell in the age range of 18-24 years old, two (40%) were 25- 34 years old, one (20%) was 35-44 years old, and one (20%) was 45-54 years old. Three (60%) participants identified as White/Caucasia, one (20%) identified as Caribbean, and one (20%) identified as Hispanic/ Latino, or Spanish origin.

The sample consisted of one (20%) registered nurse with an associate degree as their highest education level, three (60%) with a bachelor's degree, and one (20%) with a graduate degree. Of the five participants, one (20%) has 0-2 years of nursing experience, one (20%) has 3-5 years of nursing experience, two (40%) have 6-9 years of nursing experience, and one (20%) has 20+ years of nursing experience. Four (80%) of the participants were employed as full-time staff and one (20%) was employed as a per-diem/ pool staff. All participants had direct patient care. A summary of the participant Demographic and Professional Data can be found in Table 1.

Table 1**Summary of Demographic and Professional Data (n= 5)**

	<u>Count</u> (n=5)	<u>Percent</u> %
<u>Gender</u>		
Male	0	0%
Female	5	100%
Non-binary	0	0%
Prefer not to say	0	0%
<u>Age Range</u>		
18 – 24	1	20%
25 – 34	2	40%
35 – 44	1	20%
45 – 54	1	20%
55 – 64	0	0%
65+	0	0%
<u>Ethnicity</u>		
White/ Caucasian	3	60%
American Indian	0	0%
Middle Eastern or North African	0	0%
Asian	0	0%
Black/ African American	0	0%
Caribbean	1	20%
Hispanic/ Latino, or Spanish origin	1	20%
Native Hawaiian or other Pacific Islander	0	0%
Multi-Ethnic or Other	0	0%
<u>Highest Education Level</u>		
Associate degree	1	20%
Bachelor's degree	3	60%
Graduate degree	1	20%
Other	0	0%
<u>How many years of nursing experience do you have?</u>		
0- 2 years	1	20%
3- 5 years	1	20%
6- 9 years	2	40%
10- 15 years	0	0%
16- 20 years	0	0%
20+ years	1	20%
<u>Employment Status</u>		
Full-time staff	4	80%
Part-time staff	0	0%
Per diem/ Pool staff	1	20%
Travel or agency	0	0%
<u>Provide Direct Clinical Care</u>		
Yes	5	100%
No	0	0%

Knowledge

The questions that were asked of the participants about their knowledge towards needlestick injury prevention and incident reporting are listed in Table 2. The pre and post-test responses were calculated into percentages. A paired *t*-test was used to compare pre and post-test scores. For the pre-test, analysis indicated a mean score of 84.600 with a standard deviation of 10.889. The post-test mean score was 90.760 with a standard deviation of 6.442. The *t*-statistic = 2.1381 and the degrees of freedom (*df*) = 4. The two-tailed *p* value of the Pre and Post-Test Knowledge scores was 0.0993. Despite an increase in the mean scores, the knowledge results were not statistically significant at *p* < 0.5. For visual representation, a table (Table 3) and bar graph (Figure 2) of the pre and post-test statistical results for the knowledge domain are presented.

Table 2

Questions on Knowledge

	<u>Count</u> (n=5)	<u>Pre-Test</u> <u>Percent</u>	<u>Post-Test</u> <u>Percent</u>
<u>NSIs are defined as wounds caused by needles that accidentally puncture the skin.</u> Yes* No		100% 0%	100% 0%
<u>Recapping of the needle after performing nursing procedures is recommended to decrease the risk of needlestick injury.</u> Yes No*		0% 100%	0% 100%
<u>Disposal in a sharps container after performing procedures is recommended to decrease the risk of needlestick injury.</u> Yes* No		100% 0%	100% 0%
<u>Three doses are required for full protection from Hepatitis B.</u> Yes* No		100% 0%	100% 0%

<u>Hepatitis C disease can be prevented by vaccine.</u>		
Yes	40%	40%
No*	60%	60%
<u>Needlestick injuries may transmit blood-borne diseases like hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus HIV.</u>		
Yes*	100%	100%
No	0%	0%
<u>Hepatitis B and C, HIV are blood-borne pathogens that medical staff are most commonly exposed to when they experience a needlestick injury.</u>		
Yes*	100%	100%
No	0%	0%
<u>In needlestick injuries, Hepatitis B carries the greatest risk of transmission.</u>		
Yes*	80%	100%
No	20%	0%
<u>The percentage transmission of HBV is higher than HIV owing to needlestick injury.</u>		
Yes*	80%	100%
No	20%	0%
<u>Are you aware of the procedure and guidelines to follow if you sustain a needlestick injury in the workplace?</u>		
Yes*	80%	100%
No	20%	0%
<u>There is currently no approved post-exposure prophylaxis for HCV.</u>		
Yes*	60%	60%
No	40%	40%
<u>Concerning needle stick injury from HCV infected patient, HCV antibody testing should be performed at 4–6 months.</u>		
Yes*	80%	100%
No	20%	0%
<u>Tetanus vaccine is part of the treatment after experiencing needlestick injury.</u>		
Yes*	20%	80%
No	80%	20%

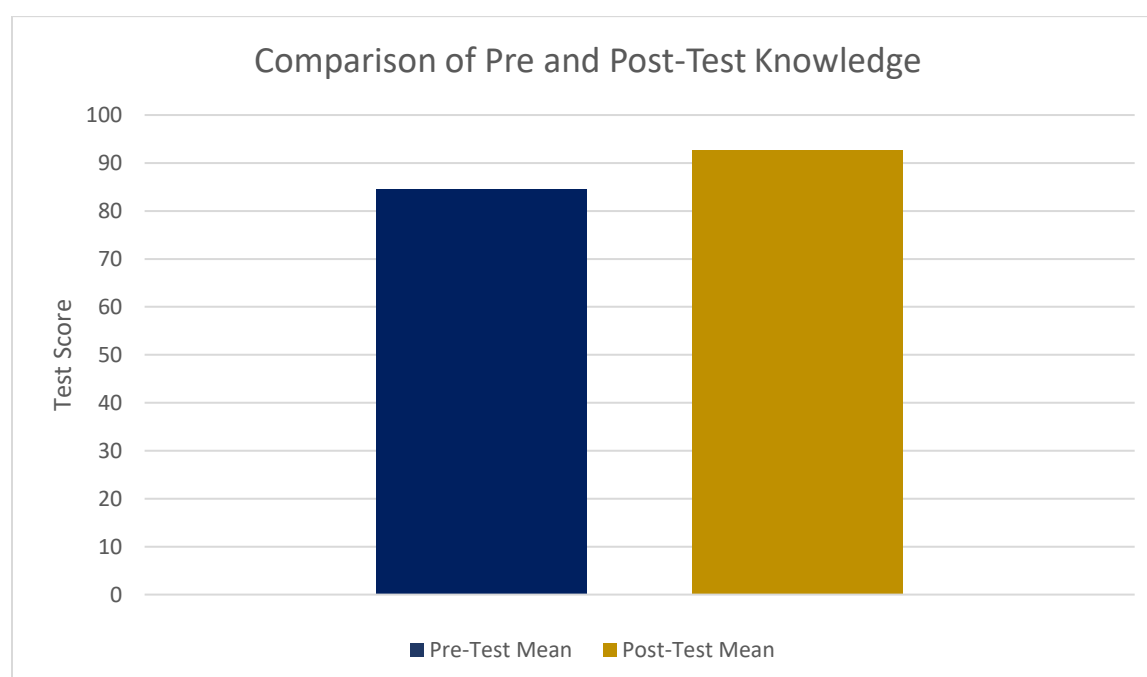
Note: An asterisk (*) is used to denote the “correct,” or “expected,” responses for the questions.

Table 3**Statistics for Knowledge Scores**

Pre-Intervention		Post Intervention		<i>t</i>	<i>p</i>	<i>df</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
84.600	10.889	90.760	6.442	2.1381	0.0993	4

Figure 2

The Mean Scores of Knowledge of NSI Prevention and Incident Reporting Pre- and Post-Test

**Attitudes**

The questions that were asked of the participants about their attitudes towards needlestick injury prevention and incident reporting are listed in Table 3. The initial five questions on attitudes were opinion-based and could not be measured. The pre and post-test responses were calculated into percentages. Using a paired *t*-test, the pre-test, analysis indicated a mean score of 78.000 with a standard deviation of 4.108. The post-test mean score was 89.000 with a standard deviation of 7.202. The *t*-statistic = 2.6485 and the *df*= 4. The two-tailed *p* value of the Pre and

Post-Test Attitudes scores was 0.0571. Despite an increase in the mean scores, the attitudes results were not quite statistically significant at $p < 0.5$. For visual representation, a table (Table 5) and bar graph (Figure 3) of the pre and post-test statistical results for the attitudes domain are presented.

Table 4

Questions on Attitudes

	<u>Count</u> (n=5)	<u>Pre-Test</u> <u>Percent</u>	<u>Post-Test</u> <u>Percent</u>
<u>I am worried about sustaining a needlestick injury.</u>			
Strongly disagree (1)			
Disagree (2)		0%	20%
Neutral (3)		40%	0%
Agree (4)		20%	20%
Strongly agree (5)		20%	60%
<u>Patient care is more important than the safety of health care workers.</u>			
Strongly disagree (1)			
Disagree (2)		60%	60%
Neutral (3)		40%	40%
Agree (4)		0%	0%
Strongly agree (5)		0%	0%
<u>All sharps injuries at work should be reported immediately.</u>			
Strongly disagree (1)			
Disagree (2)		0%	0%
Neutral (3)		0%	0%
Agree (4)		0%	0%
Strongly agree (5)		60%	20%
		40%	80%
<u>I think needlestick injuries are preventable.</u>			
Strongly disagree (1)			
Disagree (2)		0%	0%
Neutral (3)		60%	0%
Agree (4)		40%	60%
Strongly agree (5)		0%	40%
<u>Needles and sharp objects waste should be disposed of by a professional company, not in domestic waste.</u>			
Strongly disagree (1)			
Disagree (2)		0%	0%
		0%	0%

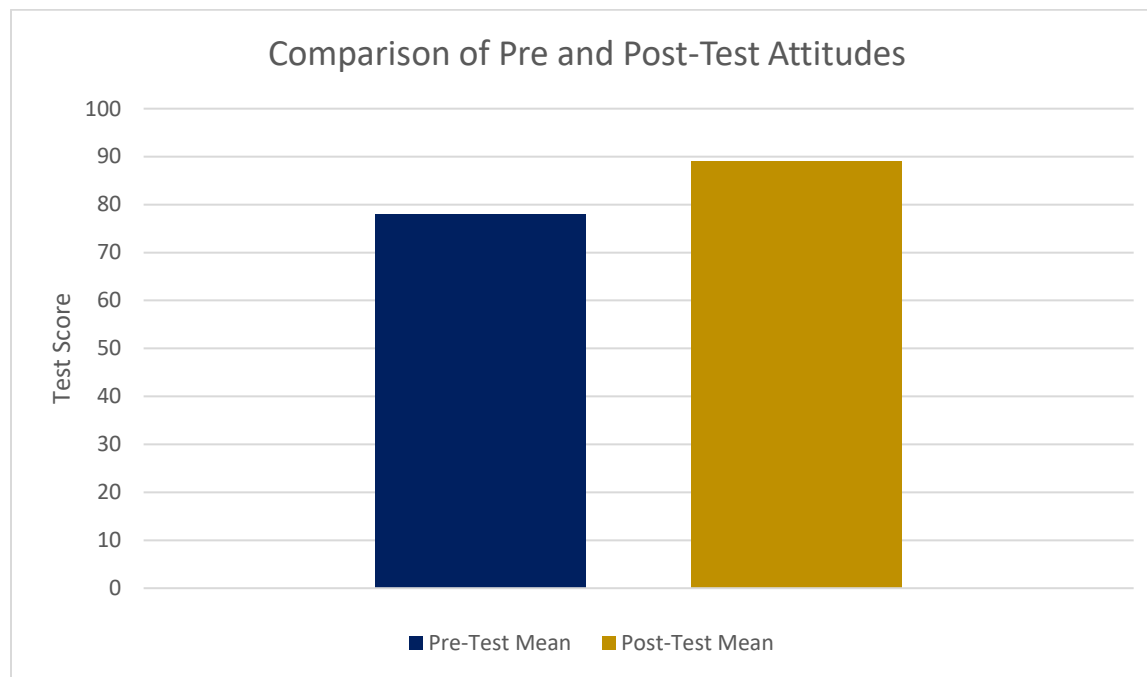
Neutral (3)	0%	0%
Agree (4)	40%	40%
Strongly agree (5)	60%	60%
<u>If you have a needlestick injury your immediate action will be to wash your hand with water only.</u>		
Yes	0%	0%
No*	100%	100%
<u>If you have a needlestick injury your immediate action will be to wash your hand with soap and water.</u>		
Yes*	100%	100%
No	0%	0%
<u>If you have a needlestick injury your immediate action will be to wash your hand with antiseptic solution.</u>		
Yes	80%	80%
No*	20%	20%

Note: An asterisk (*) is used to denote the “correct,” or “expected,” responses for the questions.

Table 5

Statistics for Attitudes Scores

Pre-Intervention		Post Intervention		<i>t</i>	<i>p</i>	<i>df</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
78.000	4.108	89.000	7.202	2.6485	0.0571	4

Figure 3**The Mean Scores of Attitudes of NSI Prevention and Incident Reporting Pre- and Post-Test****Behaviors**

The questions that were asked of the participants about their behaviors towards needlestick injury prevention and incident reporting are listed in Table 4. The initial four questions on behaviors were based on personal occurrences, if applicable, and could not be measured. The pre and post-test responses were calculated into percentages. For the pre-test, the analysis indicated a mean score of 89.980 with a standard deviation of 9.147. The post-test mean score was 96.660 with a standard deviation of 7.468. The t -statistic = 1.6330, and the $df= 4$. The two-tailed p -value of the Pre and Post-Test Attitudes scores was 0.1778. Despite an increase in the mean scores, the results of the behaviors were not quite statistically significant at $p < 0.5$. For

visual representation, a table (Table 7) and bar graph (Figure 4) of the pre and post-test statistical results for the behaviors domain are presented.

Table 6

Questions on Behaviors

	<u>Count</u> (n=5)	<u>Pre-Test</u> <u>Percent</u>	<u>Post-Test</u> <u>Percent</u>
<u>Did you ever experience a needlestick injury at work?</u>			
Yes		20%	20%
No		80%	80%
<u>Did you report the needlestick injury?</u>			
Yes		0%	0%
No		20%	20%
N/A		80%	80%
<u>If yes: at which time was the injury reported?</u>			
Immediately after the incident		0%	0%
Later, before going off the workplace (same day)		0%	0%
After two+ days of the incident		0%	0%
N/A		100%	100%
<u>If no: what was (were) the reasons for not reporting the incident?</u>			
<u>Select all that apply.</u>			
Being too busy at the time of injury		20%	20%
The sharp was never used on the patient		0%	0%
The sharp was used on the patient but the patient's disease was not of concern		0%	0%
I did not know I should report		0%	0%
I did not know how to report		0%	0%
My colleagues told me not to worry		0%	0%
N/A		80%	80%
<u>Do you recap needles with 2 hands before disposal?</u>			
Yes		20%	20%
No*		80%	80%
<u>Do you bend needles before disposal?</u>			
Yes		0%	0%
No*		100%	100%
<u>Is the safety box/disposal container usually available?</u>			
Yes*		100%	100%
No		0%	0%
<u>Do you always put sharp items into its assigned disposal container?</u>			
Yes*		100%	100%
No		0%	0%

<u>Have you been vaccinated against Hepatitis B?</u>		
Yes*	100%	100%
No	0%	0%
<u>Have you received training on the use of safe devices in the last year?</u>		
Yes*	60%	100%
No	40%	0%

Note: An asterisk (*) is used to denote the “correct,” or “expected,” responses for the questions.

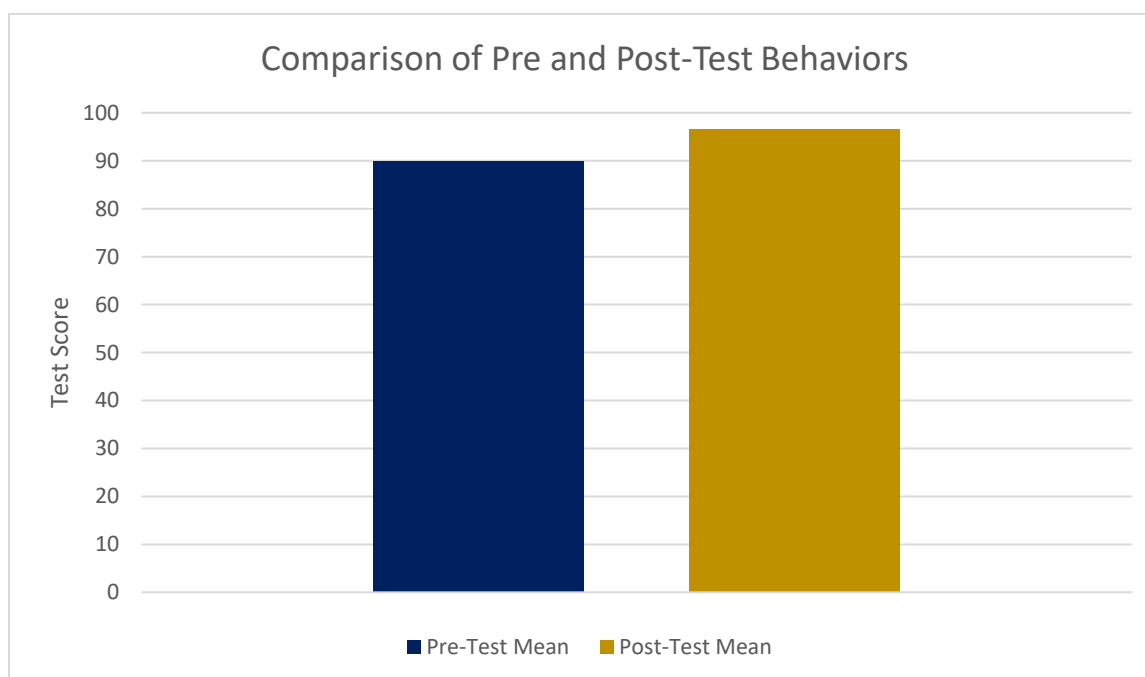
Table 7

Statistics for Behaviors Scores

Pre-Intervention		Post Intervention		<i>t</i>	<i>p</i>	<i>df</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
89.980	9.147	96.660	7.468	1.6330	0.1778	4

Figure 4

The Mean Scores of Behaviors of NSI Prevention and Incident Reporting Pre- and Post-Test



IX. Discussion

This quality improvement project examined whether an occupational safety course regarding needlestick injury prevention and incident reporting in the workplace would positively influence the knowledge, attitudes, and behaviors of emergency department registered nurses on needlestick injury prevention and incident reporting. Overall, for all three sections of the knowledges, attitudes, and behaviors in the QI project, the paired *t*-test findings suggested that the intervention of the occupational safety course on needlestick injury prevention and incident reporting was not statistically significant and did not show much of a change in scores, before and after the intervention. There was not a positive influence and it is possible that the minor differences in score were due to chance and not necessarily the occupational safety course.

Educational interventions for sharps safety and incident reporting have the potential to see great results but need more research. As stated in the literature review, the researchers in Alfulayw et al. (2021) believed that training programs in adherence to OSHA work practices handling needles was necessary. Unlike in the literature review studies, this QI project needed a larger sample size and it is possible that in-person training may be more effective. For example, in Walker et al. (2019), the in-person training with the sharps-safety-skills station and the revised post-exposure data collection to capture handling behaviors and practices that contribute to NSIs was showed an overall 30% reduction in NSIs, showing that the in-person educational interventions made a significant difference.

To help change future practice as a result of this project, the DNP candidate recommends the future PDSA cycle recruit a larger sample size to generate more positive and useful data. In this project there were slight increases in mean scores but overall, it was not enough to make a big difference. Although the statistics do not demonstrate this, the occupational safety course has

the potential to share valuable information to a great number of registered nurses to help prevent needlestick injuries and encourage incident reporting. In the event that arrangements can be made, an in-person 30-minute uninterrupted lesson on these topics can prove helpful.

X. Limitations of the Project

This DNP Project taught the DNP candidate about hard work and perseverance. An important limitation to the DNP candidate included autonomy. The DNP candidate faced a barrier early on in the planning phase. The prospective questionnaire was not positively received by the facility's nursing research council. A concern for validity and reliability of the outcome variable was raised. Therefore, the DNP candidate searched for an already established questionnaire. Allowing new research instruments to be experimented and measured was a part of advancing nursing practice, scholarly research, and quality improvement. To address future limitations of this nature, nursing scholars should be allowed more autonomy to conduct their DNP projects because the topics selected for these final projects are presented as knowledge gaps in the literature.

Moreover, a great limitation to the QI project was the small sample size, participant responsiveness, and educational intervention via Microsoft PowerPoint. There was also a lack of male participants, limiting the generalizability to only female participants. Though the DNP candidate put much effort into recruiting participants, many nurses did not want or were unable to participate. The immersion site hospital had about 50 RNs who were employed in the adult ED. The DNP candidate visited five ED pre-shift huddles of various times (0700, 1100, and 1900) but only received 10 interested participants. Of the 10, only five completed the pre and post-test. The incomplete responses were excluded.

Despite the reasons in favor of a recorded Microsoft PowerPoint intervention, it is possible that in-person training may have been more effective. A comparison of survey methods showed that in-person surveys had a 50% response rates, while email surveys was 30%; online surveys were 29%, and in-app surveys was 13% (Nayak & Narayan, 2019). According to Qualtrics, survey response rates increase when asked for immediate feedback after services are delivered. There is a 40% more accurate rate with immediate feedback, rather than feedback collected 24 hours later (How to Increase Online Survey Response Rates, n.d.). This information is good to have to learn how to improve future projects.

XI. Implications for the Project

For future PDSA cycles on NSI prevention and incident reporting, one must make a stronger case on the magnitude of this project. This QI project has the potential to change nursing practice and enforce the importance of continuous education. Based on the data analysis, the DNP candidate should consider contacting the non-responder participants and identify their reasons for not completing involvement. This would help address completion rates for future studies. Once identified, one can expand the project and determine if the occupational safety course would have a greater response rate and significant results if offered to nurses who provide direct clinical care in different departments.

From an educational aspect, implications for advanced practice nursing include continued education of emergency department registered nurses on needlestick injury prevention and incident reporting. Needlestick injuries are dangerous occurrences and organizations must recognize this and shift their policies, as needed, to ensure that they are following the best practices. Collaborating with their frontline healthcare workers on this topic would be beneficial.

The occupational safety course can be applied to all nurses who provide direct clinical care, as needles are handled by nurses regularly. With assistance from the facility's Clinical Education department, the plan was to continue to advocate for the topic and increased support for nurses working towards quality improvement and advancement of the nursing field.

XII. Conclusion

For clinical healthcare workers, such as nurses, needles are regularly handled. With that, there is the possibility for an NSI to occur. Education on NSI prevention and incident reporting is valuable in encouraging workplace safety for registered nurses and clinical healthcare workers. Although the findings from this QI project were not successful in displaying a statistically significant positive influence on the knowledge, attitudes, and behaviors of needlestick injury prevention and incident reporting in emergency department registered nurses, there is hope that future PDSA cycles, using an occupational safety course on the topics, will result in positive influences. The limitations should be taken into consideration for future cycles. Incident reporting in the event of a needlestick injury is crucial for the nurse to address any consequences from the injury and not have to deal with the issue on their own. Nursing practice can change from the occupational safety course intervention because it addresses the topic of psychological stressors that may be involved with needlestick injuries. When healthcare workers are educated on needlestick injury prevention and incident reporting, they can adjust some of their practice methods that are not necessarily safe, and learn how to help others along the way. Incident reporting allows one to share their experience so the organization can be aware of possible measures that need to be adjusted to ensure workplace safety and provide continued education to their staff on a more consistent basis. With a larger sample size, improved recruitment measures,

and increased participant retention rates, the DNP candidate hopes that future PDSA cycles will learn from this QI project and determine that using an occupational safety course on NSI prevention and incident reporting will generate more meaningful data.

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XIV. Dissemination Plan

Introduction

Dissemination plans are necessary when developing new methods and conducting research for quality improvement. Effective dissemination is about getting one's research findings into the hands of people who can utilize them and maximize the benefits of the study without delay (National Institute of Health Research, 2019). It helps keep researchers on target and thinking of their work's effects on a greater audience.

Dissemination Goals

The dissemination goal of the DNP candidate is to present the occupational safety course to different areas such as medical-surgical units, intensive care units, and operating rooms. Although the safety course is directed toward emergency-department registered nurses, NSIs can affect all nurses who provide direct clinical care. The PowerPoint serves as a learning opportunity filled with relevant information and resources.

Dissemination by Presentation

The DNP candidate is considering submitting the abstract to the American Association of Occupational Health Nurses (AAOHN) for their 2023 conference in Texas. The AAOHN was selected because the occupational safety course involves an education tool for workplace safety. If this information is disseminated to occupational health nurses, those readers can work with their facilities to implement the course. If unable to do so, the nurses could emphasize the importance of addressing needlestick injury prevention and incident reporting at their workplace.

Dissemination by Publication

The DNP candidate is considering the *Workplace Health & Safety: Promoting Work Environments Conducive to Well-Being and Productivity* journal for submission of this DNP

project into their publication. This journal is the official publication of the AAOHN. The DNP candidate has reviewed their author guidelines for submission.

XV. Appendices

IRB Approval Letter



**Office of Research Integrity
Research Compliance, MARC 414**

MEMORANDUM

To: Dr. Deborah Sherman
CC: Shadaina Dessalines

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: September 2, 2022

Protocol Title: "Investigating the Effects of an Occupational Safety Course on Needlestick Injury Prevention and Incident Reporting for Emergency Department Registered Nurses: A Quality Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-22-0410 **IRB Exemption Date:** 09/02/22
TOPAZ Reference #: 111998

As a requirement of IRB Exemption you are required to:


- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.


Special Conditions: N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

MMV/em

Letter of Approval from the Facility





1600 S. Andrews Avenue
Fort Lauderdale, FL 33316
t 954.355.4400
BrowardHealth.org

Date: 8/31/2022

Dear Shadaina,

Re: Investigating the Effects on an Occupational Safety Course on Needlestick Injury Prevention & Incident Reporting for Emergency Department RNs: A Quality Improvement Project

We are pleased to inform you that the above-referenced request has been approved on behalf of the EBRC Committee. This approval is in effect for one year with the condition that the findings will be presented at the Evidence-Based and shared with the unit(s) impacted. Any changes in the procedures affecting interaction with human subjects should be reported to the Broward Health IRB Ethics Committee. The approval is effective while you are a registered Florida International University student.

Best regards on your Quality Improvement Project

Sincerely,
Kathleen Fedyszen
Odette Hamilton
Audrey Henderson-Williams
 Co-Chairs Evidenced Based and Research Council

Chief Nursing Officer

*Broward Health Medical Center • Broward Health North • Broward Health Imperial Point • Broward Health Coral Springs • Salah Foundation Children's Hospital • Broward Health Weston
 Broward Health Community Health Services • Broward Health Physician Group • Broward Health International • Broward Health Urgent Care • Broward Health Foundation*

Data Collection Documents

Written Consent Form



ADULT CONSENT TO PARTICIPATE IN A QUALITY IMPROVEMENT STUDY

Investigating the Effects of an Occupational Safety Course on Needlestick Injury Prevention and Incident Reporting for Emergency Department Registered Nurses: A Quality Improvement Project

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** The purpose of the study is to examine the knowledge, attitudes, and behaviors of needlestick injury prevention and incident reporting amongst emergency department registered nurses.
- **Procedures:** If you choose to participate, you will be asked to answer questions on needlestick injuries and incident reporting and then watch a PowerPoint presentation with voiceovers. After one week, you will be asked to answer the same questions again.
- **Duration:** Your participation will take 90 minutes over the span of one month.
- **Risks:** The main risk from participation in this quality improvement project is possible emotional stress that may arise if you have personally experienced a needlestick injury.
- **Benefits:** The main benefit to you from this quality improvement project is learning how to prevent needlestick injuries and to learn the importance of incident reporting.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this quality improvement project is voluntary.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY

The purpose of this study is to examine the knowledge, attitudes, and behaviors of needlestick injury prevention and incident reporting amongst emergency department registered nurses.

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 15 proposed people in this quality improvement project.

DURATION OF THE STUDY

Your participation will involve a total of 90 minutes, over the span of one month.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:

- Complete this Informed Consent form prior to participation.
- Complete a Demographic and Professional Data form answering questions about your background.
- Complete a questionnaire on needlestick injuries and incident reporting.
- Watch an interactive PowerPoint presentation on needlestick injuries and incident reporting.
- One week after completion of the PowerPoint, complete the same questionnaire that was given on needlestick injuries and incident reporting.

RISKS AND/OR DISCOMFORTS

The study has the following possible risks to you: Emotional triggers that may arise if you have personally experienced a needlestick injury.

BENEFITS

The study has the following possible benefits to you: Increased knowledge on needlestick injury prevention and incident reporting should these injuries occur.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this study. Any significant new findings developed during the course of the study which may relate to your willingness to continue participation will be provided to you.

CONFIDENTIALITY

The records of this study will be kept private and will be protected to the fullest extent provided by law. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely, and only the researcher team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

All of the study's data will be encrypted and password-protected. Each participant will be given a code number so no names will be associated with the study data. The Doctorate of Nursing Practice (DNP) candidate will have the code book with the names of the participants and their code numbers. The master key will be with the DNP candidate, who is the only individual able to identify the coded data. The online data will be stored in a password protected folder in the password-protected laptop of the DNP candidate, who is the only person with access to it. The

laptop is stored in the locked office of the DNP candidate. Data for this study will be destroyed five years after it is collected.

USE OF YOUR INFORMATION

Your information collected as part of the study will not be used or distributed for future research studies even if identifiers are removed.

COMPENSATION & COSTS

There is no compensation for participating in this quality improvement project. There are no costs to you for participating in this study.

MEDICAL TREATMENT

Routinely, FIU, its agents, or its employees do not compensate for or provide free care for human subjects in the event that any injury results from participation in a research project. If you become ill or injured as a direct result of participating in this study, contact your regular medical provider. If you have insurance, your insurance company may or may not pay for these costs. If you do not have insurance, or if your insurance company refuses to pay, you will be billed. Funds to compensate for pain, expenses, lost wages and other damages caused by injury are not routinely available.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Shadaina Dessalines at sdess004@fiu.edu and/or (305) 200-6340.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this quality improvement project or about ethical issues with this study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I understand that I will be given a copy of this form for my records.

Signature of Participant

Date

Printed Name of Participant

Signature of Person Obtaining Consent

Date

Data Collection Documents

Participant Recruitment Flyer

The flyer features a teal background with medical-themed illustrations: a syringe, a bandage, a virus particle, and a nurse. The nurse is depicted in the bottom left, wearing a white lab coat, a face mask, and blue gloves, holding a syringe. The text is contained within white rounded rectangular boxes.

Needlestick Injury Prevention and Incident Reporting: A Quality Improvement Project

Are you a staff nurse working in the adult
Emergency Department?

Would you be willing to participate in a
quality improvement project
aimed at preventing needlestick injuries
and encouraging incident reporting?

An occupational safety course PowerPoint will
be shared via email to assess the knowledge,
attitudes, and behaviors of emergency
department RNs on needlestick injury
prevention and incident reporting.

Please contact Doctorate of
Nursing Practice candidate,
Shadaina Dessalines,
MSN, APRN, FNP-BC, at
sdess004@fiu.edu or
(305) 200- 6340 for interest
or inquiries.

The Quality
Improvement Project
will be conducted
over four weeks
within **September
and October 2022.**

Demographic and Professional Data Form

DEMOGRAPHIC AND PROFESSIONAL DATA FORM

1) What gender do you identify as?

- Male
- Female
- Non-binary
- Prefer not to say

2) What is your age range?

- 18 to 24 years-old
- 25 to 34 years-old
- 35 to 44 years-old
- 45 to 54 years-old
- 55 to 64 years-old
- 65+ years old

3) Please specify your ethnic background.

- White/ Caucasian
- American Indian
- Middle Eastern or North African
- Asian
- Black/ African American
- Caribbean
- Hispanic/ Latino, or Spanish origin
- Native Hawaiian or other Pacific Islander
- Multi-Ethnic or Other

4) What is your highest level of education?

- Associate degree
- Bachelor's degree
- Graduate degree
- Other

5) How many years of nursing experience do you have?

- 0- 2 years
- 3- 5 years
- 6- 9 years
- 10- 15 years
- 16- 20 years
- 20+ years

6) What is your current employment status at this facility?

- Full-time staff
- Part-time staff
- Per diem/ Pool staff
- Travel or agency

7) Do you provide direct patient care?

- Yes
- No

Study Instruments

Pre and Post-Test Questionnaire

Needlestick Injury (NSI) Prevention and Incident Reporting Questionnaire

Questions on Knowledge

+	<p>1) NSIs are defined as wounds caused by needles that accidentally puncture the skin.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>2) Recapping of the needle after performing nursing procedures is recommended to decrease the risk of needlestick injury.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>3) Disposal in a sharps container after performing procedures is recommended to decrease the risk of needlestick injury.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>4) Three doses are required for full protection from Hepatitis B.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>5) Hepatitis C disease can be prevented by vaccine.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>6) Needlestick injuries may transmit blood-borne diseases like hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus HIV.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>7) Hepatitis B and C, HIV are blood-borne pathogens that medical staff are most commonly exposed to when they experience a needlestick injury.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>8) In needlestick injuries, Hepatitis B carries the greatest risk of transmission.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>9) The percentage transmission of HBV is higher than HIV owing to needlestick injury.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>10) Are you aware of the procedure and guidelines to follow if you sustain a needlestick injury in the workplace?</p>

<p>10) Are you aware of the procedure and guidelines to follow if you sustain a needlestick injury in the workplace?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>11) There is currently no approved post-exposure prophylaxis for HCV.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>12) Concerning needle stick injury from HCV infected patient, HCV antibody testing should be performed at 4–6 months.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>13) Tetanus vaccine is part of the treatment after experiencing needlestick injury.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>

Questions on Attitudes

<p>1) I am worried about sustaining a needlestick injury.</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Strongly agree</p>
<p>2) Patient care is more important than the safety of health care workers.</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Strongly agree</p>
<p>3) All sharps injuries at work should be reported immediately.</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Strongly agree</p>
<p>4) I think needlestick injuries are preventable.</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Disagree</p>

<ul style="list-style-type: none"> <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
<p>5) Needles and sharp objects waste should be disposed of by a professional company, not in domestic waste.</p> <ul style="list-style-type: none"> <input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
<p>6) If you have a needlestick injury your immediate action will be to wash your hand with water only.</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>7) If you have a needlestick injury your immediate action will be to wash your hand with soap and water.</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>8) If you have a needlestick injury your immediate action will be to wash your hand with antiseptic solution.</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No

Questions on Behaviors


<p>1) Did you ever experience a needlestick injury at work?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>2) Did you report the needlestick injury?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
<p>3) If yes: at which time was the injury reported?</p> <ul style="list-style-type: none"> <input type="radio"/> Immediately after the incident <input type="radio"/> Later, before going off the workplace (same day) <input type="radio"/> After two+ days of the incident <input type="radio"/> N/A

<p>4) If no: what was (were) the reasons for not reporting the incident? Select all that apply.</p> <ul style="list-style-type: none"> <input type="radio"/> Being too busy at the time of injury <input type="radio"/> The sharp was never used on the patient <input type="radio"/> The sharp was used on the patient but the patient's disease was not of concern <input type="radio"/> I did not know I should report <input type="radio"/> I did not know how to report <input type="radio"/> My colleagues told me not to worry <input type="radio"/> N/A
<p>5) Do you recap needles with 2 hands before disposal?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>6) Do you bend needles before disposal?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>7) Is the safety box/disposal container usually available?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>8) Do you always put sharp items into its assigned disposal container?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>9) Have you been vaccinated against Hepatitis B?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No
<p>10) Have you received training on the use of safe devices in the last year?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No

Memo: With permission from the authors, this questionnaire was adapted from published research article "Incidence, Knowledge, Attitude and Practice Toward Needle Stick Injury Among Health Care Workers in Abha City, Saudi Arabia" by Alsabaani et al (2022). "Practices" is substituted with "Behaviors," and grammatical edits were made by DNP candidate Shadaina Dessalines.


Educational Intervention

DNP Project Occupational Safety Course PowerPoint



INVESTIGATING THE EFFECTS OF AN OCCUPATIONAL SAFETY COURSE ON NEEDLESTICK INJURY PREVENTION AND INCIDENT REPORTING FOR EMERGENCY DEPARTMENT REGISTERED NURSES: A QUALITY IMPROVEMENT PROJECT

Presented by:
Shadaina Dessalines, MSN, APRN, FNP-BC
 (FIU Doctorate of Nursing Practice candidate)




Disclaimer Notice

Please be advised that this PowerPoint presentation may trigger emotional distress for individuals who have personally experienced a needlestick injury.

Please contact the Doctorate of Nursing Practice (DNP) candidate, Shadaina Dessalines, if you have any concerns.

Thank you.



Purpose

- As part of their final project, the DNP candidate aims to utilize this presentation as a method to assess the knowledge, attitudes, and behaviors of emergency department (ED) registered nurses (RN) on needlestick injury (NSI) prevention and incident reporting.
- The purpose of this PowerPoint (PPT) presentation is to provide an educational resource on NSI prevention and incident reporting.

Definition of Terms

- Needlestick injury:** The Centers for Disease Control and Prevention (CDC) defines a sharps injury as a percutaneous wound from a needle, scalpel, or other sharp objects that may result in exposure to blood or bodily fluids. (Centers for Disease Control and Prevention (CDC), 2019a).
- Incident report:** A tool documenting an event that may or may not have caused injury to a person or damage to a company asset. (Incident report guide: All you need to know, 2021).

Scope of the Problem

- NSIs account for 385,000 sharps-related injuries to hospital-based workers each year. (Centers for Disease Control and Prevention, 2015a).
- Nationally, there's an average of 1,000 NSIs per day for hospital-based healthcare workers. (Needlestick injuries, n.d.).
- The majority of reported NSIs have been sustained by nurses, surgeons, and emergency personnel. (Boya et al., 2020).
- The rates of underreporting of sharps injuries in healthcare worldwide ranges from 19% to 86%. Sun et al., 2021).
- Many RNs are unfamiliar with workplace protocol following an NSI.




Background

- Nurses have frequent patient contact, perform many procedures with sharps such as phlebotomy, intravenous needle insertions, and medication injections. (Boya et al., 2020).
- Risk factors for sustaining an NSI:**
 - Long work hours
 - Overuse and unnecessary use of devices
 - Absence of personal protective equipment
 - Recapping needles
 - Engineering defects
 - Inappropriate device disposal
 - Lack of training
 - Staff shortage
 - Patient behavior
- NSIs underreported in the workplace include:
 - Inadequate protocols for post-exposure and reporting
 - Fear of punishment
 - Lack of time
 - Misperception of the risk of bloodborne pathogen exposure(Matsubara et al., 2020).


Occupational Safety and Health Administration

- Formed to ensure safety and healthy occupational conditions while working.
- Standards enacted to prevent NSIs of healthcare workers.
- Standards set through education and outreach, and impacting virtually every safety or health issue. (OSHA at 30: Three Decades of Progress in Occupational Safety and Health, n.d.).
- Established the Needlestick Safety and Prevention Act demanding employers to address safety practices. (Walker et al., 2019).



Bloodborne Pathogen Exposure (BBPE)

- A contaminated needle can transmit infection and lead to a bloodborne pathogen exposure (BBPE).
- A bloodborne pathogen is defined as infectious microorganisms in human blood that can cause disease in humans. (“Bloodborne Pathogens and Needlestick Prevention” (n.d.).
- If a patient is infected with a bloodborne pathogen, when the healthcare worker is stuck with a contaminated needle, there is a great risk. There is a possibility that the BBPE could cause the worker to seroconvert and acquire one of the many bloodborne pathogens.
- There is also the possibility that the healthcare worker does not acquire infection during the BBPE.



BBPE cont'd

Did you know that...


- The first case of human immunodeficiency virus (HIV) transmission through a contaminated needlestick was in 1984. (Wajee et al., 2013).
- Globally, NSIs have been found to cause 1,000 cases of HIV, 66,000 cases of Hepatitis B (Hep B), and 16,000 cases of Hepatitis C (Hep C) on an annual basis. (Boyu et al., 2020).
- Seroconversion rates:
 - HIV: 0.3%
 - Hep B: 23- 62%
 - Hep C: 1.8%(Wajee et al., 2013).

What To Do After an NSI Occurs

- Immediately wash the exposed area with soap and water.
- Inform charge nurse or nurse manager of the incident.
- Go to the ED for treatment and to have labs drawn as soon as possible.
 - Labs drawn include HIV, Hep B, Hep C, liver enzymes (ALT and AST)
- Contact Worker's Compensation to report the incident.
- Visit Employee Health for follow-up and continuation of incident report.
- Seek evaluation by a facility-associated Infectious Disease expert, if applicable.


BBPE Treatment

- Post-Exposure Prophylactic (PEP), only used in emergency situations, is medication taken to prevent HIV after a possible exposure.
 - Not required if patient is HIV negative
 - Higher risk dependent on patient's viral titer and seroconversion.(PEP (Post-Exposure Prophylaxis), 2021).
- Management of acquired Hepatitis B after an NSI is dependent on vaccination status.
 - Give Hepatitis B immunoglobulin within 24 hours of BBPE.
 - Unvaccinated: give HBV vaccine at 0, 1, and 2 months after NSI. Booster shot at 12 months.(King and Strong, 2020).




BBPE Treatment cont'd

- Unknown number of healthcare workers who developed Hepatitis C due to lack of follow-up after an NSI.
 - CDC recommended testing 4-6 months post-exposure in caution of aviremia during acute infection. (CDC, 2020).
 - No preventive vaccine. No post-exposure treatment but some promise with newer drugs.
- Tetanus Booster
 - Tetanus spores can enter the body through puncture wounds. (King and Strong, 2020).
 - Administer if no history of vaccination within the past 10 years. (CDC, 2019b).

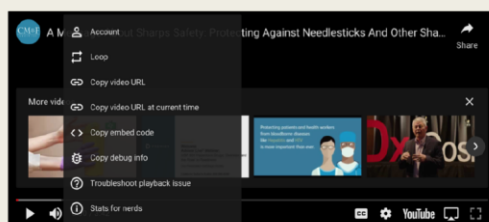


Psychological Effects

- Hospital workers who sustained needlestick and sharps injuries had significantly higher anxiety scores than those who did not, and those scores were higher immediately after the incident.
- Three identified studies indicated that at least 40% of the respective participants suffered from anxiety, ranging from mild to persistent after an NSI. (Cook and Stephens, 2017).
- The hospital facility is resourced with an Employee Assistance Program (EAP), with psychology workers, that provides support to benefits eligible employees in need.
 - Federal Occupational Health program that helps employees resolve personal problems that may adversely affect their work performance, conduct, and overall well-being. (Employee Assistance Program (EAP), 2021).

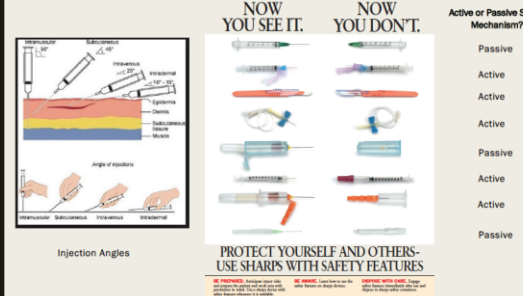


Sharps Safety



(CMAA Group, 2017).

PROTECT YOURSELF AND OTHERS- USE SHARPS WITH SAFETY FEATURES



Injection Angles: Intramuscular (90°), Subcutaneous (45°), Intravenous (27°), Intraarterial (90°).


Active or Passive Safety Mechanism?

- Passive
- Active
- Active
- Passive
- Active
- Active
- Passive

(CDC, 2015b)

Sharps Disposal

- Containers should be upright, visible, within easy reach, and below eye level.
- Ensure visibility and easy determination of the container's fill status. (Sharps Injuries: Sharps Disposal, 2014).
- Containers should be disposed once they are 3/4 full.
- Don't throw needles and other sharps into the trash or recycle bin.
- Don't try to remove, bend, break, or recap needles used by others. (Food and Drug Administration, 2019).



Needlestick Injury Prevention Checklist

- Plan ahead.
- Scan your environment.
- Utilize your resources in the room.
- Pay attention to injection procedures and disposal.
- Work slowly because rushing leads to accidents.
- Don't place your fingers in the direction that you will be injecting the needle.
- Don't recap the needle.

Do's and Don'ts When Handling Sharps

DO	DON'T
Ensure adequate lighting.	Bend, break, or manipulate needles before disposal.
Use tongs, cotton forceps, or hemostats to pick up sharps from the floor.	Use inappropriate sized PPE or instruments.
Direct the needle away from your body when injecting a patient.	Discard sharps into the trash or recyclable bin.
Activate the needle safety (if applicable) after use. Try to force or fight with the safety mechanism.	Fill the sharps container past the fill line.
Discard used needles as soon as possible.	Reach blindly into a container or tray of sharps.
Look before reaching for a sharp instrument.	Use hand-to-hand passing of sharp instruments to another person.
Use a predetermined neutral zone or tray for placing and retrieving used sharps.	

(TEAM HIDDLE, 2019)

Incident Reporting

- In a survey conducted from 1,010 participants, 488 had an NSI but only 10% reported it the hospital's team.
 - The most popular response (27%) was being too busy with work at the time of injury. (Joukar et al., 2018)
- A 1999 survey on under-reporting of contaminated NSIs in emergency health care workers recalled 643 exposures, yet only 228 (35%) were formally reported.
 - 72% of nurses had at least 2 NSI exposures (Tandberg et al., 1999)



Why Report an NSI?

- NSIs result in lower quality of life and may affect psychological well-being. (Katsenman et al., 2019)
- Help prevent further occurrences and allow the hospital to make changes.
- Educate other clinical workers on safety measures to follow.
- Seeking prompt treatment can help prevent infection or further complications.
- Help facilitate team culture and openness. (Anderson et al., 2013)
- Positive effect on safety.



Workers' Compensation Department

- Workers' Compensation assists workers after workplace injuries have occurred, such as an NSI.
- With Workers' Compensation:
 - File a claim with one of the adjusters and submit all necessary paperwork.
 - Be arranged to see an infectious disease provider, if applicable.
 - Receive information on follow-up, as applicable.
- Expenses are covered under workers' compensation by the facility.

Employee Health Department

- Report to Employee Health after having initial labs drawn in the ED.
- At Employee Health:
 - Complete paperwork and incident report on the NSI.
 - Review lab results and the source's, if capable.
 - Receive education on BBPEs and how to prevent recurrence of NSI.
 - Discuss the action plan/ follow-up.
- Advises department manager to initiate discussion and education on NSI prevention with staff.



Case Study

- Amy, RN, was working the night shift in the emergency room when the staff received alert that there were three incoming patients from a car crash on the highway. It was Amy's third shift in a row and the department was short-staffed. Amy was assigned one of the patients and she was eager to help out however possible.
- Once placed in a room and orders were reviewed, Amy went to retrieve a butterfly needle kit for lab draw. The nursing assistant was busy so Amy decided to draw the blood herself. She put on her gloves, placed the supplies on the patient's bed, raised the bed to a comfortable height, and began to open the packages.
- After drawing the labs into the test tubes, she removed the tourniquet and attempted to activate the safety mechanism. With her left hand she placed the piece of gauze over the needle still in the patient's vein, and pulled on the tubing with her right hand. All of a sudden, Amy felt a prick to her left index finger.
- In her attempt to activate the safety mechanism single-handedly, she didn't realize that the needle didn't fully retract and her left hand was covering the gauze. Amy left the tubing on the bed and quickly ran to wash her hands.



Case Study Questions

- 1) What should have been avoided in this case?
- Amy being a team player to help out her department.
 - Applying PPE.
 - Placing the supplies on the bed.
 - Placing her left hand over the gauze and needle.
 - Activating the safety mechanism single-handedly.
 - Quickly running to wash her hands.



(Thomas, 2016)

Case Study Questions

- 2) After washing her hands, Amy reports the NSI to her manager. What should she expect to do immediately after this?
- Call her PCP to inform them of the incident and have labs ordered.
 - Report the incident to Worker's Compensation and Employee Health.
 - That was all that she needed to do. Her manager will take care of the rest.
 - Ask to be seen by one of the Emergency Department providers for labs and treatment.

Case Study Questions

- 3) Amy is requesting PEP after the NSI. The source (Amy's patient) labs were negative for HIV, HBV, and HCV. Amy's HIV and HCV labs were negative and her HBV antibody lab showed immunity. Her last TDAP was in 2019. Which treatment plan should she expect?
- Antivirals
 - Antibiotics
 - Tetanus Booster
 - Monitor for change in symptoms

Healthstream Modules

- The facility offers Healthstream modules on needlestick injury prevention, bloodborne pathogens, and incident reporting.



Please feel free to review the PowerPoint content again.

Please contact DNP candidate, Shadaina Dessalines, if you have any questions comments or concerns.

Qualtrics link for Post-Test Questionnaire will be emailed in one week.

THANK YOU!!

THANK YOU FOR
YOUR TIME AND
ATTENTION!



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