

# Exploring the Training Needs of Nurses and Laboratory Specialists in Managing Emerging Infectious Diseases: A Qualitative Study in a Tertiary Hospital Setting

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## Abstract

Emerging infectious diseases (EIDs) pose significant challenges to healthcare systems, requiring nurses and laboratory specialists to be adequately prepared. This qualitative study explored the training needs and challenges faced by nurses and laboratory specialists in managing EIDs at a tertiary hospital. Semi-structured interviews with 20 participants (10 nurses and 10 laboratory specialists) revealed three key themes: inadequate training programs, challenges in interdisciplinary collaboration, and recommendations for improving training. Findings highlighted gaps in pathogen-specific education, limited simulation-based training, and poor communication between disciplines. Participants emphasized the need for targeted, interdisciplinary training programs and real-time drills to enhance EID preparedness. These findings provide actionable insights for developing effective training interventions to improve healthcare professionals' readiness for EID management.

**Keywords:** Emerging Infectious Diseases, Training Needs, Interdisciplinary Collaboration, Nurses, Laboratory Specialists, Qualitative Study, Tertiary Hospital

## Introduction

Emerging infectious diseases (EIDs) remain a significant global health challenge, requiring a coordinated and skilled healthcare response. Nurses and laboratory specialists are at the forefront of managing these diseases, playing critical roles in infection prevention, diagnosis, and patient care. However, research highlights the need for targeted training programs to adequately prepare healthcare professionals for the complexities associated with EIDs (Gebbie et al., 2002).

Inadequate training and preparedness among nurses have been identified as major barriers to effective EID management. For example, a study by Thrupp et al. (2004) demonstrated that many healthcare workers, including nurses, lack confidence in managing diseases such as SARS and avian influenza, primarily due to insufficient education on infection control protocols. Similarly, laboratory specialists often face challenges in diagnosing emerging pathogens due to gaps in knowledge and limited access to advanced diagnostic tools (Gostin et al., 2003). These gaps can lead to delayed diagnoses and inadequate containment measures, exacerbating the spread of infectious diseases.

The role of interdisciplinary collaboration and ongoing professional development in addressing these challenges has been emphasized in previous studies. Training programs that incorporate practical simulations, pathogen-specific education, and interprofessional collaboration have been shown to improve both preparedness and response among healthcare professionals (King et al., 2012). Despite these advancements, there remains a critical need to better understand the specific training requirements of nurses and laboratory specialists, particularly in the context of tertiary hospitals, where the burden of managing complex EIDs is often concentrated.

This study seeks to explore the training needs of nurses and laboratory specialists in managing EIDs within a tertiary hospital setting. By identifying gaps in current training practices and understanding the perspectives of these key professionals, this research aims to provide actionable recommendations for enhancing EID preparedness and response.

### **Literature Review**

The management of emerging infectious diseases (EIDs) requires healthcare professionals to be adequately prepared through comprehensive training programs. Nurses and laboratory specialists play critical roles in managing these diseases, including infection prevention, diagnosis, and patient care. This literature review explores existing research on the training needs and challenges faced by these professionals in the context of EID management.

#### **Training Needs of Nurses in EID Management**

Numerous studies have identified gaps in the training of nurses regarding infection control and EID preparedness. Thrupp et al. (2004) found that many nurses lacked confidence in handling diseases such as SARS and avian influenza, primarily due to insufficient training on infection prevention protocols. Furthermore, a study by Simonds and Sokol (2009) highlighted the ethical and practical challenges nurses face in balancing patient care with self-protection during infectious disease outbreaks. These findings emphasize the importance of equipping nurses with practical skills and theoretical knowledge to address the complexities of EIDs effectively.

In addition, interprofessional collaboration has been noted as a critical component of nurse training. According to Gebbie et al. (2002), training programs that incorporate teamwork and interdisciplinary simulations improve nurses' ability to manage EIDs in high-pressure settings. Despite these advancements, many healthcare systems continue to struggle with resource limitations, leading to insufficient training opportunities for nurses in tertiary hospitals.

#### **Training Needs of Laboratory Specialists in EID Management**

Laboratory specialists are essential in the timely diagnosis of infectious diseases, yet they often face significant challenges related to knowledge gaps and technological limitations. Gostin et al. (2003) noted that laboratory professionals frequently encounter difficulties in diagnosing emerging pathogens due to a lack of pathogen-specific training and access to advanced diagnostic tools. The authors emphasized the need for continuous professional development to ensure laboratory specialists can effectively contribute to disease surveillance and management.

Moreover, King et al. (2012) highlighted the role of laboratory specialists in providing critical data for public health interventions during outbreaks. However, the study also underscored the importance of integrating laboratory training with clinical workflows to enhance coordination between lab specialists and other healthcare professionals. Limited collaboration between laboratory staff and clinical teams can hinder the efficient use of diagnostic results in patient care and public health decision-making.

### Gaps in Current Training Programs

Existing research points to several gaps in the training programs for nurses and laboratory specialists in managing EIDs. For example, a systematic review by Iavicoli et al. (2006) identified a lack of pathogen-specific education in most healthcare training curricula, which impedes healthcare professionals' ability to respond effectively to novel infectious threats. Additionally, the review found that simulation-based training, although effective, is often underutilized due to resource constraints in many healthcare systems.

Another significant challenge is the lack of standardization in EID training programs across healthcare facilities. Studies have noted variability in the content and delivery of training programs, leading to inconsistent preparedness levels among nurses and laboratory specialists (King et al., 2012). This variability often results in a fragmented approach to EID management, particularly in tertiary hospitals where the demand for specialized training is highest.

### The Role of Interdisciplinary Training

Interdisciplinary training programs have been recognized as an effective way to bridge the gaps in EID preparedness. By fostering collaboration between nurses, laboratory specialists, and other healthcare professionals, these programs can enhance communication and teamwork during outbreaks. Gebbie et al. (2002) emphasized that joint training sessions improve understanding of each professional's role in EID management, thereby reducing delays in diagnosis and treatment.

The literature underscores the critical need for targeted training programs to address the gaps in EID preparedness among nurses and laboratory specialists. While there has been progress in incorporating interdisciplinary approaches and simulation-based training, significant challenges remain in standardizing and scaling these programs. Addressing these gaps is essential to ensure healthcare professionals are adequately equipped to manage the complexities of EIDs in tertiary hospital settings.

### Methodology

This qualitative study was conducted in a tertiary hospital setting to explore the training needs of nurses and laboratory specialists in managing emerging infectious diseases (EIDs). The research aimed to gain an in-depth understanding of the perceived gaps in existing training programs and identify areas for improvement through the lived experiences of healthcare professionals.

### Study Design

A qualitative descriptive design was employed to capture the experiences, perceptions, and opinions of

nurses and laboratory specialists regarding EID training. This approach was chosen for its flexibility in exploring complex phenomena and its ability to provide rich, detailed insights into participants' experiences.

## Study Setting

The study was conducted in a tertiary hospital. This hospital serves as a referral center for infectious disease cases and has a dedicated infectious diseases unit, making it an ideal setting for exploring the training needs of healthcare professionals managing EIDs.

## Participants

Participants were purposively selected to include nurses and laboratory specialists directly involved in infectious disease management. Inclusion criteria were as follows:

1. At least two years of professional experience in a tertiary hospital setting.
2. Involvement in patient care or diagnostic testing related to infectious diseases.
3. Willingness to participate in an in-depth interview.

A total of 20 participants were recruited, comprising 10 nurses and 10 laboratory specialists. This sample size was determined to achieve data saturation, where no new themes or insights emerged during data collection.

## Data Collection

Data were collected through semi-structured interviews conducted. Interviews were conducted in a private room within the hospital to ensure confidentiality and comfort. Each interview lasted approximately 45-60 minutes.

The interview guide was developed based on a review of the literature and included open-ended questions such as:

- “Can you describe your experiences with training related to emerging infectious diseases?”
- “What challenges have you faced in managing infectious diseases due to gaps in training?”
- “What type of training do you believe would enhance your preparedness for managing EIDs?”
- “How do you perceive the collaboration between nurses and laboratory specialists in managing EIDs?”

Interviews were audio-recorded with participants' consent and transcribed verbatim for analysis. Field notes were also taken to capture non-verbal cues and contextual details.

## Data Analysis

Thematic analysis was used to analyze the interview data. The process involved the following steps:

1. Familiarization: Reading and re-reading transcripts to gain an initial understanding of the data.
2. Coding: Identifying significant statements and assigning codes to meaningful units of data.
3. Theme Development: Grouping codes into broader themes that captured the key training needs and challenges faced by participants.
4. Review and Refinement: Iteratively refining themes to ensure they accurately represented the data.

Two researchers independently coded the data to enhance reliability, and discrepancies were resolved through discussion. NVivo software was used to facilitate data organization and analysis.

## Ethical Considerations

Ethical approval for the study was obtained from the ethics committee. Participants provided written informed consent before participation. Confidentiality was maintained by anonymizing transcripts and storing data securely. Participants were assured that they could withdraw from the study at any time without consequences.

## Rigor and Trustworthiness

To ensure the rigor and trustworthiness of the study, the following strategies were employed:

- **Credibility:** Prolonged engagement with participants and member-checking to confirm the accuracy of interpretations.
- **Transferability:** Providing detailed descriptions of the study context to allow others to assess its applicability to their settings.
- **Dependability:** Maintaining an audit trail of research decisions and processes.
- **Confirmability:** Triangulating data sources and using reflexive journaling to minimize researcher bias.

This methodology ensured a comprehensive exploration of the training needs of nurses and laboratory specialists in managing EIDs. By grounding the study in a tertiary hospital setting and employing robust qualitative methods, the findings provide valuable insights into improving EID preparedness in similar healthcare contexts.

## Findings

The findings of this study are organized into three major themes, each with corresponding sub-themes. These themes reflect the training needs, challenges, and perceptions of nurses and laboratory specialists in managing emerging infectious diseases (EIDs). Participant quotes are included to support the themes.

### Theme 1: Inadequate Training Programs

This theme captures participants' perceptions of the gaps in current training programs related to EID management.

## *Sub-Theme 1.1: Limited Focus on Emerging Pathogens*

Participants highlighted the lack of pathogen-specific training in existing programs, which hinders their ability to recognize and respond to novel diseases effectively.

- **Participant P3 (Nurse):**

*“We were taught general infection control protocols, but when it comes to diseases like Ebola or MERS, I felt completely unprepared. We need specific training on these pathogens.”*

- **Participant P14 (Laboratory Specialist):**

*“Sometimes, we encounter samples for rare pathogens, and we don’t have proper guidelines or training to handle them safely.”*

## *Sub-Theme 1.2: Inadequate Simulation-Based Learning*

Participants emphasized the need for practical, simulation-based training to improve their preparedness for real-life EID scenarios.

- **Participant P6 (Nurse):**

*“Theoretical knowledge isn’t enough. I believe simulation drills would help us practice how to manage outbreaks efficiently.”*

- **Participant P18 (Laboratory Specialist):**

*“We need hands-on training, especially for handling high-risk samples. It’s one thing to know the protocol and another to apply it under pressure.”*

## **Theme 2: Challenges in Interdisciplinary Collaboration**

This theme reflects the barriers to effective collaboration between nurses and laboratory specialists during EID management.

### *Sub-Theme 2.1: Lack of Role Clarity*

Participants reported confusion about roles and responsibilities, which often leads to inefficiencies during outbreaks.

- **Participant P5 (Nurse):**

*“Sometimes, I’m not sure what information the lab team needs from me, and that delays the testing process.”*

- **Participant P12 (Laboratory Specialist):**

*“We rarely communicate directly with nurses. It would be helpful to have joint meetings or training sessions to align our efforts.”*

## *Sub-Theme 2.2: Communication Gaps*

Poor communication between teams was identified as a critical barrier to effective EID management.

- **Participant P9 (Nurse):**

*“During the last outbreak, there were delays because we didn’t get test results on time. Better communication channels would have made a huge difference.”*

- **Participant P15 (Laboratory Specialist):**

*“Sometimes, we don’t receive all the clinical details we need to prioritize tests. This affects the accuracy and speed of our work.”*

## **Theme 3: Recommendations for Improving Training**

Participants provided suggestions for enhancing EID-related training programs.

### *Sub-Theme 3.1: Inclusion of Pathogen-Specific Modules*

Both nurses and laboratory specialists advocated for training programs tailored to emerging pathogens.

- **Participant P1 (Nurse):**

*“We need more targeted training, especially for diseases that are likely to emerge in our region. It’s not enough to focus only on general infectious diseases.”*

- **Participant P16 (Laboratory Specialist):**

*“Workshops on specific pathogens, their diagnostics, and containment strategies would be highly beneficial.”*

### *Sub-Theme 3.2: Joint Interdisciplinary Training*

Participants suggested collaborative training programs to improve teamwork and understanding between nurses and laboratory specialists.

- **Participant P4 (Nurse):**

*“If we had more joint training sessions, we would understand how to support the lab team better and vice versa.”*

- **Participant P11 (Laboratory Specialist):**

*“Training that brings us together to discuss workflows and challenges would help us coordinate better during outbreaks.”*

### *Sub-Theme 3.3: Emphasis on Real-Time Drills*

Participants stressed the importance of incorporating real-time outbreak drills to simulate high-pressure scenarios.

- **Participant P7 (Nurse):**

*“Practicing in a controlled environment would give us the confidence to act quickly and effectively during an actual outbreak.”*

- **Participant P20 (Laboratory Specialist):**

*“Real-time drills involving all teams would help us identify gaps in our processes and improve coordination.”*

### **Discussion**

This study explored the training needs of nurses and laboratory specialists in managing emerging infectious diseases (EIDs) within a tertiary hospital setting. The findings highlight significant gaps in current training programs, challenges in interdisciplinary collaboration, and actionable recommendations for improving EID preparedness. This discussion contextualizes the results within existing literature and provides implications for practice, policy, and future research.

#### **Inadequate Training Programs**

The study revealed that nurses and laboratory specialists perceive current training programs as insufficient, particularly in relation to pathogen-specific knowledge and practical application through simulations. This aligns with Thrupp et al. (2004) findings, which noted that healthcare workers often feel unprepared to manage diseases such as SARS and avian influenza due to inadequate education on specific pathogens. The lack of simulation-based training identified in this study is consistent with Iavicoli et al. (2006), who emphasized the effectiveness of simulation exercises in improving preparedness for infectious disease outbreaks.

The findings underscore the need for training programs that integrate both theoretical and practical components. For example, hands-on workshops focusing on emerging pathogens could enhance the confidence and capabilities of both nurses and laboratory specialists. Simulation-based training, particularly those replicating high-pressure outbreak scenarios, can also provide critical experiential learning opportunities.

#### **Challenges in Interdisciplinary Collaboration**

Interdisciplinary collaboration emerged as a critical challenge, with participants highlighting issues such as unclear roles and poor communication. This is consistent with prior research by Gebbie et al. (2002), which emphasized the importance of teamwork and defined roles in managing public health emergencies. Misaligned workflows and insufficient communication channels between nurses and laboratory specialists can lead to delays in diagnosis and treatment, as reported by several participants in this study.



Improved interdisciplinary collaboration requires structured communication strategies and joint training sessions. As suggested by Gostin et al. (2003), fostering collaboration through regular interdisciplinary meetings or joint simulations can help clarify roles, streamline workflows, and enhance mutual understanding. This approach would not only improve EID response but also build a culture of teamwork and shared responsibility within the healthcare system.

## Recommendations for Improving Training

Participants provided valuable recommendations for enhancing training programs, including the inclusion of pathogen-specific modules, joint interdisciplinary training, and real-time drills. These suggestions align with King et al. (2012), who advocated for training programs that integrate clinical and laboratory practices to improve coordination during outbreaks.

The emphasis on joint interdisciplinary training reflects the need for collaborative learning environments that bring together nurses, laboratory specialists, and other healthcare professionals. Such training can bridge gaps in understanding and foster a cohesive approach to EID management. Real-time drills, as recommended by participants, provide an opportunity to identify and address operational inefficiencies in a controlled setting, preparing healthcare teams for real-world scenarios.

## Implications for Practice

The findings of this study have several practical implications:

1. **Enhanced Training Programs:** Healthcare institutions should develop comprehensive EID training programs that include pathogen-specific education, practical simulations, and interdisciplinary modules.
2. **Improved Communication Channels:** Establishing structured communication protocols and fostering regular interdisciplinary discussions can enhance collaboration between nurses and laboratory specialists.
3. **Resource Allocation:** Adequate resources must be allocated to support simulation-based training and the development of targeted educational materials for emerging pathogens.

## Implications for Policy

From a policy perspective, healthcare authorities should standardize EID training programs to ensure consistency across institutions. Policies should mandate interdisciplinary training and provide guidelines for conducting regular drills to evaluate readiness. Additionally, investing in continuing professional development programs for healthcare professionals can ensure sustained preparedness for future outbreaks.

## Limitations and Future Research

This study has some limitations that should be acknowledged. First, the findings are specific to one tertiary hospital and may not be generalizable to other settings. Second, while the study provides

valuable qualitative insights, quantitative research could complement these findings by assessing the effectiveness of specific training interventions.

Future research should explore the impact of implementing the recommended training programs and communication strategies on EID preparedness. Additionally, studies examining the perspectives of other healthcare professionals, such as physicians and infection control specialists, could provide a more comprehensive understanding of interdisciplinary challenges.

### **Conclusion**

This study highlights critical gaps in the training and collaboration of nurses and laboratory specialists in managing EIDs. Addressing these gaps through targeted training programs, improved communication, and interdisciplinary collaboration is essential for enhancing EID preparedness. By implementing the recommendations provided, healthcare institutions can better equip their teams to respond effectively to the challenges posed by emerging infectious diseases.

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