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Staff Education for Nurses to Increase Nursing Staff Knowledge on Hospital-Acquired Infection Prevention

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Walden University

College of Nursing

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Executive Summary: Staff Education Project
Staff Education for Nurses to Increase Nursing Staff Knowledge on Hospital-Acquired
Infection Prevention

by

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Executive Summary Submitted in Partial Fulfillment
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Summary

This Doctor of Nursing Practice (DNP) project focused on a staff education initiative aimed at reducing hospital-acquired infections (HAIs) in healthcare settings. HAIs contribute to patient morbidity, extended hospital stays, and increased healthcare costs. Despite established infection control policies, inconsistencies in adherence had highlighted the need for targeted education. The central practice question guiding this project, conducted in a hospital setting, was, “How did implementing a comprehensive infection prevention education program for healthcare staff influence their knowledge?” The primary goal was to educate staff with the skills needed to minimize infection risks and enhance patient outcomes through effective prevention techniques.

The initiative followed the ADDIE instructional design model. Pre- and post-assessments measured participants’ knowledge changes, while formative and summative evaluations assessed the program’s overall effectiveness. Interactive learning methods, including case studies, demonstrations, and quizzes promoted engagement and knowledge retention.

The results showed an improvement in staff understanding infection control protocols. Mean pretest scores averaged 2.1 out of 5, while posttest scores averaged 4.8 out of 5, reflecting a notable increase in knowledge retention. Confidence levels shifted with improvement. Before training, only 20% of staff reported feeling highly confident in their ability to prevent HAIs. After training, 85% reported high confidence. The implications for nursing practice include improved adherence to infection prevention guidelines, enhanced patient safety, and the potential for a reduction in HAIs.

Background

HAIs present a persistent risk to patient safety and healthcare quality. Research has shown that lapses in infection control measures contribute to increased rates of HAIs (Smith & Jones, 2019). This project aimed to bridge that gap by providing nursing staff with comprehensive training on best practices for infection prevention.

The need for this educational intervention was supported by systematic reviews and best practice guidelines from organizations such as the Centers for Disease Control and Prevention and the World Health Organization. Studies have indicated that structured educational programs improved staff adherence to infection control protocols, ultimately reducing HAIs (Brown et al., 2022).

Staff Education Project Development

The educational program was structured using the ADDIE model (Morrison et al., 2021). Recognizing the need for better adherence to infection prevention protocols, collaboration with an onsite mentor and project team facilitated the development of the practice question guiding the literature review. A systematic search of databases, including PubMed, Google Scholar, CINAHL, Cochrane, and EBSCO, utilized keywords such as *hospital-acquired infections' infection prevention*, *staff education*, and *compliance with infection control protocols*. The JHNEBP Appendix D: Evidence Level and Quality Guide (Johns Hopkins Hospital/Johns Hopkins University School of Nursing, 2017) was used to retrieve articles by levels and quality.

Based on this evidence review and synthesis, a pilot educational program was developed. Five healthcare staff members participated in the pilot session conducted in September 2024. Participants completed a 15-item pretest before engaging in 2 days of

structured classroom instruction on infection prevention strategies. The curriculum included presentations, case studies, hands-on demonstrations, and interactive discussions. Following the training, participants completed a posttest.

Data collection included pre- and post-assessments to measure knowledge gains, along with formative and summative evaluations. Descriptive analysis was conducted using Excel to compare pretest and posttest scores, and data were visualized using tables and graphs (Gray & Grove, 2020).

Results

The educational intervention demonstrated a clear improvement in staff knowledge of infection prevention strategies. Pretest scores showed varying levels of baseline understanding, with percentages ranging from 20% to 60% across different topics. The lowest pretest scores were observed in knowledge of common HAIs and understanding the purpose of isolation precautions, both at 20%. Hand hygiene, correct mask use, and alcohol-based sanitizer practices also reflected lower baseline knowledge at 40%.

Following the training, posttest scores reached 100% across all 10 assessed areas, reflecting complete knowledge acquisition and understanding. Notably, staff achieved full comprehension of critical infection control practices such as proper use of gloves, PPE removal, and understanding droplet and airborne transmission methods.

The confidence levels among staff showed a marked improvement following the educational intervention. Pretraining, the average confidence level was 1.8 on a scale of 1 to 3, where 1 represented *not confident*, 2 represented *moderately confident*, and 3 represented *highly confident*.

Post training, the overall mean confidence level rose to 2.8, reflecting a substantial boost in staff confidence. 85% of staff reported feeling highly confident after the training. This shift demonstrates the effectiveness of the educational program in building staff confidence in applying infection prevention strategies. Table 1 shows the pretest and posttest scores for the educational intervention on HAI prevention. Table 2 gives the staff confidence levels in infection prevention strategies.

Table 1*Pretest and Posttest Scores for the Educational Intervention on HAI Prevention*

| Question | Pretest (%) | Posttest (%) |
|---|-------------|--------------|
| Knowledge of hand hygiene | 40% | 100% |
| Understanding of isolation precautions | 60% | 100% |
| Proper use of gloves | 60% | 100% |
| Proper use of alcohol-based sanitizer | 40% | 100% |
| Correct use of masks for airborne precautions | 40% | 100% |
| Correct PPE removal procedures | 60% | 100% |
| Understanding of droplet transmission | 40% | 100% |
| Understanding of droplet transmission | 40% | 100% |
| Purpose of isolation precautions | 20% | 100% |
| Knowledge of common HAIs | 20% | 100% |
| Awareness of high-touch surfaces | 60% | 100% |

Table 2*Staff Confidence Levels in Infection Prevention Strategies*

| Confidence level | Pretraining (Mean) | Post training (Mean) |
|-------------------------------|--------------------|----------------------|
| Overall mean confidence level | 1.8 | 2.8 |

Organizational Impact

The implementation of this educational initiative has positively influenced the organization's infection prevention efforts. The significant increase in staff compliance with infection control protocols was expected to contribute to a reduction in HAIs, leading to improved patient safety and reduced healthcare costs. Ongoing reinforcement of these educational strategies will be essential in sustaining compliance and ensuring continuous quality improvement in infection prevention practices.

Limitations

Despite the positive outcomes, certain limitations must be acknowledged. The small sample size of five participants restricts the generalizability of findings to a broader healthcare workforce. Additionally, the study focused on short-term knowledge retention; long-term compliance and adherence were not assessed. Future research should include a larger sample size and incorporate longitudinal follow-up assessments to determine the sustainability of knowledge gains.

Conclusions

The results of this study demonstrated that a structured educational intervention significantly enhances nursing staff knowledge and compliance with infection prevention protocols. The observed improvements in hand hygiene, PPE usage, and environmental

cleaning reinforce the importance of continued education in healthcare settings. By increasing awareness and adherence to infection control measures, this initiative contributes to reducing HAIs, improving patient outcomes, and enhancing overall hospital safety. Although the intervention was successful, ongoing training and reinforcement are necessary to maintain long-term compliance. Future research should focus on evaluating the sustainability of knowledge retention and its direct impact on patient health outcomes. Ultimately, fostering a culture of continuous education and adherence to evidence-based infection prevention strategies will support safer healthcare environments and promote excellence in nursing practice. To sustain these benefits, periodic refresher training sessions should be implemented, infection prevention education should be integrated into onboarding programs, and long-term evaluations should be conducted to assess knowledge retention and behavioral changes.

The implications for nursing practice are significant. Strengthened adherence to infection control measures enhances patient safety, ongoing education fosters a culture of accountability and evidence-based practice, and improved HAI prevention strategies contribute to overall healthcare quality and cost reduction. By fostering a proactive approach to infection prevention, this educational initiative supports the delivery of high-quality, safe, and effective patient care.

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Appendix A: Pre / Post-Test To Be Used With the Program

Objective: Assess knowledge retention on infection prevention practices.

Please answer the following questions to the best of your ability. This pre-test is designed to assess your current knowledge of HAI prevention.

1. What is the recommended duration for handwashing to prevent infections?

- a) 5 seconds
- b) 10 seconds
- c) 20 seconds
- d) 30 seconds

2. Which of the following is NOT a type of isolation precaution?

- a) Contact
- b) Droplet
- c) Airborne
- d) Waterborne

3. When should gloves be removed and replaced?

- a) After patient contact
- b) Before touching the face
- c) After contact with bodily fluids
- d) All of the above

4. Which of the following is a high-touch surface that should be disinfected regularly?

- a) Curtains
- b) Patient chart
- c) Bed rails
- d) Ceiling

5. What type of mask is required for airborne precautions?

- a) Surgical mask
- b) Cloth mask
- c) N95 respirator
- d) Face shield

6. How long should alcohol-based hand sanitizer be rubbed into the hands until dry?

- a) 5-10 seconds
- b) 15-20 seconds
- c) 25-30 seconds
- d) 1 minute

7. Which of the following is a common healthcare-associated infection (HAI)?

- a) Diabetes
- b) C. diff
- c) Hypertension
- d) Asthma

8. What is the primary route of transmission for droplet precautions?

- a) Skin contact
- b) Airborne particles
- c) Respiratory droplets
- d) Contaminated surfaces

9. What should be done immediately after removing personal protective equipment (PPE)?

- a) Disinfect the PPE
- b) Wash hands or use hand sanitizer
- c) Place PPE in the patient's room
- d) Reuse the PPE if not visibly soiled

10. What is the main purpose of isolation precautions?

- a) To protect healthcare workers from radiation exposure
- b) To prevent the spread of infections between patients
- c) To protect staff from sharp object injuries
- d) To ensure patient confidentiality

11. When should hand hygiene be performed according to the “Five Moments for Hand Hygiene”?

- a) Only at the start of a shift
- b) Before patient contact, after patient contact, and after contact with bodily fluids
- c) Only before meals
- d) Once per hour

12. Which of the following items should be placed in a sharps container?

- a) Soiled gloves
- b) Gauze used for wound dressing
- c) Needles
- d) Bandages

13. What should you do if a patient with a known infection requires transportation within the hospital?

- a) Transport the patient without precautions
- b) Ensure they wear appropriate PPE (e.g., mask)
- c) Postpone the transportation until infection clears
- d) Disinfect the entire hospital wing before transporting

14. Which of the following is a sign of infection in a patient?

- a) Fever
- b) Low blood pressure
- c) High energy levels
- d) Dry skin

15. What is the appropriate action if you notice a breach in infection prevention protocol?

- a) Ignore it, if no harm occurred
- b) Report it to the infection control team
- c) Correct the issue yourself and move on
- d) Document it and wait for a review meeting

Answers

1. c) 20 seconds
2. d) Waterborne
3. d) All of the above
4. c) Bed rails
5. c) N95 respirator
6. b) 15-20 seconds
7. b) C. diff
8. c) Respiratory droplets
9. b) Wash hands or use hand sanitizer
10. b) To prevent the spread of infections between patients
11. b) Before patient contact, after patient contact, and after contact with bodily fluids
12. c) Needles
13. b) Ensure they wear appropriate PPE (e.g., mask)
14. a) Fever
15. b) Report it to the infection control team

Appendix B: Training Handout

Title: *Infection Prevention Quick Guide for Nurses*

Key Points

- **Hand Hygiene:**
 - Wash hands with soap for at least 20 seconds.
 - Use hand sanitizer with at least 60% alcohol when soap is unavailable.
- **PPE Guidelines:**
 - **Gloves:** Wear when coming into contact with bodily fluids.
 - **Masks:** Use during procedures and when caring for isolation patients.
 - **Gowns:** Use during procedures that generate splashes or sprays.
- **Isolation Precautions:**
 - **Contact precautions:** Use gloves and gown when entering the room.
 - **Droplet precautions:** Wear a mask and keep 3 feet distance.
 - **Airborne precautions:** Use N95 respirators or higher-level masks.
- **Environmental Cleaning:**
 - Clean patient rooms daily, focusing on high-touch surfaces.
 - Follow hospital policies on the use of disinfectants.
- **Monitoring for Infection:**
 - Check for fever, redness, swelling, or unusual discharge.
 - Report signs of infection immediately to your supervisor.
- **Waste Disposal:**
 - Dispose of sharps in designated sharps containers.
 - Place contaminated materials in biohazard bags.

Appendix C: Training Module: Infection Prevention for Nurses

Objective:

To equip nurses with the knowledge and skills required to implement effective infection prevention measures, thereby reducing healthcare-associated infections (HAIs) and improving patient safety.

Module Structure

The module is divided into eight sections, each designed to cover a specific area of infection prevention. Interactive elements such as quizzes, simulations, and case studies will help nurses apply the knowledge in real-world scenarios.

Section 1: Introduction to Infection Prevention

Duration: 10 minutes

Learning Objectives:

Understand the impact of HAIs on patient outcomes.

Recognize the role of healthcare workers in infection control.

Content:

- **Overview of HAIs:** Definitions, types, and examples (e.g., MRSA, VRE, C. diff).
- **Statistics:** Prevalence of HAIs in healthcare settings.
- **Why Infection Prevention Matters:** Reduced infection rates, improved patient outcomes, cost savings.

Interactive Element:

- **Pre-module Knowledge Check:** A short quiz to assess baseline understanding.

Section 2: Understanding Common Infections

Duration: 15 minutes

Learning Objectives:

Identify different types of infections (bacterial, viral, fungal).

Understand routes of transmission (contact, droplet, airborne).

Content:

- **Types of Infections:** Overview of common bacterial, viral, and fungal infections encountered in healthcare settings.
- **Transmission Pathways:** How infections spread through direct contact, droplets, and airborne particles.
- **Infection Lifecycle:** How infections develop and the chain of infection (infectious agent, reservoir, portal of exit, mode of transmission, portal of entry, susceptible host).

Interactive Element:

- **Case Study:** Identify potential sources of infection in a simulated hospital room.

Section 3: Hand Hygiene

Duration: 20 minutes

Learning Objectives:

Learn proper handwashing techniques according to CDC guidelines.

Understand when and how to use alcohol-based hand sanitizers.

Content:

- **Importance of Hand Hygiene:** Role in preventing transmission of infections.
- **Handwashing Technique:** Step-by-step demonstration (20-second wash, scrubbing all surfaces of hands).

- **Hand Sanitizer Use:** When to use it, effectiveness compared to soap and water.
- **Five Moments for Hand Hygiene:** WHO guidelines (before patient contact, after patient contact, after exposure to bodily fluids, etc.).

Interactive Element:

- **Simulation:** Virtual handwashing practice with immediate feedback on technique.

Section 4: Personal Protective Equipment (PPE)

Duration: 20 minutes

Learning Objectives:

Properly don (put on) and doff (take off) PPE.

Understand when to use different types of PPE (gloves, masks, gowns, face shields).

Content:

- **Types of PPE:** Gloves, masks, gowns, face shields.
- **PPE Usage Guidelines:** When to wear PPE based on the type of patient interaction and risk of exposure.
- **Donning and Doffing PPE:** Step-by-step video demonstration of the correct order to put on and remove PPE to minimize contamination.
- **PPE Disposal:** Proper disposal of used PPE to prevent cross-contamination.

Interactive Element:

- **Simulation:** Virtual donning and doffing practice with assessment of technique.

Section 5: Cleaning and Disinfection

Duration: 15 minutes

Learning Objectives:

- Understand the importance of regular cleaning and disinfection of surfaces and equipment.
- Learn which disinfectants are appropriate for healthcare settings.

Content:

- **High-Touch Surfaces:** Identification of frequently touched areas in patient rooms (bed rails, IV poles, doorknobs, etc.).
- **Cleaning vs. Disinfection:** Difference between cleaning (removing dirt) and disinfecting (killing pathogens).
- **Types of Disinfectants:** EPA-approved disinfectants for healthcare settings and their uses.
- **Disinfection Protocols:** How often and when to clean surfaces (between patients, at the end of shifts).

Interactive Element:

- **Scenario-Based Activity:** Choose the correct cleaning procedure for different patient areas.

Section 6: Isolation Precautions

Duration: 15 minutes

Learning Objectives:

- Identify when to apply different types of isolation precautions (contact, droplet, airborne).

- Know how to manage patients under isolation protocols.

Content:

- **Contact Precautions:** For infections spread by direct contact (e.g., MRSA).
Gloves and gowns are required.
- **Droplet Precautions:** For respiratory infections spread by large droplets (e.g., influenza). Masks are required.
- **Airborne Precautions:** For infections spread by tiny airborne particles (e.g., TB).
N95 respirators are required.
- **Isolation Rooms:** Proper use of negative pressure rooms for airborne precautions.

Interactive Element:

- **Quiz:** Match the infection type with the appropriate isolation precaution.

Section 7: Handling Contaminated Equipment and Waste

Duration: 10 minutes

Learning Objectives:

Safely handle and dispose of contaminated equipment and biohazardous waste.

Content:

- **Sharps Disposal:** Safe disposal of needles and other sharp objects in designated containers.
- **Biohazardous Waste:** Identification and disposal of materials contaminated with bodily fluids.
- **Cleaning Medical Equipment:** Sterilization of reusable equipment and handling of single-use items.

Interactive Element:

- **Case Study:** Choose the correct disposal method for various types of waste.

Section 8: Monitoring and Reporting Infections

Duration: 15 minutes

Learning Objectives:

- Recognize signs and symptoms of infection in patients.
- Understand the importance of timely reporting of infections.

Content:

- **Common Signs of Infection:** Fever, redness, swelling, pus, etc.
- **Infection Reporting Procedures:** How to report infections within the healthcare facility.
- **Tracking Infections:** The role of infection control teams in tracking and managing outbreaks.

Final Assessment

Duration: 10 minutes

Format:

A final quiz to assess knowledge retention (multiple-choice) was implemented along with skill Demonstration.

Appendix D: Presentation

Introduction to Infection Prevention

Infections patients acquire during their stay in a healthcare setting.

Types of HAIs:

MRSA

Clostridium
difficile (C. diff)

surgical site
infections

catheter-
associated urinary
tract infections
(CAUTIs)

ventilator-
associated
pneumonia
(VAP).

(CDC, 2023)

Personal Protective Equipment

Gloves

→

Hand Hygiene: Best Practices

- Handwashing with soap and water for at least 20 seconds (CDC).

Steps

- Wet, lather, scrub (palms, back of hands, between fingers, under nails), rinse, and dry with a clean towel.

- Before and after patient contact.
- After contact with body fluids.
- After removing gloves.

Duration

When to Wash Hands

Isolation Precautions

Contact Precautions: Use gloves and gown when in contact with patients with MRSA or C. diff.

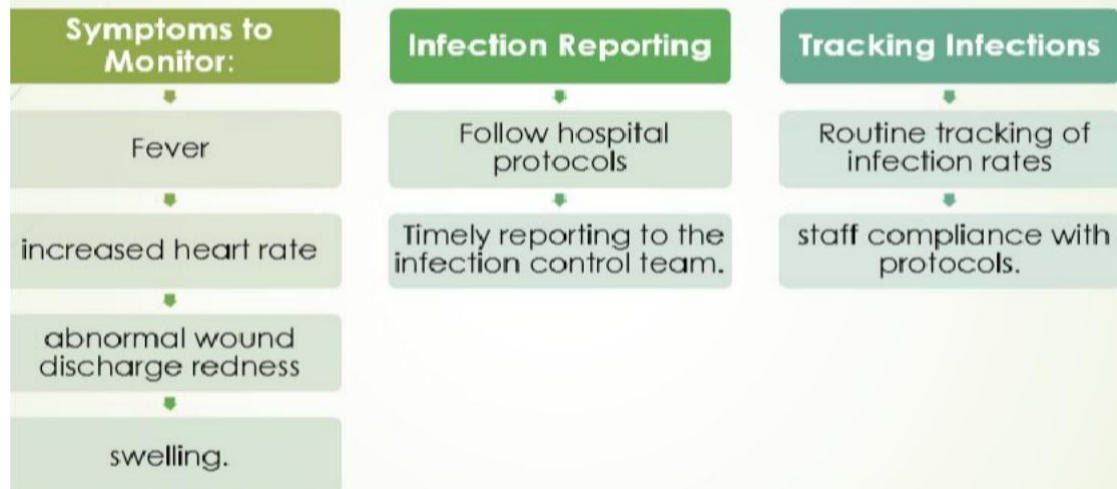
Droplet Precautions: Wear a mask for patients with influenza or pertussis.

Airborne Precautions: Use an N95 respirator for patients with tuberculosis or measles.

Isolation Rooms: Use negative-pressure rooms for airborne infections

(Siegel et al., 2020)

Monitoring and Reporting Infections



(CDC, 2023)

Quiz and Knowledge Check

How long should you wash your hands to prevent infection?

Which PPE should be worn when caring for a patient with tuberculosis?

What is the correct order for removing PPE?

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