

2020

Improving Rabies Aftercare by Educating Emergency Department Providers of Care

Gloria Denise Evans
Walden University

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Walden University

College of Nursing

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Gloria Denise Evans

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Walden University
2020

Abstract

Improving Rabies Aftercare by Educating Emergency Department Providers of Care

by

Gloria Denise Evans

MS, Emory University, 2002

BS, Widener University, 1999

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

September 2020

Abstract

According to an evaluation completed by the local health department in the state where the project was conducted, patients were not returning to the emergency department (ED) for post-exposure prophylaxis (PEP) rabies vaccine as recommended. Educating the ED providers on care, who are usually the first point of contact after an animal bite with possible rabies virus transmission, is critical to improving patients' outcomes secondary to rabies postexposure. The focus for this project is educating ED personnel about rabies PEP administration after rabies virus exposure which will increase their knowledge regarding rabies follow-up care. Lewin's change theory provided the theoretical support for the project, which consisted of an educational PowerPoint or summary handout to ED staff members concerning the treatment recommendations for rabies postexposure. A pretest and posttest were used to measure knowledge of the 50 participants before and after the education. More than 75% of personnel (physicians, nurse practitioners, the physician assistant, emergency room nurses) were unable to answer Question 1 correctly, 50% of the ED personnel were unable to answer Question 2 correctly, and answers by all personnel were incorrect on Questions 3-10. After the education, all personnel answered all questions correctly. Thus, the education addressed the gap in ED personnel's knowledge that may have contributed to the lack of patients' adherence to rabies PEP treatment. Better rabies follow-up treatment education can impact social change by improving provider knowledge to facilitate accurate health care teaching by ED personnel and encourage subsequent compliance of patients with evidence-based recommendations for rabies PEP to prevent unnecessary deaths.

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Acknowledgments

Thanks to my Lord and Savior Jesus Christ, I can do all things through Christ Jesus. Ronald Evans (my husband), I am so grateful for your calmness, patience, and most of all your love and support during this process. Thanks to my children Isaiah, Chantal, and Shakwan for your continued support and love for Mom. Dad and Mom and my extended Philadelphia family all things are possible with family. Tammie Barrett (big sis) and family thanks for love and support for Aunt Niecy. Ann, Steven, Iyanna, and my New Jersey connection thank you for blessings and laughter. My Evans and Sherrod families, thanks for your continued encouragement and love. My spiritual sister circle Sylenna, Adrienne, Renee, Jaclyn, Sherry, Sherika, Nerida, Aunt Sandra, and Jan Jones thanks for ongoing spiritual love and support with unceasing prayers and scripture to get me through on days when at the end of my rope. Dr. Jennifer Thornton, Dr. Keith Thornton, Dr. Tappan, Dr. Crystal Harmon, and Dr. Jay Boone, you inspired me to continue through to the end of this journey. Dr. Monica Carver, I put the big britches on to get it done, thanks for everything. Dr. Kommu, Team 5, and the Fredericksburg CBOC's thanks for continuing to challenge me. Ms. Bennett (women's health) thanks for continued positive reinforcement. Dr. MacDougal—my life coach, this would never have occurred without our weekly session. Dr. Sue Bell, how can I thank you the best mentor and supporter with all my struggles. Thank you from the bottom of my heart.

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Section 1: Nature of the Project

Introduction

According to the Centers for Disease Control and Prevention (CDC, 2008), rabies exposure is almost always fatal when infected individuals are not given the appropriate rabies post-exposure prophylaxis (PEP) treatment. Emergency department (ED) providers (physicians, nurse practitioners, physician assistants, and nursing staff) have primary responsibility for educating the patients about rabies PEP recommendation and protocols. Thus, their educational foundation and disease management understanding regarding PEP is essential for promoting patients' adherence to follow-up rabies vaccine injections. Updating the ED providers' knowledge ensures that patients will receive the necessary information about adherence and return for rabies PEP vaccine injections. Most providers and nurses are educated about rabies as part of their initial infectious disease courses, but the rate of expertise declines with time or lack of use. Studies have demonstrated that retention of seldom used clinical knowledge declines rapidly with less than 50% retention among health care personnel at 1-year post-education (Weggemans, Custers, & ten Cate, 2017). This project was essential to ensure best practices occur at ED clinical sites. Presenting rabies educational information annually to ensure knowledge retention and accuracy-related to rabies PEP treatment by ED personnel can benefit patients and staff by increasing knowledge about rabies PEP.

Background

Rabies, a zoonotic viral disease, occurs secondary to saliva transfer when an infected animal bites a human. All mammals, including humans, are vulnerable to rabies

when exposed to the causative RNA virus in the *Rhabdoviridae* family, genus *Lyssavirus* (CDC, 2008). In the United States, the vector for human rabies is predominantly insectivorous bats that infect domesticated animals such as dogs and cats (CDC, 2008). The infected animal then bites a human, transferring the virus (CDC, 2008). Rabies has the highest mortality rate (nearly 100%) of any infectious disease because by the time symptoms (encephalitis and paralysis) are noticed, the viral replication, which occurs slowly at the tissue site, has moved to the autonomic and sensory nerve systems where its replication accelerates (Honeycutt & Dire, 2017). The rabies virus incubation period is between 4 weeks and 12 weeks, resulting in latent, asymptomatic infection (CDC, 2008). A person who is exposed requires vaccination against rabies and must receive four doses of rabies vaccine according to a schedule—one dose right away and additional doses on the third, seventh, and 14th day after exposure. Patients should receive Rabies Immune Globulin at the same time as the first dose of rabies vaccine (CDC, 2008). ED providers order these injections; however, if nursing staff members administer them without the recommended rabies PEP injections, the progression of the disease includes encephalitis, coma, organ failure, and finally, death (Bailey et al., 2013).

Because the rabies virus is fatal, PEP treatment is critical, and health care professionals must prevent disease progression of infected individuals through evidence-based management. Management includes the correct administration and timing of rabies PEP treatment and patient teaching about the importance of adhering to the PEP schedule. According to the American Association of Colleges of Nursing (AACN) Doctor of Nursing Practice (DNP) Essentials, an advanced practice nurse at the doctoral

level designs, implementations, and evaluates beneficial interventions to enhance the quality of health care delivery (AACN, 2006). Therefore, based on this project, the nursing profession can improve access to quality care by providing evidence-based directions regarding rabies PEP treatment care.

Problem Statement

The problem addressed by the DNP project is the rabies PEP treatment in two ED departments. According to an evaluation completed by the health department in the state where the project was conducted, patients were not returning to these EDs for PEP rabies vaccine as recommended. The gap in practice was the ED providers' knowledge deficit of current best practices related to rabies PEP. Providers at the EDs must have adequate knowledge in order to improve patients' outcomes. But limited research concerning ED provider and staff education about rabies follow-up is available, which is why there was an interest at the clinical site to improve care quality by performing this project (see Honeycutt & Dire, 2017).

Purpose and Practice-Focused Question

The purpose of this project was educating the ED providers and staff members about the recommended treatment and follow-up care after rabies exposure, which may lead to better patient teaching by providers and staff members regarding the seriousness of rabies exposure and the urgent need to return for scheduled PEP treatment (Honeycutt & Dire, 2017). The question answered by this project was "Does educating ED personnel on the evidence-based practices for rabies PEP administration increase knowledge regarding follow-up care after rabies virus exposure?" This project determined whether

education filled the knowledge gap among ED providers and staff related to the evidence-based guidelines for care of patients exposed to rabies. Additionally, the AACN (2006) recommends that doctoral-prepared nurses act on the national Nursing Code of Ethics (2016) to improve access to quality care by evaluating the gaps in the present system. Educating the ED providers (physicians, nurse practitioners, physician assistants, and registered nurses) on the recommendations of the CDC and the World Health Organization can increase knowledge of rabies PEP. Providing clear and accurate treatment information to patients can increase patient compliance with return for rabies PEP vaccine.

The Context for the Doctoral Project

The setting for this doctoral project was two local regional medical center EDs. A memo from the local health department related to rabies follow-up care reported that patients were not returning to these EDs for follow-up rabies vaccine as recommended. This project was triggered by the need to investigate why this clinical practice problem was occurring in the settings and whether the problem can be addressed by education.

In line with the DNP Essentials (AACN, 2006) and the Walden University mission to enhance social change, this project was focused on the Healthy People 2020 objective to improve access to rabies PEP and appropriate follow-up care for patients after exposure to the rabies virus (CDC, 2008). The project purpose was to educate ED staff on current clinical guidelines and best practices for treating patients exposed to the rabies virus. The Walden University Staff Education Manual was followed to carry out this project. The Walden University Institutional Review Board (IRB) approval was

obtained prior to the education delivery and data collection from the ED staff members regarding knowledge of PEP before and after the education intervention. Educational programs for ED providers have improved patient outcomes when a pre/post education survey design was used (Bernstein et al., 2007). The scope of this project was limited to education of ED personnel to improve their knowledge of rabies follow-up treatment and did not include collection and analysis of outcome data related to changes in patient adherence to the rabies PEP.

Significance

The DNP role includes reviewing or discovering a clinical situation related to patients or health care organizations and assisting with change in an outcome for the betterment of the situation. Currently, the literature contains limited data on rabies follow-up education for providers and patient outcomes secondary to educational opportunities. This project's significance relates to educating the ED personnel about the current rabies follow-up recommendations so that patients' return for follow-up care will increase. The lead role as the DNP student on the project and coordinator of the project team composed of professionals from other disciplines (pharmacy, infectious disease medicine) ensured the education provided was relevant for educating in the EDs of a health care organization. Additionally, social change related to a significant gap in current practice is required of doctorate-prepared clinical leaders and fundamental to the DNP students' role development according to the AACN DNP Essentials (2006). Increasing the ED personnel's knowledge about rabies and the importance of follow-up treatment has the potential for social change by improving follow-up care and alter

patient outcomes for rabies follow-up treatment. Increasing patients' adherence to rabies follow-up treatment and decreasing the risk of death by complying with recommended rabies follow-up treatment.

Summary

The DNP education supports nurses to become clinical practice leaders for improved patient outcomes through changing health care systems. I established leadership qualities through recognizing a problem, reviewing the data, discussing concerns with team members, and developing an avenue for change at minimal cost that could result in positive patient outcomes and better service from the health care organization. Educating ED personnel about rabies follow-up care and projecting this knowledge to patients may improve rabies follow-up behavior that aligns with the nature of DNP degree and the expectations of this project. Section 2 provides information on the theoretical support for the project, the local background and context for the project, my role on the project, and the role of the project team.

Section 2: Background and Context

Introduction

The problem addressed by the DNP project is the PEP treatment shortfall in two ED settings due to lack of knowledge related to rabies treatment follow-up recommendations. As a DNP student, there is a requirement to provide insight into a clinical situation, review the relevant data and literature, develop and implement a change plan, and review for client outcomes and organizational reshaping in order to provide better outcomes. Through this rabies follow-up treatment education project for ED personnel, the DNP Essentials (AACN, 2006) were addressed. Further, rabies exposure is a continuing global threat, and ensuring adequate follow-up is needed.

Concepts, Models and Theories

Nursing has not always been considered a profession. Nursing care was provided by individuals who lacked a scientific foundation for their practice (Sarkis & Connors, 1986). Nursing care delivery was inconsistent because of the insufficient academic preparation and reliance on observation and trial and error. However, Florence Nightingale, a self-educated woman, used her knowledge to alter patient outcomes and reshape nursing into a profession (Sarkis & Connors, 1986). Nursing research standards began to emerge with Nightingale's application of statistical data and evidence-based care recommendations during the Crimean war (Sarkis & Connors, 1986). The nursing profession's progress related to research, education, and change evolved from Nightingale's writings into the nurse standards of care used today. For instance, Nightingale noted concerns for patient deaths and realized an alteration in standards of

cleanliness made a difference. Thus, identifying a problem, researching a way to improve outcomes, developing education, and reviewing the outcomes follows the nursing model initiated by Nightingale.

Nursing practice today incorporates not only the work of nurses such as Nightingale but also the theories elaborated by other disciplines (e.g., sociology and psychology). This project involved Kurt Lewin's change framework and middle range theory. Within the health care environment, change is a regular occurrence and education is often the vehicle to implement changes in a health care system. Lewin's change framework states that all changes result from force field analysis related to a situation (Hussain et al., 2018). Forces for change and forces resisting change must be identified. The change process moves through three stages of change: unfreezing, changing, and refreezing (Porras & Robertson, 1992). This sequenced process of change explains the essential stages of change (Bate, Khan, & Pye, 2000). Researchers have highlighted the importance of leadership before launching each phase of change (Burke, 2003; Whelan, Berry, Gordon, & Hinings, 2003). DNP-prepared nurses recommend changes and understand how changes and the change process will affect patients, other health care professionals, and health care systems. The use of Lewin's change theory for this project ensured practice standardization through application of best evidence to the clinical practice problem.

Relevance to Nursing Practice

It is important for nurses to develop data collection and analysis skills for evidence-based health care reform (Institute of Medicine, 2009). The idea of nursing

practice standardization through research contributes to the nursing profession's vitality and durability to effect change in health care. Research is an essential component for implementation of nursing policy and clarity in patients' needs and outcomes. Data give tangible evidence to nursing practice and analyzing data increases the knowledge about necessary changes in practice (Yen, 2015). Reviewing nursing data also allows for standardization within practice and gives nursing more creditability as a profession (Morijikian et al., 2007).

Middle range theories in nursing are defined by McEwen and Wills (2014) as clinical practice or evidence-based practice theories. Middle range theories were developed in the early 1960s by other disciplines and applied to nursing practice and operational purposes. Nursing adopted the concept of middle range theory in 1974 (McEwen & Wills, 2014). Middle range theories have allowed nurses to explore, research, and apply concepts in practice. Using middle range theories ensures nurses' actions are built on strong theoretical and evidentiary findings.

Applying a middle range theory in this project allowed me to explore the current literature and apply it to a practice problem. The DNP role is expanded by implementation of middle range theories to integrate theory and practical applications to address current clinical problems (Grove, Burns, & Gray, 2013). Advanced clinical practice can be improved by applying Lewin's change theory and other middle-range theories because these theories measure clinical research at the client level, while apply these principles to ensure evidence-based practice and quality healthcare for populations.

Local Background and Context

This project was developed at the clinical practicum site while streamlining the process for patient rabies PEP discharge instruction. In discussing the rabies discharge process with the local health department infectious disease provider, concerns for follow-up and questions about why patients did not continue the PEP series were posed. I discussed the concern with my clinical adviser who did not realize patient follow-up was an issue after rabies virus exposure. This conversation enlightened me to the need to explore with the two local hospital EDs a way to improve rabies follow-up care and inspired the idea to investigate the literature and provide education to ED personnel on rabies PEP.

Role of Doctor of Nursing Practice Student

A DNP student requires knowledge and experience to move into the role of a leader with an interdisciplinary approach to improving patient care outcomes. As a student preparing for practice as a DNP graduate, improving patient outcomes in health care organizations is critical to healthy social change. This rabies PEP project allowed me to use all content areas related to my degree from clinical practice preparation to implementation of change in a health care system. My specific responsibilities as the DNP leader for this project were to search the literature for the current evidence and recommendations for PEP, present literature evidence and national and international group recommendations about PEP to the project team, create an evidence-based education PowerPoint and information sheet, collect and analyze pretest and posttest data, and present findings and recommendations to the project team. I developed a pretest

and posttest questionnaire to be used to determine if the PEP education intervention was effective in increasing providers' and nurses' knowledge, as well as the content of the education presented to the personnel of the two clinical sites for the project. In addition to the PowerPoint presentation developed for the education, I created an educational handout for personnel to keep and that was given to persons who are unable to attend the education in person. After the education was delivered, I was responsible for analyzing the pretest and posttest questionnaire data and presenting the findings and recommendations for future practice change to the project team. The decisions regarding changes to current policies and procedures will be determined by the hospitals' administrators.

Role of the Project Team

The project team included the clinical preceptor, the local health department infectious disease physician, and the hospital pharmacist. My clinical preceptor assisted me in scaling the project down to a DNP student level. While discussing patient follow-up with the local health department infectious disease doctor, this project was formed. I reviewed rabies follow-up recommendations with the hospital pharmacist and discussed the availability of rabies vaccine. After these discussions with the infectious disease physician, the pharmacist and my clinical preceptor, the team was formally constituted for the project. After I developed the educational materials (rabies PEP education PowerPoint and information sheet and the pretest/posttest questionnaire), I asked the team members to review the materials for content clarity, accuracy, and applicability to the ED personnel. Minimal recommended revisions were made by the team.

Summary

The rabies PEP follow-up project emerged from my background as an ED provider and my discussion of discharge instructions in collaboration with interdisciplinary colleagues. Lewin's change theory was the theoretical foundation for this project. Bringing this DNP project together required an evaluation of the evidence to ensure accuracy of the education. Collection and analysis of pretest and posttest knowledge data determined that the education was effective in improving PEP knowledge. Section 3 discusses the sources of evidence for the project, the analysis and synthesis of the evidence, and the ethical considerations related to project implementation.

Section 3: Collection and Analysis of Evidence

Introduction

This DNP project addressed the lack of rabies PEP treatment in two ED settings because of lack of knowledge related to rabies treatment follow-up recommendations. The project involved a pretest and posttest design to determine whether education on rabies PEP could increase ED personnel knowledge of the current national and international recommendations and guidelines. This section presents the clinical practice-focused question, the two sources of evidence for the project, and the plan for analysis and synthesis of the evidence.

Practice-Focused Question

This project applied a change model and an educational intervention to improve ED personnel's knowledge regarding rabies PEP follow-up. The practice-focused question was "Does educating ED personnel about rabies PEP administration increase knowledge regarding follow-up care after rabies virus exposure?" The question was addressed by determining whether education decreased the knowledge gap among ED providers and staff related to the evidence-based guidelines for care of patients exposed to rabies. To answer this question, a PowerPoint presentation and an information sheet were developed to educate the ED personnel and a questionnaire was designed to assess pre- and post-education knowledge. After the ED providers were educated, the expectation was that patient adherence to evidence-based PEP would increase. Measurement of patient compliance and clinical outcomes as well as any necessary

changes in policies and procedures related to rabies PEP may be conducted after the project ends and at the direction of the hospitals' administrators.

Sources of the Evidence

The sources of the evidence for this project included a literature review, which provided identification of research related to the gap-in-practice for this project, and the pretest and posttest data analysis conducted. The electronic databases and search engines used through the Cochrane Library and the Walden University Library provided information about rabies follow-up treatment ED providers needed to know. Using search terms such as *education of rabies for ED providers, emergency room provider and rabies, rabies education, rabies follow-up care, rabies vaccines, rabies follow-up treatment, educating ED providers and nurses, rabies and ED, and rabies and nursing education*. I searched CINALH, Medscape, the Emergency Medicine journals and the Infectious Disease journals, the CDC and World Health Organization websites, and Google for information to develop the project education content. The evidence for this project was searched from 2000 to 2020.

The second source of data was responses to the pretest and posttest questionnaires. This rabies PEP project involved collection and analysis of data from human subjects. The project dealt with the education of ED personnel about rabies follow-up treatment, and pretest/posttest knowledge data were collected from the participants to demonstrate whether the education increased knowledge. Thus, the Walden University IRB application was completed and permission to begin the project was received (IRB approval # 07-31-20-0672009) prior to the education and data

collection. No signed consent form was necessary, as the completion and return of the pretest and posttest questionnaires served as informed consent. Ethics committee requirements were also reviewed at both ED locations and neither site required IRB approval. The process for analysis and synthesis of these pretest and posttest data are described in the next section.

Analysis and Synthesis

This DNP project included data from a pretest and posttest questionnaire to assess the knowledge of the ED personnel regarding rabies follow-up. Based on the review of literature, a rabies PEP educational PowerPoint and rabies information sheet were developed. The rabies educational information sheet was developed to ensure that all ED personnel would be provided the information. ED personnel rarely have opportunities for sitting and learning for an extended period, so the informational sheet replaced the PowerPoint presentation for individuals who were not available for the onsite presentations. Before the onsite presentation began, I asked the ED personnel present to complete the pretest and hand it in if they wished to be included in the project evaluation. After the rabies educational session, the questionnaire was distributed again to ED personnel in attendance, and they were asked to complete the posttest for the evaluation analysis. This process allowed review and comparison of the knowledge before and after the education was presented. Because no participant names were collected on the pretest and posttest questionnaires, a paired *t* test was not used to demonstrate significance. Instead, data are reported by number of correct answers on each question before and after the education.

Summary

Educating ED providers on rabies PEP is important to improve patient outcomes. In order to note change, data were collected before and after the education was presented. This rabies PEP project changed ED personnel's knowledge base about rabies PEP and may change patient outcomes regarding rabies follow-up care received in the EDs.

Section 4: Findings and Recommendations

Introduction

A primary responsibility of ED personnel is educating their patients about health promotion and disease prevention. Because 50% of clinical knowledge retention declines after 1 year, reeducation about rabies PEP is essential for ED personnel (Weggemans et al., 2017). This rabies PEP educational project was designed to update and reeducate ED personnel to increase the rabies PEP adherence in patients' follow-up care. Updating the ED personnel's knowledge ensured that patients will receive the necessary information about adherence to return for rabies PEP vaccine injections.

Finding and Implications

ED personnel were given a rabies questionnaire (see Appendix A) to determine their knowledge regarding rabies PEP treatment in adults. The ED providers were then educated on rabies immunization either through a rabies PowerPoint presentation or rabies educational sheet. After either type of content presentation, the questionnaire was redistributed to ED personnel for assessment of knowledge. According to the initial questionnaire data, ED providers had a significance knowledge deficit regarding changes in recommendations by the CDC and World Health Organization regarding adult rabies follow-up vaccine dose and timing recommendations. More than 75% of providers (physicians, nurse practitioners, physician assistants, ER nurses) were unable to answer Question 1 correctly, about 50% of the ED personnel were unable to answer Question 2 correctly, and all answers by all staff members were incorrect on Questions 3 through 10. These indicated knowledge gaps regarding missing a rabies dose and the current

recommendations for follow-up care when this occurs. Additionally, there was no familiarity with treatment for rabies exposure and rabies PEP treatment protocol recommendations (see Appendix E).

After the ED personnel educational session occurred either through PowerPoint presentation or rabies educational information sheet, all questions on the posttest were answered correctly by all participants. The implication of these findings for educating ED personnel about rabies PEP follow-up is that a knowledge deficit can be addressed by a short educational intervention using a PowerPoint presentation or information handout. Updating ED personnel about adult rabies PEP may increase adherence by patients to follow-up treatment and change social attitudes about the importance of adult rabies PEP adherence.

Recommendations

ED personnel are required to participate in quarterly or yearly continuing education to update themselves on clinical knowledge and procedures of importance to the management of ED patients. The major recommendation for practice from this project is to add a rabies PEP follow-up educational unit to the required yearly continuing education modules. As noted earlier, the rate of knowledge declines yearly when reeducation does not happen. Updating evidence-based knowledge yearly is critical for rabies PEP adherence and patient outcomes because rabies exposure is rarely seen yet is fatal if not treated appropriately. Adding the rabies PEP questionnaire (see Appendix A) and informational sheet (see Appendix C) to the required continuing education modules may ensure current clinical knowledge and accurate recommendations for rabies PEP

follow-up by ED personnel to patients as well as promotion of compliance with best practices. Advocating for patients is the ED personnel's responsibility and updating themselves through rabies PEP continuing medical education is an important duty to their patients.

Strength and Limitations

The strength of the rabies PEP educational project was the reeducating and updating of ED personnel to increase knowledge for promoting patient adherence to the vaccine protocol. Knowledge is the key element for ED personnel to provide appropriate health care to patients. The findings of this project uncovered the additional need to create a pediatric rabies PEP continuing medical education.

The main limitations of the rabies PEP educational project were the lack of participation by all ED personnel in the rabies PEP education and no direct knowledge about whether the ED personnel reeducation did result in changes to their education process with patients. Additionally, adult only education and practice recommendations cannot be generalized to pediatric PEP follow-up. Future data collection will be necessary to demonstrate whether the rabies PEP education translates into increased compliance with PEP follow-up among patients.

Section 5: Dissemination Plan

According to the DNP Essentials from the AACN (2006), the DNP program is an opportunity to prepare graduates to collaborate, communicate, lead, and systematically work to make positive changes in society. Dissemination of DNP project is the culmination of a DNP program and a way to advance nursing practice and benefit the community. The education received by ED personnel at the project site can benefit other providers of care. The use of two different educational media to support this DNP project provided different options for sharing with the health care community. The information sheet and questionnaire could be published in a peer-reviewed journal, distributed by a health care organization during annual reviews, added to a government website for quick viewing, or used to develop an application for rapid information retrieval. Further, the PowerPoint presentation with the questionnaire would allow circulation to occur through digital media, group presentations, health care organization training programs, and peer-reviewed journal publication. Finally, publicizing the findings of this DNP project could enlighten or refresh ED personnel's basic knowledge of rabies PEP treatment for adult clients. Throughout this DNP project, the goal has been dissemination of evidence-based information for the benefit of health care personnel and society.

Analysis of Self

Changing a health care organization's educational process to alter the way others view rabies PEP recommendations has challenged the scope of the skills received from my DNP program. The idea of developing an educational process for ED personnel regarding rabies PEP treatment care for adults seemed simple; however, developing a

new rabies PEP educational module for ED providers and pointing out the gaps in existing knowledge was met with obstacles. As this DNP project evolved, ED providers were surprised at their lack of knowledge and thankful that education was provided. As a DNP student, I achieved a higher level of evidence-based practice expertise through changing a process in the health care system. I am grateful for the opportunity to grow into a DNP-prepared provider of care and proud that my efforts benefited the ED personnel and their patients.

Summary of Project

The clinical practice problem addressed by this DNP project was a gap in knowledge related to rabies PEP among personnel in two EDs. The purpose of the project was to provide information on the current evidence-based guidelines for rabies PEP and the importance of rabies virus exposure follow-up treatment. The gaps in knowledge related to rabies PEP were evident on the pretest; however, after the education (through a PowerPoint presentation or handout with the same information) all participants answered all questions on the posttest correctly. The educational intervention was not time-consuming, and the results showed the necessary increase in knowledge pretest to posttest.

This DNP project was implemented during a COVID-19 pandemic and during the summer, which is when dog bites increase and the rabies PEP education is essential. Thus, there was a special need to reeducate and refresh knowledge regarding rabies PEP recommendations for adults while continuing to manage safety during the global crisis. Educating the ED staff members about the recommended treatment and follow-up care

after a rabies exposure can lead to better patient teaching about the seriousness of rabies exposure and the urgent need to return for scheduled PEP treatment. Updating PEP knowledge will impact social change by improving appropriate health care teaching by providers and compliance of patients with evidence-based recommendations for rabies PEP. Rabies follow-up treatment education was critical to addressing the gap in practice among the ED personnel and the lack of patients' adherence to rabies PEP treatment.

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Appendix A: Rabies Follow-up Questionnaire

- 1) What is current recommendation for initial post rabies exposure with no previous vaccine?
 - a) Rabies vaccine and rabies globulin with dose 3, 7, 14, 21
 - b) Rabies vaccine and rabies globulin with dose 3, 7, 21
 - c) Rabes vaccine and rabies globulin with dose 3, 7, 14
 - d) Rabies vaccine and rabies globulin with dose 3, 7, 14, 21, 28
- 2) Preexposure rabies vaccinated patients receive rabies Immune Globulin (HRIG) and rabies vaccine (Rabavert) during initial exposure.
 - a) True
 - b) False
- 3) What is RFFIT test and how does it relate to rabies postexposure follow-up
 - a) RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used to tell the amount of RVNA in rabies serum regarding exposure to vaccine
 - b) RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is use by local health department to determine if additional rabies injections are needed
 - c) RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used to stop the rabies series after exposure
 - d) RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used by Kansas State University to review the new standard for post rabies exposure.

- 4) A patient received the first dose of rabies vaccine and HRIG in the emergency department and returns on day 7 for next dose, what recommendation should the provider make for care?
- a) Start the series at day 14, then continue day 21, then day 28 and have RFFIT testing
 - b) Start the series at day 3, then day 7, continue to day 14, and have RFFIT testing
 - c) Start the series at day 0, then day 3, continue to day 7, then day 14, and have RFFIT testing
 - d) Call the health department and get RFFIT testing no rabies vaccine
- 5) Which patient requires continued rabies follow-up vaccine?
- a) HIV patient exposure to Bat
 - b) Sickle Cell Anemia patient exposure to rat droppings
 - c) Osteopenia patient exposure to dog
 - d) None of the above
- 6) Only a patient who has been bitten requires rabies follow-up vaccine?
- a) True
 - b) False
- 7) RFFIT testing is conducted at the local health department if a dose of rabies vaccine is missed?
- a) True
 - b) False
- 8) What is the recommend rabies follow-up dose for patients with pretreatment?

- a) Rabies immune globulin and rabies vaccine 0, 3, 7, 14
 - b) Rabies immune globulin and rabies vaccine 0, 3
 - c) Rabies immune globulin and rabies vaccine 0, 3, 7, 14, 21
- 9) Pre-rabies-vaccine patients receive 3 doses of HRIG
- a) True
 - b) False
- 10) This rabies follow-up educational program increased or refreshed your rabies knowledge?
- a) Yes
 - b) No

Appendix B: Feedback Questionnaire from Team

- 1) Does this rabies educational PowerPoint accurately inform ED personnel about rabies follow-up care? If not, please make suggestions.
- 2) Does the questionnaire challenge the ED personnel about rabies PEP follow-up treatment and care? If not, please make suggestions.
- 3) Do the rabies educational materials clearly outline the rabies PEP follow-up treatment and aftercare recommendation for ED personnel? If not, please make suggestions.

Appendix C: ED Provider Rabies Educational Sheet

What is Rabies?

Rabies is a potentially fatal viral disease that is caused by a bite or scratch from a rabid animal. Rabies is transmitted by animals to humans through saliva transfer. Rabies is caused by an RNA virus in the genus Lyssavirus and animals are vulnerable to exposure (Center for Disease Control, 2008). In the United States, the predominant source of human rabies is through insectivorous bats that infect terrestrial animals such as dogs and cats (Center for Disease Control, 2008).

The rabies virus incubation period is between 4 weeks and 12 weeks, which results in latent asymptomatic infection and late clinical symptoms (encephalitis and paralysis).

What are Rabies Medications and Patient Recommendations?

Human Rabies Immune Globulin (HRIG) is given once and is recommended for any anti-rabies prophylaxis unvaccinated person. HRIG is usually infiltrated at the area of the wound or around it to build up immediate antibodies until the body can produce its own. The dose recommended for HRIG is 20iu/kg body weight for all persons including children. If a person has been previously immunized, then no HRIG is needed.

Rabies vaccine (Rabavert) is given on day 0, 3, 7, and 14 after exposure for non-immunized individuals. Rabies vaccine in a 1 ml dose is given intramuscularly in the deltoid in adults and in the anterolateral area of the thigh in children. The vaccine is never

given in the gluteal area because of lower neutralizing antibody titers. If a person has been previously immunized against rabies, vaccine is only recommended on Day 0 and Day 3. TDAP should be offered to patients who have not been vaccinated in the last 10 years.

What Rabies Wound Care Is Recommended?

Wound cleansing is essential after a bite that could have been from a rabid animal. Thoroughly cleansing the wound could reduce the risk of rabies infection and likely decrease the possibility of a secondary bacterial infection. Wound care with soap and water or diluted water and povidone iodine solution will produce healing quickly.

What are the Recommendations When a Rabies Vaccine Dose is Missed?

Rapid Fluorescent Foci Inhibition testing (RFFIT) measures the ability of rabies specific antibodies to neutralize rabies virus and prevent the virus from infecting cells. RFFIT is recommended at the local health department if the patient misses a rabies dose.

Individuals are recommended to start the rabies PEP series at the last dose and have RFFIT completed Example: If an individual is due for a dose of Rabavert on Day 7 and misses the appointment, the provider should give the Day 7 injection as soon as possible and then send the individual for RFFIT testing at the local health department. Do not restart the series from the beginning.

Appendix D: Rabies Post Exposure Prophylaxis (PEP) Education

Rabies Post Exposure Prophylaxis (PEP) Protocols Education

by

Gloria (Denise) Evans APRN, RN

Rabies PEP Education

Rabies is a viral disease that is transmitted by animals to humans through a bite with saliva transfer. Rabies is caused by an RNA virus in the genus *Lyssavirus* and animals are vulnerable to exposure (Center for Disease Control, 2008). In the United States, the predominant source of human rabies is through insectivorous bats that infect terrestrial animals (dogs and cats) (Center for Disease Control, 2008).

What are Rabies PEP Recommendations?

Human Rabies Immune Globulin (HRIG) is given once and is recommended for any anti-rabies prophylaxis unvaccinated person. HRIG is usually infiltrated at the area of the wound or around it, to build up immediate antibodies until the body can produce their own. The dose recommend for HRIG is 20iu/kg body weight for all persons including children. If a person has been previously immunized, then no HRIG is needed.

What are the Current National Rabies PEP Recommendations?

Rabies vaccine (Rabavert) is usually given on days 0, 3, 7, and 14 after exposure for non-immunized individuals. Rabies vaccine in a 1 ml dose is given to adults intramuscularly in the deltoid. The vaccine is never given in the gluteal area because lower neutralizing antibody titers result. If a person has been previously immunized against rabies, vaccine is only recommended on Days 0 and 3.

TDAP should be offered to patients who have not been vaccinated in the last 10 years.

What Rabies Wound Care is Recommended?

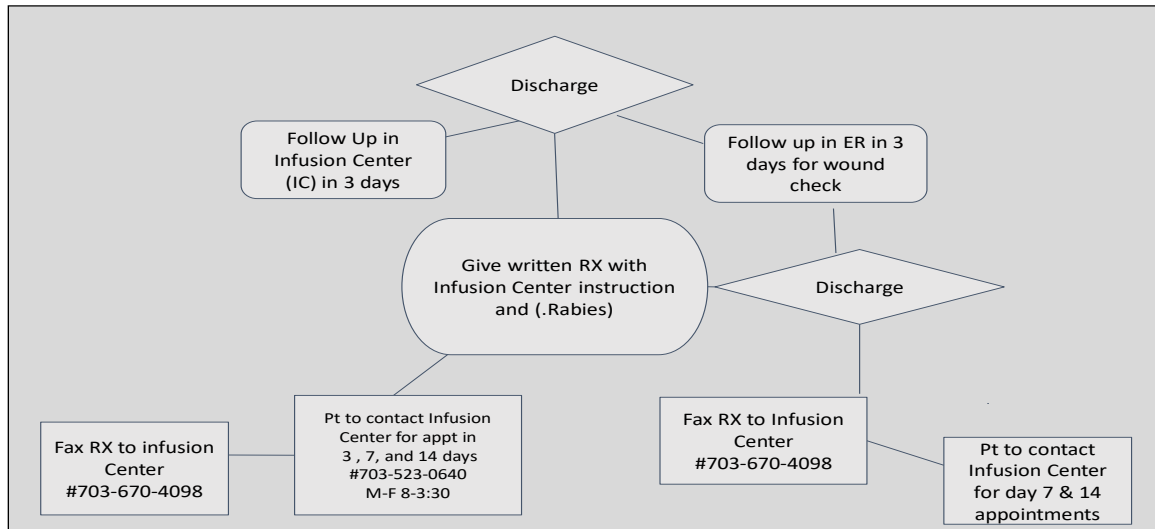
Wound cleansing is essential after a bite that could have been from a rabid animal. Thoroughly cleansing the wound could reduce the risk of rabies infection and likely decrease the possibility of a secondary bacterial infection. Wound care with soap and water or diluted water and povidone iodine solution will produce healing quickly.

What are the Missing Rabies Dose Recommendations?

Rapid Fluorescent Foci Inhibition testing (RFFIT) measures the ability of rabies specific antibodies to neutralize rabies virus and prevent the virus from infecting cells. RFFIT is recommended at the local health department if the patient misses a rabies dose.

Individuals are recommended to start the rabies PEP series at the last dose and have RFFIT completed.

Example: If an individual is due for a dose of Rabavert on Day 7 and misses the appointment, the provider should give the Day 7 injection as soon as possible and then send the individual for RFFIT testing at the local health department. Don't start the series from the beginning.



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Appendix E: Data from the Questionnaire

1) What is the current recommendation for initial post rabies exposure with no previous vaccine?

- a) Rabies vaccine and rabies globulin with dose 3, 7, 14, 21
- b) Rabies vaccine and rabies globulin with dose 3, 7, 21
- c) Rabies vaccine and rabies globulin with dose 3, 7, 14
- d) Rabies vaccine and rabies globulin with dose 3, 7, 14, 21, 28

Correct answer: C

Sample size	Health care professional	Correct	Incorrect
20	Physicians	20	0
15	Nurse practitioners	15	0
10	ED nurses	5	5
5	Physician Assistants	5	0

2) Pre-exposure rabies vaccinated patients receive HRIG and rabies vaccine during initial exposure?

- a) True
- b) False

Correct answer: B

Sample size	Health care professional	Correct	Incorrect
20	Physicians	10	10
15	Nurse practitioners	5	10
10	ED nurses	3	7
5	Physician Assistants	1	4

- 3) What is the RFFIT test and how does it relate to rabies postexposure follow-up
- RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used to tell the amount of RVNA in rabies serum regarding exposure to vaccine.
 - RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is use by the health department to determine if additional rabies injection is needed.
 - RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used to stop the rabies series after exposure.
 - RFFIT stands for Rapid Fluorescent Foci Inhibition Test and is used by Kansas State University to review the new standard for post rabies exposure.

Correct answer: A

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 4) A patient received the first dose of rabies vaccine and HRIG in the Emergency Department and returned on day 7 for next dose. What recommendation should the provider make for care?
- Start the series at day 14, then continue to day 21, then day 28, and have RFFIT testing
 - Start the series at day 3, then day 7, continue day 14, and have RFFIT testing
 - Start the series at day 0, then day 3, continue to day 7, then day 14, and RFFIT testing
 - Call the health department and get RFFIT testing, no rabies vaccine

Correct answer: B

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 5) Which patient requires continued rabies follow-up vaccine?
 a) HIV patient exposure to Bat
 b) Sickle Cell Anemia patient exposure to rat droppings
 c) Osteopenia patient exposure to dog
 d) None of the above

Correct answer: A

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 6) Only a patient who has been bitten require rabies follow-up vaccine.
 a) True
 b) False

Correct answer: B

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 7) RFFIT testing is conducted at the Local Health Department if missing a dose of rabies vaccine
 a) True
 b) False

Correct answer: A

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 8) What is the recommended rabies follow-up dose for a patient with pretreatment?
- a) Rabies immunoglobulin and rabies vaccine 0, 3, 7, 14
 - b) Rabies immunoglobulin and rabies vaccine 0, 3
 - c) Rabies immunoglobulin and rabies vaccine 0, 3, 7, 14, 21

Correct answer: B

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 9) Pre-rabies-vaccine patients receive 3 doses of HRIG.
- a) True
 - b) False

Correct answer: B

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5

- 10) This rabies follow-up educational program increased or refreshed your rabies knowledge?
- a) Yes
 - b) No

Correct answer: A

Sample size	Health care professional	Correct	Incorrect
20	Physicians	0	20
15	Nurse practitioners	0	15
10	ED nurses	0	10
5	Physician Assistants	0	5