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Staff Nurse Education on Best Practices for Preventing Blood-Borne Pathogen Exposures

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College of Nursing

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Moriohunmubo Omonayin

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

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Walden University
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Abstract

Staff Nurse Education on Best Practices for Preventing Blood-Borne Pathogen Exposures

by

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MS, Walden University, 2018

BS, Chamberlin University, 2011

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

May 2022

Abstract

Blood-borne pathogens (BBPs) are an occupational risk confronted by many health care workers. Nurses are routinely exposed to Hepatitis B, Hepatitis C, and human immunodeficiency virus. A literature review, which included retrieval of peer-reviewed quantitative articles, systematic reviews, and mixed-methods studies published between 2014 and 2021 supported the need for nurses to be knowledgeable about prevention of BBP exposures and the processes to follow after an incident. The project aimed to educate staff nurses on the best practices for preventing the risk for and transmission of BBPs. A pretest–education–posttest format was used to assess knowledge before and after the presentation of an education session. Benner’s stages of skills acquisition theory in nursing guided the project. Sixteen nurses completed both the pretest and posttest questionnaires and attended the education session. Simple descriptive statistics (counts and percentages) were used to report the change in nurses’ knowledge. Fourteen of 16 nurse participants answered each of the 10 pretest questions correctly. After the education, all 16 nurse participants answered all 10 questions correctly. Based on the findings, nurses know what to do regarding prevention of BBP transmission and reporting of BBP exposures. Future projects might evaluate contributing factors other than knowledge deficits that increase BBP exposure risks among nurses. Particular factors to explore are how distractions and nurses’ workloads contribute to the risk of BBP infections. Ensuring knowledge and compliance of staff nurses with organizational processes through education promotes social change by reducing the economic and psychological effects associated with BBP exposures.

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Dedication

I would like to dedicate my work to the Almighty God, the one who loves me and granted me the grace to complete this project. My heartfelt thanks to my beloved husband for his support, encouragement, and prayers. Also, my love and gratitude go to my beautiful and adorable daughters, Oluwadamilola, Temilade, Temitope, and Anuoluwa, for always supporting me and praying for me. I love you all. Thanks also goes to my parents, Mr. and Mrs. Eleniselu, who instilled in me the importance of education. In remembrance of my mother-in-law, who is a mother indeed, Margaret Omonayin, who always told me to be all that I can be and all her support with her grandchildren during my school years. My dedication also goes to my Pastor Sunday Adu, who saw my potential and always encouraged me to go for the best. Lastly, to all the Walden faculty, counselors, and staff, I thank you for providing the needed guidance and support to make this journey successful. You indeed make the difference.

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Section 1: Nature of the Project

Introduction

Health care workers (HCWs) are individuals who work in the health care sector. HCWs comprise various groups, including nurses, physicians, and allied workers such as respiratory technicians and radiologists. All these different health professions work together to achieve common goals, including disease prevention and management. However, as HCWs perform their daily work activities, they are at risk for exposure to infectious disease. Fifty-nine million HCWs globally risk becoming infected with hepatitis, human immunodeficiency virus (HIV), or tuberculosis by unintentional exposure to patients' blood and other bodily fluids (Mandić et al., 2018). Blood-borne pathogens (BBPs) are a risk factor for HCWs and expose them to infectious and contagious diseases. Exposure to BBPs can occur with sharps, needles, and bodily fluid splashes to nonintact skin and mucous membranes. According to Lee et al. (2018), work-related blood exposure can occur from a percutaneous injury such as a needle stick or cut from a previously used sharp device and contact with a mucous membrane, nonintact skin, blood, tissue, or other bodily fluid.

According to Al-Zahrani et al. (2014), HCWs have an increased risk of infection with BBPs such as Hepatitis B virus (HBV), Hepatitis C virus (HCV), and HIV. Exposure to these viruses can be life-changing for the affected person. The World Health Organization (2003) estimated that every year three million HCWs will experience percutaneous exposure to BBPs, two million will be exposed to HBV, 900,000 will be

exposed to HCV, and 170,000 to HIV. The cumulative BBP transmissions will include 70,000 HBV infections, 15,000 HCV infections, and 500 HIV infections.

Exposure to BBPs can lead to financial costs to the organization and emotional and psychological stress to employees. According to Hyun Lee (2017), the self-reported work exposure data obtained from the electronic health record (EHR) in a Korean university hospital between January 1, 2011, and December 31, 2015, revealed analysis of the BBPs reports involving various hospital personnel. Occupational blood exposure to BBPs among housekeepers was 14.8%, physicians 8.5%, and nurses 6.2%. BBP exposures that occurred in wards, emergency rooms, and operating rooms were 38.1%, 13.3%, and 12.2%, respectively; of these exposures, 86.7% were percutaneous, and 13.2% were mucocutaneous exposures. Risks are higher based on how often an employee uses sharp objects and needles in their daily work environment. The data show that HCWs such as physicians, nurses, and phlebotomists are at higher risk than office workers in health care settings.

In addition to the risk for disease transmission, emotional trauma associated with nurses' exposure to a known source of HIV is relatively high. The fear of the unknown can destabilize a nurse, leading to reduced attention in patient care, which can eventually lead to decreased patient safety, poor nurse job satisfaction, and anxiety on the part of the nurse. When a nurse is exposed to a person known to be HIV positive, preexposure prophylaxis (PrEP) medication is recommended to help reduce the risk of contracting the disease. PrEP has been shown to be quite effective; however, the side effects of the medication can be debilitating and make it challenging to adhere to the medication

regimen. The lack of adherence can result in decreased efficacy and effectiveness (Fields & Tung, 2021). Decreased effectiveness of the medication predisposes the affected person to contracting the disease. A physician is required to discuss the side effects of medication with patients. According to Peterson et al. (2019), these discussions of side effects can lead to distrust of the medical professionals and the pharmaceuticals. Other considerations such as comorbidities and health history must be considered by the providing doctor before prescribing PrEP to an individual. For example, lab work that reveals the status of the liver and kidney functions of the affected person must be considered before prescribing PrEP medication.

The rate of BBP exposures in the health care setting requires attention to prevent and reduce the risk of exposure and infection in this setting. Education on how to prevent and report exposures is essential for all HCWs to help reduce the incidence of exposure and the prevalence of transmitted diseases. Most sharps-related injuries go unreported by HCWs. The Centers for Disease Control and Prevention (CDC) national surveillance reports indicated most physicians exposed to BBPs do not report the incidence. An estimated 40.7% to 66.7% of students do not report exposure to the appropriate person (Bush et al., 2017). Therefore, education on prevention and timely reporting is crucial to reducing BBP exposures and infection rates. When BBP exposures are reported promptly, clinicians can evaluate the incident and prescribe prophylaxis and interventions as needed. Appropriate and timely intervention will help reduce the risk of infection and future exposures.

Problem Statement

BBPs are one of the many risks that HCWs face in their day-to-day professional activities. The CDC estimated that over 5.6 million HCWs are at risk for work-related BBP transmissions (Occupational Safety and Health Administration [OSHA], n.d.). This alarming number shows the exposure risk and the need to make HCWs aware of the risks associated with BBPs and the reasons to reduce work-related exposures. HCWs are at high risk for BBP exposures because of their constant exposure to blood and bodily fluids through needle sticks, splashes, and spills. According to OSHA, exposure to BBPs can come from human blood, semen, vaginal secretions, amniotic fluids, cerebrospinal fluids, and pleural fluids. Prevention of BBP incidents is a crucial step in reducing the risk of disease transmission to HCWs. Based on the data obtained in 2007 from health care facilities using surveillance through the Exposure Prevention Information Network, the overall percutaneous injury rate for all the participants was 27.97 percutaneous injuries per 100 beds occupied (Bush et al., 2017). The gap in practice to be addressed at the project site is the need for risk reduction related to BBP exposures and delay in reporting injuries. Thus, the practice-focused question for this project was: Does education of staff nurses on BBP exposures increase knowledge about types of BBPs, risk prevention, and injury reporting?

Purpose Statement

The purpose of the project was to evaluate the impact of education on staff nurses in increasing their knowledge to prevent the risks associated with BBPs and enhance timely reporting when exposed to BBPs. Nurses are responsible for providing quality

care to their patients while making critical and life-saving decisions to promote optimal care among the populations they serve. However, all the daily tasks and activities they do puts them at a greater risk for BBPs. The project's primary goal was to bridge the gap in practice related to BBP exposure prevention and timely reporting. Education, competencies, and training are some of the tools used in the healthcare organization to enlighten and educate employees on new developments, evidence-based practice, and changes in the healthcare setting. The project aims to establish the importance of education in reducing the incident rate of BBP incidents among nurses. Also, in the project, I examined whether the knowledge gap could be bridged in the timely reporting of BBP incidents. Education and timely reporting decrease the infection rate and psychological stress associated with BBPs. According to self-reported questionnaires, a cross-sectional study conducted among 334 nurses revealed that two thirds of nurses had BBP exposure in the past year. Over half of the participants who had exposure to BBP did not report to the health organization they were working for at the time of incident (Mehradad et al., 2014). Mehrdad et al. noted that the HCWs required more training and education to prevent and promptly report BBPs.

Nature of the Doctoral Project

HCWs in the hospital setting provide care for patients with acute and chronic diseases, perform life-saving procedures, and administer disease management and prevention interventions. Due to the various procedures and interventions used by nurses in the hospital environment, they are at increased risk for BBP exposures. The incidence rate among 10,452 HCWs with 1,072 average bed years was 5.6 cases per 100 person

years and 20.3 cases per 100 bed years (Lee, 2017). Grimmond and Good (2017) found that 181 hospitals in 34 states reported 9,343 BBP exposures, among which 71% were subcutaneous and 29% were mucutaneous exposures. HCWs are provided with personal protective equipment (PPE) to help in preventing BBP exposure while performing their daily routines. PPE is designed as protective gear but does not substitute for standard precautions in the workplace. For example, when nurses perform a procedure with anticipated exposure to a large volume of blood or bodily fluids, they are expected to put on a gown, gloves, and goggles or face shields to protect against exposure. Additional prevention of BBP infections in the workplace includes offering vaccination against HBV, checking HBV titers, administering postexposure prophylaxis with exposure to HIV, implementing engineered safety devices, and properly disposing of needles and other sharps (Garus-Pakowska & Górajski, 2019). Reducing the risk of BBPs involves the employer and the employee; both parties have their responsibility and role to play in the prevention of BBPs.

The articles I used to develop the education intervention were retrieved from sources available at the Walden University library, the CDC, the U.S. Library of Medicine, OSHA, and from the databases EBSCO and CINAHL. All these sources supported that BBP exposures are a challenge among HCWs and that many HCWs do not report BBP exposures promptly or do not report exposures at all. The literature consensus and anticipated finding of this project was that training and education could improve knowledge to prevent exposures and infection incidence among HCWs.

The project was designed to identify the effect of education on nurses' knowledge of BBP exposure prevention and timely reporting of incidents. There was an identified clinical need to develop an education program to educate and update nurses on the risks associated with BBPs. The project entailed administering a pretest questionnaire before the educational intervention to gather data about the nurses' knowledge about BBP prevention and how to report exposures. The questionnaire was repeated after the education to determine if the nurses' knowledge increased as a result of the education provided. The pretest and posttest questionnaires were offered to all nurses who attended the education session. Return of the questionnaires by the nurses was considered consent to participate in the data collection and analysis for the project. The data obtained from the pretest and posttest questionnaires were analyzed using descriptive statistics (counts and percentages) to evaluate the knowledge gap of the nurses and whether the education closed that gap.

Significance

Knowledge and awareness of BBPs among nurses will help reduce the transmission rate and risk of preventable infections in the health care system. The stakeholders for this project included nurses, the personnel in the occupational health department, the director of the occupational health department, and the health care system where the project took place. The project was expected to increase the level of understanding among staff nurses regarding the risks associated with exposure to BBPs and to create awareness at the organization level of the increased risk of exposures whenever nurses performed procedures involving needles or that could include the

possibility of bodily fluid splashes. Creating awareness of BBP exposure incidence, routine use of safety-engineered devices with procedures, and reporting every exposure are ways to reduce the risk for contracting an infectious disease from BBPs. The need for immunizations such as the Hepatitis B vaccine, the procedures for treating exposures, the benefits of timely reporting of exposures when they occur, and the possible environmental contributing factors to BBP exposures can help the organization provide interventions to reduce the risk factors among nurses. The outcomes of this project may be used in other health care settings and may be useful to other allied health care departments in the organization.

Summary

BBP exposures are not considered a top priority for nurses. There is more focus on patient safety with limited attention placed on direct caregivers such as on how to prevent exposure to infectious disease and maintain safety in the workplace. Education, training, and competency expectations are made readily available to nurses regarding patient safety, fall prevention, and improving skills; however, there is not much education on the need for nurses to prevent BBP exposures in the workplace. Nurses are exposed daily to BBPs due to various procedures such as suctioning, injection administration, and wound dressing. Standard precautions are in place to help nurses with exposures to blood and bodily fluids, but not all nurses adhere to standard precautions. Standard precautions are encouraged worldwide to protect against BBP exposures; however, the regulations are not strictly adhered to, especially in a resource-constrained environment (Zhu et al., 2019). The importance of adhering to standard precautions can be taught through

inservice education and periodically reemphasized during annual required training updates.

Section 2: Background and Context

Introduction

Health care organizations have categorized HCWs as personnel who perform one or more duties in the health care system. HCWs' services can be voluntary or compensated by the organization. Regardless of the worker category, most employees who work in a health care system are at risk for being exposed to BBPs. According to Pérez-Díaz et al. (2015), this population is at risk for exposure to infectious materials such as bodily fluids and contaminated medical devices and surfaces. HCWs comprise of physicians, nurses, technicians, paramedics, students, and other allied health professionals working directly or indirectly in patient care services.

Working directly with the patient involves patient care such as providing daily care to the patient, diagnosing illnesses and managing diseases, and treating patients, all of which increase the risk of BBP exposures. Employees who indirectly work with patients include the environmental services personnel who ensure clean rooms and equipment, laundry service workers, and food and nutrition service workers who provide meals to the patients based on the orders and guidelines of the providing physicians and nurses. The workers who provide indirect care to patients also can be at increased risk for BBPs if the direct workers do not properly dispose of their used needles and other sharp objects. For example, an employee working in the laundry services or food and nutrition services can be at risk for BBPs if used sharps such as needles are left in the bed or on the food tray where the indirect care employee can be stuck with the sharp while performing their duties.

Due to higher exposure rates among direct HCWs, providing safety strategies to reduce BBP exposure incidence is needed to minimize work time loss, maintain productivity, and decrease stress related to the incidents of BBP exposures. The various BBPs which HCWs are exposed routinely are highly contagious when the pathogen comes into contact with the mucous membranes or the nonintact skin of the exposed person. Hepatitis B and Hepatitis C, if not treated immediately, affect the liver. HIV, if not treated, can lead to AIDS, which can target the immune system leading to significant damage in major organs. The key to preventing and reducing risk factors lies in timely reporting of exposure for quick interventions and continuous education of HCWs on the best strategies for reducing the risks of exposure. The risk of exposure to needle-stick injury (NSI) is still high among HCWs, indicating a need for comprehensive education to decrease the risk of job-related blood-borne diseases. The independent risk factors for NSIs include age, sex, job title, working hours, and place, as well as the type of practice. Enough staffing and engineered safety equipment, with the implementation of evidence-based education programs, are required to reduce the rate of NSIs (Marawan Gabr et al., 2018). Continuous education serves as a safety reminder and can help reduce the prevalence of BBP infections among HCWs. Included in this section are the concepts, models, and theories used in the process of planning, implementing, and evaluating the project, the relevance of the project to nursing practice, the local background and context, and the role of the DNP student.

Concepts, Models, and Theories

Clinical competency is one of the ways to evaluate learning deficiencies among HCWs based on their specific field of practice. Competency is the combination of knowledge and skills application in various fields of learning and practice in the health care system. Clinical competency is expected in the nursing field and is a significant way to measure knowledge and skills in nursing. The process of assessing clinical competency can lead to recognition of areas that require improvement (Elhami et al., 2018). Assessing knowledge and skill deficits can foster understanding of the gaps in practice and the methods necessary for bridging the knowledge and skill gaps. Nurse theorists play a vital role in shaping clinical practice competencies and improving education practices to ensure competent nurse clinicians.

Benner's stages of skill acquisition demonstrate that the process of acquiring skills in the clinical setting is progressive and experience-based, leading to skill acquisition and the transition process (Murray et al., 2019). Benner's model of skill acquisition in nursing is a middle-range theory developed in 1984. The model applies to skill acquisition in the nursing profession and comprises five different stages: (a) novice, (b) advanced beginner, (c) competent, (d) proficient, and (e) expert. Nurses at each stage of skill acquisition contribute to the clinical setting in a different way. Nursing practice starts with simple challenges and gradually moves toward complex care and eventually ends with comprehensive decision making in presenting care (Elhami et al., 2018).

Assessing the level a nurse has achieved in the model helps in identifying the level of knowledge and understanding a nurse has in a particular area of practice. The

novice in Benner's theory is a nurse without experience. A new graduate from nursing school would fall into this category. A new graduate nurse's knowledge is based on textbook learning and various ideas acquired in their learning process. As new graduates progress to the proficient stage, they start seeing patterns in situations and occurrences in the process of gathering experience as they move along the experience spectrum. As the new graduate moves toward the competent stage, the nurse improves the ability to coordinate care and use the experience gained in promoting quality care. In the competent stage, the nurse starts looking at the patient holistically. The patient is not separate from the disease process but viewed and assessed in conjunction with the disease process to promote disease management. Finally, in the expert stage, the nurse can make accurate and specific decisions to enhance and promote quality care and safety in the patient population.

Institutional culture needs to be receptive to enabling stage-related professional development (Cooper, 2009). Due to the culture of professional development, most health care settings strive for their clinicians to be experts and remain current in their fields of practice through professional development and continuing education. Benner's theory is the appropriate foundational theory for this project because it enables an organization to distinguish the strengths and weaknesses of each nurse related to stage and organize proper training as needed to help bridge the knowledge and skill gaps regarding best strategies in preventing BBPs. Benner's theory forms the basis for continued education and training to be organized on the level or stage of the nurse. The theory can also be used as an evaluation process in determining what training needs are required for the

HCWs to provide excellent, quality, expert care to the patients. Differentiating nurses most prone to sustaining NSIs based on their Benner theory stage may be helpful in preventing NSI through education in the health care system. A term used in the project with multiple meanings is *skills acquisition*. Skills acquisition in this regard refers to the knowledge and experience gained in the process of performing repeated skills in the work environment.

Relevance to Nursing Practice

BBP exposure has been one of the risks and challenges faced in the nursing field because of the direct care nurses provide to patients. BBP exposures put HCWs at increased risk for possible infection, affecting their physical and emotional well-being. Educating about and providing best strategies for HCWs on preventing exposure to BBPs and following precautionary steps after exposure to BBPs prevents associated diseases. According to Kasatpibal et al. (2016), specific steps need to be observed after exposure; these steps include thoroughly washing the affected area with soap and water and proceeding to the occupational health department in that health care organization for further guidance. As mentioned earlier, the potential risk of contracting HBV, HCV, and HIV is increased among workers with exposure to BBPs. It is crucial to identify the patient who exposed the HCW to a possible BBP. A blood sample is needed from the source individual and the exposed HCW to determine baseline pathogen status and rule out possible infection. If the HCW is exposed to a patient with known HIV, there will be a need to take postexposure prophylaxis for HIV according to the national guideline, which in most cases should be started within 2 hours of exposure (Kasatpibal et al.,

2016). Timely reporting by the HCW is, therefore, important for immediate intervention to reduce the risk of infection.

The BBP processes and procedures after a nurse is exposed to infectious disease through blood or bodily fluids are relevant to nursing practice because nurses directly provide care to the patient or population they serve. The HCWs' safety measures and adherence to the procedures are necessary to promote a healthy workforce and reduce work-related infections. If HCWs are not educated adequately about prevention and reporting of BBP exposures or the procedures to follow after exposure to BBPs, there will be increased BBP exposures, infections, and financial burden to the organization due to lab work, medication prophylaxis, and possible treatment of the acquired diseases. According to Cooke and Stephens (2017), the average cost of injury related to NSIs ranges from \$199 to \$1,691, which does not include loss of work time and productivity from the HCWs. Despite the advancement in PPE, safety-engineered devices, and sharp containers, there is still an increase in BBP exposures in the health care system.

The challenge of BBP exposures has been addressed in the past to breach the gap in knowledge. Scholars have identified the prevalence of exposures among students, allied HCWs, such as phlebotomists and those working in the laboratory. Also, the impact of safety-engineered devices has been evaluated related to reduction of BBP infections.

Local Background and Context

Relevance of the Problem

HCWs have a high risk of being exposed to blood and bodily fluids, which puts them at a higher risk of contracting HIV, HCV, and HBV. If exposure is not promptly managed, contracting these diseases can result in chronic and long-lasting health burdens for the HCW. As stated earlier, an estimated 5.6 million HCWs are exposed to BBPs annually. A study conducted in a tertiary teaching hospital between June 2016 and May 2018 found 67 BBP incidents, with 94% related to NSI and 6% related to blood and bodily fluid exposure (Anitha et al., 2020). The CDC (2019) indicated that nurses have a higher rate of BBP exposures than other HCWs; 53% of sharps-related injuries occurred among nurses and 25% occurred among other allied workers in the health care system. Evidence has demonstrated that BBP exposures are more prevalent among HCWs than any other population. The provision of standardized training and education can help reduce the prevalence rate.

Institutional Context Applicable to the Problem

This project was conducted in a nonprofit hospital with 449 beds. The hospital employs an average of over 2,000 nurses. Last year, BBP exposure was reported by over 120 nurses, and the director for occupation health services was committed to the project to ensure reduction in the number of nurses exposed to BBPs. As an occupational health nurse, maintaining a safe environment in the workplace is crucial because it boosts the morale of the employees and will prevent future adverse health issues among staff nurses.

Locally Used Terms

BBP is the main term relevant to the project. BBPs can be contracted through blood and blood products. According to Faguy (2017), blood and blood products are the most significant modes of transmitting BBPs to HCWs. The incidence of BBP transmissions to HCWs can be reduced using the appropriate PPE, standard precautions, and adhering to the organization's safety measures.

Role of the DNP Student

The role of a doctor of nursing practice (DNP) student in this project included identifying knowledge deficits and addressing the identified deficiencies through education based on the current evidence-based best practices for the prevention of BBP exposures. DNP nurses are classified as change agents and innovators who can establish sustainable care and practice models to meet the needs of the organization, community, and society to promote equitable, affordable, and quality health care across the wellness-to-illness continuum (Giardino & Hickey, 2020). Health care providers are considered resources for health information and education for the population they serve. Health care providers aspire to promote healthy behaviors and make critical care decisions to provide optimal care to their patients; however, at times in performing their daily routines, they are exposed to various forms of work-related injury. BBP exposures are commonly encountered by HCWs.

As the DNP student, I educated and trained staff to prevent incidents and facilitate timely reporting of BBP exposures. I played a significant role in translating and explaining lab work obtained from the exposure source. I currently work as an

occupational health nurse practitioner and have seen the risk of BBP exposure that challenges nurses in their daily work environment. The emotional stress each time a nurse is exposed to these pathogens is indescribable. Some of the cases I have experienced could have been prevented if the nurses had adhered to the organization's safety measures. Moreover, the side effects of the PreP medication can lead to loss of work time for the affected nurses and increased workload for their colleagues.

The motivation for this project was to promote a safe work environment not only for the nurses but the healthcare workers in the organization. I conducted the literature review and developed the pretest to evaluate the initial knowledge of the nurses regarding the project topic. The pretest included questions about the types of BBPs, the methods of contracting BBP diseases, prevention methods, and the organization's reporting methods and processes after exposure. A posttest questionnaire was administered that included the same questions as the pretest to evaluate if the knowledge gap had been addressed. I developed the educational presentation based on the literature review to teach the nurses. Data collected from the pretest and posttest were evaluated and presented to the hospital administrators and the DNP project committee.

Summary

HCWs are at risk of exposure to BBPs in their work setting. The health care system is complex and complicated, involving the diagnosis and treatment of various health-related conditions. HCWs participate at different levels in disease management and prevention activities in the health care system, and they are confronted with different challenges and obstacles as they perform their daily work. The process of delivering and

coordinating patient care with family members and other allied health care providers can be stressful and fast paced, which can expose HCWs to high risk of work-related injuries (Geoffrion et al., n.d.). Minimizing risk factors that can lead to injury and infectious disease is required to help prevent BBP exposures and infections in the health care system. Also, various processes are involved in the planning and evaluation of BBP prevention in the workplace.

The project intent was to breach the gap in practice using education and Benner's stages of skill acquisition theory in reducing BBPs among HCWs. According to Wanless (2017), health behavior theories and models can be used to facilitate the implementation of change by establishing a culture of safety and risk management programs. Theories and models can lead to an effective change process in promoting and improving employees' health in the workplace.

Section 3: Collection and Analysis of Evidence

Introduction

Each health care organization is responsible to train all their HCWs in identifying and reporting BBP exposures when they occur. HCWs should be familiar with the time frame of reporting injuries and who to inform of an exposure (Deva et al., 2020). The information received on the incidence rate, epidemiological features of the exposures, and the transmission rate of infection is essential in formulating effective preventive measures, such as adhering to universal precautions and safe injection practices. Performing a pretest and posttest assessment was required to analyze whether the educational offering was successful in addressing the gaps in practice due to knowledge deficits within the health care organization.

Needs assessment is an important step while attempting to implement change in any given area. Needs assessment enables a researcher to identify gaps and challenges in specific areas and the target population for an intervention. Also, needs assessment helps present the necessity for change to the target population and the identified stakeholders. According to Kettner et al. (2017), accuracy and skill in matching needs to services come from a detailed study of the problem. When the need assessment determines a knowledge deficit, education can be provided, and a pretest and posttest can be employed to evaluate the effectiveness of an education intervention. The data collected from the pretest questionnaire were used to identify the education deficits of the HCWs. After conducting the training, posttest questionnaire data were collected to ensure there was an understanding of the materials taught regarding BBP incidents and infection prevention.

Education on BBPs gives HCWs the opportunity to learn the organizational policies, procedures, and processes related to BBP exposures, and the need for compliance to the safety measures put in place by the organization. In this section, I focus on the pretest questionnaire, the presentation that was developed to teach current evidence-based best practices, and the posttest questionnaire that repeated the pretest questions to evaluate staff nurse understanding of the presented education. Also, the sources of evidence and the analysis and synthesis of the pretest and posttest data are addressed in this section.

Practice-Focused Question

Decreasing the incidence rate of BBP exposures among staff nurses will help to reduce associated risk for infections with each exposure. When a nurse is exposed to BBPs, the nurse is not the only one who feels the impact. When a nurse is exposed to a person with an infectious disease, the nurse must be taken off the floor for further evaluation by the occupational health department; this evaluation can lead to less productivity and increased workload for the other nurses. Educating the nurses about pre- and postexposure procedures and what to expect is essential in prevention, incident management, and timely reporting. Prevention and timely reporting are critical steps in stopping the spread of disease through BBP exposures. The national surveillance report that the CDC anchored revealed that most physicians do not report BBP exposure, and an estimated 40.7% to 66.7% of medical students do not report exposure (Bush et al., 2017). The CDC (2019) noted that an estimated half or more of sharps-related injuries go unreported by HCWs. The administration of timely prophylaxis reduces the conversion

rate to the exposed disease. The practice-focused question for this project is: Does education of staff nurses on BBP exposure increase knowledge about risk prevention and injury reporting? The pretest and posttest questionnaires assessed the level of knowledge and understanding of the nurses completed the questionnaires.

Below are the operational definitions of key concepts of the project:

Blood-borne pathogen (BBP): BBPs are contracted in various ways; however, in the health care system most exposures occur through direct contact with the blood or bodily fluids of an infected person. Other ways that disease can be transmitted is through sexual contact; needle sharing; splash to eyes, nose, and mouth; and maternal to fetus exposure in childbirth (Henry, 2020).

Health care workers (HCWs): Various groups of professionals such as nurses, doctors, phlebotomists, and other allied health personnel working in the health care sector.

Hepatitis B: Transmitted through blood exposure and if not diagnosed in a timely manner can eventually lead to liver damage. According to Trevisan et al. (2021), before the introduction of the Hepatitis B vaccine, the virus increased the morbidity and mortality rate among HCWs.

Hepatitis C: A virus transmitted through contact with the blood of an infected person. Prompt treatment is required to prevent complications and damage to the liver.

Human Immunodeficiency Virus (HIV): A virus that affects the immune system and increases the risk of a person with the disease to various opportunistic disease if not

adequately managed. HIV can be transfer to HCWs through blood and bodily fluid exposures.

Sources of Evidence

The sources of evidence used in this project were two-fold. First, evidence was gathered from reliable organizational bodies and databases such as the U.S. Library of Medicine, the CDC, the OSHA, the World Health Organization, and databases such as EBSCO and CINAHL available through the Walden University Library. The CDC is a vast disease management organization with a focus on prevention, assessing data, and disseminating information to help in prevention and health education purposes. OSHA is a designated department that ensures compliance and safety of workers in the United States. Combining information from these sources provided detailed data and recommended practices regarding efforts to decrease the incidence of BBP exposures among nurses; these sources also provided data from previous studies and research regarding the challenges of BBPs. The project literature review established the importance of educating nurses, from new graduate nurses to seasoned nurses, on exposure reduction and infection prevention in the occupational setting. The search keywords used during this project included *blood borne pathogens, transmission, needle stick, needle stick injury, Hepatitis B, Hepatitis C, HIV, blood and bodily fluid exposure, PrEP medication, nurses, health care, and health care workers*. Combinations of these words were used in a search that focused on peer-reviewed articles published between 2017 and 2021.

The second source of evidence was collected from the participating staff nurses through the pretest and posttest questionnaires. The education for the nurses was mandatory, but completion of the questionnaires was voluntary. The nurses were informed of their right to refuse participation in the pretest and posttest. In addition, Walden University Institutional Review Board (IRB) approval was obtained before the beginning of data collection.

Analysis and Synthesis

The analysis of the data collected was based on the questionnaires nurses were invited to complete. The questionnaires were coded using numbers and letters to represent the volunteer and to match pretests and posttests; this process was used to conceal the identity of the person answering the questionnaire. The first step was analyzing the pretest questionnaires collected from the nurses. The pretest questionnaires provided an assessment of the fundamental knowledge of BBP exposure, prevention, and reporting process as described in the organizational policies and procedures. Primary learning objectives for the education included the following required information necessary for best practices related to BBP incident prevention and reporting:

- Employees will be able to identify various BBPs they are at risk for contracting
- Employees will be able to identify the organizational reporting systems for BBP exposure;
- Employees will be able to evaluate when to use PPE during a procedure;

- Employees will be able to analyze proper sharp disposal in the organization;
- Employees will be able to identify safety measures in place for preventing BBP exposures;
- Employees will be able to define standard precautions;
- Employees will be able to evaluate the route of transmission for BBPs; and
- Employees will be able to identify transmission-based precautions.

Reassessment of the knowledge was performed after the education sessions. The posttest questionnaire was administered to reevaluate if the project's purpose and the learning objectives were achieved using the educational method. The synthesis of data included the input of pretest and posttest questionnaire data into an Excel spreadsheet and analysis using SPSS. Analysis provided the descriptive statistics (counts and percentages) for recommendations and dissemination. Questionnaires with missing information were discarded and not included in the data analysis.

Summary

The process of collection and analysis of data was crucial to the project planning, implementation, and dissemination of findings. This section elaborated on the data collection method for the proposed project. The section also discussed the search engines and databases that were used to collect literature data and provide best practices points of reference for the project. The governing organizations and published research retrieved from the databases established the importance of education for reduction in BBP exposures and infections. The sources of evidence and search keywords were described in this section. Combinations of keywords provided a broad search and detailed data to

establish the benchmarks for the project. The data collection included using employee questionnaires, which identified the employees' knowledge regarding BBP exposure. The questionnaires also include questions to identify those who had been involved in a BBP exposure, how it was addressed, and the protocol followed for reporting the exposure.

Disagreement and lack of interest can be barriers to designing and implementing change projects within an organization. However, anticipating obstacles provide the ability to prepare for pushbacks and stagnation of a project. One of the strategies to avoid push backs and stagnation was the use of effective communication tools. When the purpose of the project was clearly defined, the transition to the change and the involvement of the stakeholders was made easier. Open communication maintained improvement, gave encouragement, and allowed the employees to present their concerns or opinions regarding the progress of the project (Olmos-Ochoa et al., 2019).

Communication was the key to address concerns and give feedback during the project planning. Also, trust building with the employees was important. Trust can help navigate disagreements and lack of interest. Establishing trust was vital to remove barriers in designing and planning the project. Moreover, one of the difficulties anticipated was the willingness of the employees to participate in the completion of the questionnaires.

Communication about the rationale for the pretest/posttest design may have been helpful in recruiting the participants, but addressing this challenge likely needed to have direct leadership endorsement.

Section 4: Findings and Recommendations

Introduction

The identified problem for the project was the exposure rate of nurses to BBPs in the health care setting. The project's main objective was to decrease the rate at which nurses are exposed to BBPs in their work environment. Nurses are faced daily with various challenges that involve making critical decisions that pertain to the well-being of their patients. Nurses are also faced with the challenge of carrying out different tasks and procedures to promote their patients' health. Those tasks include drawing blood, intravenous line (IV) placement for access, injections, and line placements. In performing these various procedures, nurses are at risk of being exposing to blood and bodily fluids. The purpose of this project was to assess for knowledge deficits related to BBP exposure prevention and treatment by providing tailored education to staff nurses to increase knowledge and awareness of BBPs to prevent and reduce identified risks associated with BBP and promote timely reporting when an exposure to BBPs has occurred. Timely reporting is one of the key factors to managing and treating BBP exposure.

The effect of increased knowledge is awareness and timely reporting of exposure incidents that will decrease the infection rate and psychological stress associated with BBPs. The practice-focused question was: Does education of staff nurses on BBP exposure increase knowledge about risk prevention and injury reporting? The assessment tool used was a pretest and posttest questionnaire. This tool was used to identify the knowledge deficits related to BBPs so areas for educational focus could be identified and emphasized in the education session. The pretest and posttest questionnaires were

administered anonymously to nurses who attended the education session. Other sources of evidence were obtained from credible organizations such as the U.S. Library of Medicine, the CDC, OSHA, the World Health Organization, and from the EBSCO and CINAHL databases available through the Walden University Library.

Findings and Implications

The project was completed in an acute care setting hospital. Data collection was limited to nurses and data were collected through questionnaires given to nurses. The sample included 30 nurses who attended the education session. Sixteen nurses responded to the questionnaires, and data were gathered from their completed questionnaires (see Table 1). Of the 16 nurses who responded to the questionnaire, 14 were knowledgeable about the transmission of BBPs. Fifteen nurses were able to identify the vaccination types available for prevention of pathogen transmission after an exposure; all 16 nurses were knowledgeable about the standard precautions and prevention methods, and 14 nurses were able to identify the seroconversion process for each identified pathogen.

Table 1

Summary of Pretest Questionnaire Responses

	# correct responses	# incorrect responses	Percentage	# of participants
Standard precaution and safety	16	0	100%	16
Transmission route	14	2	87%	16
Available vaccine	15	1	93%	16
Seroconversion	14	2	87%	16

An unanticipated outcome was the response rate of the nurses. More nurses were anticipated to respond to the questions; also, there was a challenge getting the nurses to

participate in the education. The data collected were limited due to the low response received from the nurses. However, the responses from the 16 participating nurses forms the sample the findings and recommendations are based on. The data gathered revealed that nurses know the prevention and safety measures that should be applied when dealing with possible BBP exposure and BBP prevention. Therefore, the education was focused on the transmission of BBPs, vaccines readily available to nurses for prevention, and the seroconversion process of BBPs. All the participating nurses answered the posttest questions correctly (see Table 2).

Table 2

Summary of Posttest Questionnaire Responses

	# correct responses	# incorrect responses	Percentage	# of participants
Standard precaution and safety	16	0	100%	16
Transmission route	16	0	100%	16
Available vaccine	16	0	100%	16
Seroconversion	16	0	100%	16

Implications for Positive Social Change

The project revealed that nurses are aware of the process and importance of limiting the occurrence of BBPs in their daily work life. Creating awareness among the nurses through education will continue to help reduce BBP occurrences and promote timely reporting of BBP exposures among the nurses. Also, the education will create awareness of the vaccines the health care organization provides for reducing the risk of disease after an exposure to BBPs.

Recommendations

Safety in health care organizations depends on both the organization and the employee. The health care organization is responsible for providing safety measures and continuous training and evidence-based education to nurses to ensure a safe environment, especially when performing procedures that increase the risk of BBP exposures. Also, nurses have the obligation and responsibility of adhering to the safety measures provided by the organization. Recommendations to decrease the exposure rate and address the gap in practice are to focus on training and education of nursing staff, especially during their initial hospital orientation when they first start as a new employee. Also important is education and training that will be included in the employees' annual competencies and reminders during their yearly physical screenings. Leaders of the organization are encouraged to be involved in the educational training and competencies assessment to model for the nurses the standard of practice. The organization's leadership should also create practice guidelines that include safety measures, the vaccination process, and the reporting channels for the nurses to follow after BBP exposures.

Strength and Limitations of the Project

The strength of the project was that the participants in the convenience sample did represent various departments in the hospital and could take information gained from the education back to their department. The limitation of the study was the small sample size. Not only was the number of responses to the questionnaires low, but the sample was limited to nurses. Other employees, such as those employed in operating rooms and the laboratory, can be affected by BBP exposures. A potential bias was in the administration

of the questionnaires. I intend to focus on the experienced nurses in the distribution of the questionnaires, but this selection of participants might have allowed identification of the nurses. I overcame this challenge by administering the questionnaires anonymously to the willing participants.

Recommendation for Future Projects

There are various contributing factors to BBP exposures among nurses and HCWs in general. Addressing the risks and contributing factors is crucial to maintaining a safe environment for both the nurses and the population they serve. This study addressed the safety measures, transmission modes, vaccinations, and timely reporting of BBPs.

Recommendations for future projects involve evaluating other factors that could increase BBP risks among HCWs. Focus areas may include exploring how workplace distractions and nurses' workloads contribute to and increase the risk of BBPs among HCWs. Various EBP have been established to manage distractions in medication administration. One of the practices is to minimize distraction while the clinicians are administering medications to the patients; organizations have used phrases such as *safe zone* to limit distractions during medication administration. Future studies should focus on managing distractions while performing all procedures that carry the risk of exposure to blood and bodily fluids. Improved ability to concentrate on these tasks may decrease BBP exposures among nurses.

Summary

This section reported the data collected from the questionnaires and the responses of each nurse. It also showed the gap in knowledge among the nurses. The project

showed the need for consistency of the nurses in adhering to safety and standard precautions as a preventive method of reducing the risk of BBPs. Recommendations and future recommendations were also discussed in this section. The strength and limitations of the project, which were primarily related to the sample size, were analyzed in this section. BBPs are an ongoing occurrence concern in the health care system. Education and training are some ways to ensure compliance and safety among the nurses in the health care system. Education and training on BBPs during initial orientation and annual competencies can help reduce BBP risk among nurses.

Section 5: Dissemination Plan

Introduction

Dissemination of the project is a crucial and essential aspect of communicating the findings and potential solutions to an identified problem. The ability to appropriately disseminate results increases the visibility of the outputs, the potential for public involvement in science and innovation, and the confidence of society in the practice of nurses (Marin-Gonzalez et al., 2017). Findings from the project can promote social change and further research development, particularly related to possible causes of the incidence of exposures to BBPs and resulting infections despite knowledge of risks, precautions, and reporting processes. The format for the dissemination process for this project will be using the collected data to perform inservice and educational sessions to target groups, leadership, and stakeholders so they can have access to the findings and recommendations. Also, the occupational health department will be provided the presentation outline (see Appendix B) developed for this project and notified of the results for possible inclusion in further education with employees during their preemployment or annual health screenings, as mandated by the organization.

Analysis of Self

The project has been an educational journey for me, providing firsthand experience of influencing and impacting change in the health care organization. Completing this project helped me in problem identification and the process involved in finding solutions to an identified problem. I was also able to gain knowledge in practice guidelines, policies, and procedures and how they are the foundation and bedrock of an

organization. I anticipate more project plans and dissemination in my future as I continue to support occupational safety and compliance in the work environment. Although there were various challenges with questionnaire distribution, especially during a worldwide pandemic, I was grateful for the nurses who participated in the project and their willingness to be part of a positive change in their work environment.

Summary

In conclusion, nurses face various risks while performing their daily work. Different measures are available for nurses to reduce their risk of exposure; standards and safety tools such as safety-engineered needles, personal protective equipment, and vaccinations help reduce the risk of exposure and postexposure infections. The employer and the employee are responsible for maintaining a safe work environment. Based on the project findings, nurses know what they need to do regarding prevention of BBP transmission and reporting of BBP exposures. Ensuring compliance through education and training is part of the responsibility of the leadership in the health care organization. The ability of the health care organization to manage BBP exposures reduces the economic and psychological effects associated with these occurrences. Creating awareness also helps in reducing the knowledge gap and ensuring safety in the workplace.

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Appendix A: Instructions and Pretest/Posttest Questionnaire

The project aim is to educate staff on the best practices for managing blood borne pathogens among health care workers. The questionnaires assesses the health care workers' baseline knowledge regarding their understanding of BBP exposures and knowledge after the education. All responses to the questionnaire are confidential and anonymous. The findings from the questionnaire will help determine the effect of education in preventing BBP exposures. Please kindly complete the questionnaire, which will take approximately 10 minutes of your time. Thanks for your anticipated cooperation and time.

The Walden IRB approval number is 12-01-21-0561391.

Pretest and Posttest Questionnaire

1. In what situations are standard precautions meant to be used?

- When there is a potential for transmission of pathogens through contact with blood, bodily fluids, skin, and mucous membranes
- Temporarily and as needed
- Only when the patient is diagnosed with infectious disease
- When I am not in a hurry

2. The source for contracting HIV, Hepatitis C, and Hepatitis B virus is:

- Urine and spit
- Blood and bodily fluids
- Body contact
- Airborne contact

3. What are the measures that should be taken to reduce the risk of infectious disease transmission?

- Avoiding contagious patients
- Frequent handwashing
- Keeping your gloves on at all times
- Staying 6 feet apart from the patient

4. How often should needle recapping be performed?

- Once a day
- Intermittently
- When in a hurry
- Never

5. Protective vaccine is currently available for which of these diseases?

- Tuberculosis
- HIV
- Hepatitis B
- Hepatitis C

6. Years of experiences reduces your risk of contracting infectious diseases?

- True
- False

7. When should you report an exposure to infectious disease?

- After the end of your shift
- The next business day
- Immediately
- When you are less busy

8. How long does the Hepatitis B virus survive outside the body?

- It cannot survive outside the body
- 3 days and it still remain infectious
- 7 days and it still remain infectious
- I don't know

9. Which of the diseases when treated promptly can reduce the risk of seroconverting?

- HIV
- Hepatitis B
- Hepatitis C
- Tuberculosis

10. What are the various ways of preventing infectious disease transmission?

- Through the use of personal protective equipment
- Activating safety engineered devices when appropriate
- Appropriately disposing and safely handling sharp objects and devices
- All of the above

Appendix B Education Session Outline

Best Practices for Preventing Transmission of Blood Borne Pathogens

Health care workers (HCWs) are role models and promoters of health in their community.

Engaging in prevention measures in preventing transmission of blood borne pathogens among nurses helps prevent non-communicable diseases and their complications.

According to Linton and Koonmen (2020), 68% of the surveyed nurses place their patients' health, safety, and wellness before their own.

HCWs are accountable for various health-related decision making in their daily routine

HCWs are exposed to multiple workplace stressors and infectious disease that includes long working hours, work-related stressors, and critical decision-making, which can have a negative impact on them (Wayment et al., 2019).

Types of Blood Borne Pathogens

Nurses are exposed to various infectious and contagious diseases while performing their daily activities.

- Some of the common blood and bodily fluid exposure includes Urine, Blood, stool, and blood products

- The common blood borne pathogens among healthcare workers include human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV)

- Measures in preventing exposure to these pathogens are necessary while performing daily assigned activities.

Blood Borne Pathogen Sources & Exposure

- There are various ways that nurses are at risk for exposure to Blood Borne Pathogen

- Understanding the risk of exposure and ways of contracting the pathogen enables prevention and measures to reduce transmission of the disease

- According to the Center for Disease prevention and control, the various ways to contract and be exposed to blood borne pathogen includes: Needle sticks injury, blood and bodily fluids in contact with mucous membrane, eyes, nose, mouth and break in the skin barrier, cuts, and wounds from assaults and splashes and punctures while performing invasive procedure

- There are various ways that nurses are at risk for exposure to Blood Borne Pathogen

- Understanding the risk of exposure and ways of contracting the pathogen enables prevention and measures to reduce transmission of the disease

- According to the Center for Disease prevention and control, the various ways to contract and be exposed to blood borne pathogen includes: Needle sticks injury, blood and bodily fluids in contact with mucous membrane, eyes, nose, mouth and break in the skin barrier, cuts, and wounds from assaults and splashes and punctures while performing invasive procedure

Measures for Prevention

- The healthcare organization is responsible for providing safety-engineered devices and Personal Protective equipment for their employees to reduce the risk of exposure to blood borne pathogens.
- Personal protective equipment (PPE) includes gloves, gowns, face shield, and goggles
- Safety-engineered devices are standard in the healthcare system .is devices are put in place to help reduce the risk of injury to the nurses. Then they are commonly found on needles and sharp objects used for procedures.

Vaccination

Vaccination is another process of ensuring safety in the healthcare system.

- The various vaccination that is available to healthcare workers include the Hepatitis B vaccine, The measles, mumps, & rubella vaccine (MMR), varicella vaccine, and the TDAP vaccine
- Vaccination is encouraged to be received by all healthcare workers to help reduce their risk of blood-borne exposure.

Timely Reporting

In the event of exposure to a blood borne pathogen, timely reporting is crucial to help in reducing the risk of complications associated with the exposure.

At any given time, with a needle stick injury, the exposed person is at risk for HCV, HCB, and HIV.

Currently, there are prophylactic measures to help reduce the risk of individual seroconverting from exposure. For example, their exposure to an HIV-positive person

requires the PreP medication to be initiated within 2 hours and not greater than 72 hours of exposure to reduce the risk of seroconverting of the exposed.

Understanding the organization's reporting policies and procedures is essential to educate nurses in timely reporting and the process involved for optimal treatment.