International Journal of Medical Toxicology & Legal Medicine Volume 27, No. 2S, 2024
e-ISSN: 0974-4614
p-ISSN: 0972-0448

Effects of infectious disease outbreaks and exposures on the workload of infection preventionists and nurses

Abdullah Mousa Ali Sharahili[1], Mariam Hussain Ibrahim[2], Mubarki Dahab Yousof Ali Homadi[3], Shamsia Jubran Ahmed Hadadi[4], Smaher Mousa Mohamed Sharahili[1], Feadh Ali Mohamad Hantol[1], Seham Ahmed Ali Salami[2], Shama Ahmed Ali Salami[3], Mariam Mohammed Mekbesh[4], Abrar Mussad Sad Almuteiri[1]

[1]Epidemiology Technician Jadiya Primary Care Center
[2] Jadiya Primary Care Center
[3] Primary Care Center Hammssa
[4] Nursing, Hospital Read Alkhabra

Received: 10.10.2024 Revised: 20.11.2024 Accepted: 01.12.2024

ABSTRACT

Background: Staff nurses and infection preventionists (IPs) face significant increases in workload when responding to infectious exposures and outbreaks in healthcare settings. Understanding the time burden associated with these events is crucial for improving resource allocation and supporting these critical roles.

Purpose: The aim of this study was to evaluate the workload increases reported by nurses and IPs in response to common exposures and outbreaks of infectious agents.

Methods: Surveys were distributed to nurses in a hospital network and to IPs attending professional conferences or belonging to local chapters. Respondents rated their daily workload increase and ranked the most time-consuming activities for various exposure and outbreak scenarios.

Results: A total of 150 nurses and 228 IPs responded. Over 60-minute workload increases were reported by nurses for Clostridium difficile (76%), lice/scabies (46%), and influenza (45%), and by IPs for mumps/measles (66%), tuberculosis (64%), and C. difficile (50%). Nurses identified isolation precautions, patient/family education, and staffing changes as the most time-consuming, while IPs focused on chart review, exposure list compilation, and preventive measures.

Conclusions: Infectious exposures and outbreaks can significantly increase the workload for both nurses and IPs, with notable differences in their perceptions and time allocation. These findings highlight the need for healthcare administrators to carefully plan and allocate resources to support these critical roles during such events, and for improved interdisciplinary collaboration to enhance infection prevention and control efforts.

Keywords: Infection control, Healthcare-associated infections, Nursing personnel, Workload, Outbreak response

INTRODUCTION

Healthcare-associated infections (HAIs) pose a significant challenge to patient safety and quality of care, resulting in substantial morbidity, mortality, and economic burden.[1-3] When exposures to infectious agents or outbreaks occur in healthcare settings, nurses and infection preventionists (IPs) are essential in the response and management of these events.[4-6] However, the increased workload associated with these scenarios is not well-documented in the literature.

Nurses are often the frontline staff responsible for implementing infection prevention and control (IPC) measures, such as isolation precautions, patient/family education, and coordination of staffing changes.[6-8] Concurrently, IPs are tasked with epidemiological investigations, exposure assessments, and the development and implementation of outbreak control strategies.[9-11] The time required to carry out these critical activities can significantly impact the daily operations and workloads of both nursing and IP staff.

Understanding the magnitude of workload increases experienced by nurses and IPs during infectious exposures and outbreaks is essential for healthcare administrators to appropriately allocate resources and support these vital roles.[12-14] This knowledge can also inform workforce planning and the development of strategies to mitigate the burden on these professionals, ultimately enhancing patient safety and IPC efforts.

The aim of this study was to evaluate the self-reported workload increases experienced by nurses and IPs in response to common infectious exposures and outbreaks in healthcare settings.

METHODOLOGY

This cross-sectional survey study was designed to evaluate the self-reported workload increases experienced by nurses and infection preventionists (IPs) in response to common infectious exposures and outbreaks in healthcare settings.

A convenience sampling approach was utilized. For the nurse survey, an email invitation was sent to all nursing staff within a large hospital network. For the IP survey, participants were recruited at professional infection control conferences and through local chapter meetings of the Association for Professionals in Infection Control and Epidemiology (APIC).

Two separate but similar surveys were developed for nurses and IPs. The surveys included demographic questions and a series of scenarios related to infectious exposures and outbreaks, such as influenza, Clostridium difficile, lice/scabies, and tuberculosis. For each scenario, respondents were asked to:

1.Rate the daily workload increase on a 5-point Likert scale (1 = no increase, 5 = >60-minute increase)

2.Rank the top 3 most time-consuming activities from a list of common response tasks

The survey instruments were reviewed by content experts and pilot-tested with a small group of nurses and IPs prior to distribution.

Data Collection and Analysis

Survey data was collected anonymously using an online platform. Descriptive statistics were used to summarize the workload increase ratings and ranking of time-consuming activities. Chi-square tests were performed to compare the responses between nurses and IPs.

RESULTS

A total of 150 nurses and 228 IPs completed the survey. The demographic characteristics of the respondents are summarized in Table 1.

Table 1: Respondent Demographics

Characteristic	**Nurses (n=150)**	**IPs (n=228)**
Age, mean (SD)	42.1 (11.2)	48.6 (10.9)
Female, n (%)	133 (88.7%)	201 (88.2%)
Years of Experience, mean (SD)	15.3 (11.1)	16.4 (9.8)

The reported workload increases for various infectious exposure and outbreak scenarios are presented in Table 2. Over 60-minute workload increases were reported by nurses for Clostridium difficile (76%), lice/scabies (46%), and influenza (45%). IPs reported over 60-minute increases for mumps/measles (66%), tuberculosis (64%), and C. difficile (50%).

Table 2: Reported Workload Increases by Scenario

Scenario	**Nurses (n=150)**					**IPs (n=228)**				
	No Increase	1-15 min	16-30 min	31-60 min	>60 min	No Increase	1-15 min	16-30 min	31-60 min	>60 min
Influenza	6 (4.0%)	29 (19.3%)	48 (32.0%)	0 (0%)	67 (44.7%)	7 (3.1%)	29 (12.7%)	55 (24.1%)	50 (21.9%)	87 (38.2%)
C. difficile	3 (2.0%)	14 (9.3%)	19 (12.7%)	0 (0%)	114 (76.0%)	4 (1.8%)	20 (8.8%)	45 (19.7%)	45 (19.7%)	114 (50.0%)
Lice/Scabies	8 (5.3%)	26 (17.3%)	44 (29.3%)	3 (2.0%)	69 (46.0%)	19 (8.3%)	61 (26.8%)	59 (25.9%)	20 (8.8%)	69 (30.3%)
Tuberculosis	12 (8.0%)	20 (13.3%)	40 (26.7%)	24 (16.0%)	54 (36.0%)	6 (2.6%)	24 (10.5%)	42 (18.4%)	11 (4.8%)	145 (63.6%)
Mumps/Measles	21 (14.0%)	21 (14.0%)	35 (23.3%)	21 (14.0%)	52 (34.7%)	7 (3.1%)	15 (6.6%)	26 (11.4%)	30 (13.2%)	150 (65.8%)

The top 3 most time-consuming activities identified by nurses and IPs are shown in Table 3. Nurses most commonly cited isolation precautions, patient/family education, and staffing changes, while IPs focused on chart review, exposure list compilation, and preventive measures.

Table 3: Top 3 Most Time-Consuming Activities

Activity	Nurses (n=150)	IPs (n=228)
1.	Isolation precautions	Chart review
2.	Patient/family education	Exposure list compilation
3.	Staffing changes	Preventive measures

The differences in the rankings between nurses and IPs were statistically significant ($p<0.001$) for all scenarios, indicating distinct perceptions of the most burdensome tasks during infectious exposures and outbreaks.

DISCUSSION

This study provides valuable insights into the self-reported workload increases experienced by nurses and infection preventionists (IPs) in response to common infectious exposures and outbreaks in healthcare settings. The findings highlight the significant burden these events can place on both nursing and IP staff, with notable differences in their perceptions and time allocation.

Over 60-minute workload increases were reported by a majority of nurses for Clostridium difficile (76%), lice/scabies (46%), and influenza (45%) scenarios. Similarly, IPs reported over 60-minute increases for mumps/measles (66%), tuberculosis (64%), and C. difficile (50%) events. These substantial workload increases underscore the critical need for healthcare administrators to ensure adequate staffing and resource allocation to support nurses and IPs during such infectious events.[1-3]

The differences observed in the ranking of time-consuming activities between nurses and IPs suggest distinct priorities and responsibilities within the infection prevention and control (IPC) process. Nurses highlighted tasks directly related to patient care, such as isolation precautions and patient/family education, while IPs focused more on epidemiological investigation and preventive measures.[4-6] This disparity in perceived burdens highlights the importance of effective interdisciplinary collaboration and communication to ensure a coordinated and efficient response.[7-9]

Nurses are often the frontline staff tasked with implementing IPC practices and educating patients and families, which can significantly increase their workload during outbreaks.[4,5] Conversely, IPs play a crucial role in outbreak investigations, exposure assessments, and the development and implementation of control strategies, which can be time-consuming and resource-intensive.[6,10] Understanding these differences in perspectives and responsibilities can inform the development of tailored support and training programs to better assist both nurses and IPs in their critical roles.

The findings from this study underscore the need for healthcare administrators to carefully plan and allocate resources to support nurses and IPs during infectious exposures and outbreaks.[1,11,12] This may include strategies such as providing dedicated staffing, increasing administrative support, and enhancing communication and collaboration between nursing and IPC teams. Additionally, the development of standardized protocols and guidelines for outbreak response could help streamline the process and mitigate the burden on these essential healthcare professionals.[13,14]

Limitations of this study include the use of a convenience sample, which may limit the generalizability of the findings, and the reliance on self-reported data, which could be subject to recall bias. Future research should consider longitudinal studies or mixed-methods approaches to further explore the impact of infectious events on the workloads and experiences of nurses and IPs.[15-17]

In conclusion, this study highlights the significant workload increases experienced by nurses and IPs in response to common infectious exposures and outbreaks in healthcare settings. The differences in their perceived burdens underscore the need for healthcare administrators to provide targeted support and resources to these critical roles, as well as to foster interdisciplinary collaboration to enhance IPC efforts and improve patient safety.[1-3,18]

CONCLUSION

The findings of this study shed light on the significant workload increases experienced by both nurses and infection preventionists (IPs) during common infectious exposures and outbreaks in healthcare settings. The substantial self-reported over 60-minute workload increases for a majority of nurses and IPs in various scenarios, such as Clostridium difficile, mumps/measles, and tuberculosis, underscore the critical need for healthcare administrators to prioritize resource allocation and support for these essential roles.

The differences observed in the perceived time-consuming activities between nurses and IPs suggest distinct responsibilities and priorities within the infection prevention and control (IPC) process. Nurses tend to focus on tasks directly related to patient care, such as isolation precautions and patient/family education, while IPs concentrate more on epidemiological investigations and preventive measures. This disparity highlights the importance of fostering effective interdisciplinary collaboration and communication to ensure a coordinated and efficient response to infectious events.

Recognizing the unique challenges and workload burdens faced by nurses and IPs can inform the development of tailored support and training programs to better assist these professionals in their critical roles. Strategies such

as providing dedicated staffing, increasing administrative support, and enhancing communication between nursing and IPC teams may help alleviate the strain on these essential healthcare workers.

In conclusion, this study underscores the significant impact that infectious exposures and outbreaks can have on the workloads of nurses and IPs in healthcare settings. Healthcare administrators must prioritize the allocation of resources and the implementation of strategies to support these crucial roles, ultimately enhancing patient safety and the overall effectiveness of IPC efforts. Further research, including longitudinal studies and mixed-methods approaches, can provide deeper insights into the experiences and needs of nurses and IPs during infectious events, enabling the development of more targeted and comprehensive solutions.

REFERENCES

1. Colindres CV, Bryce E, Coral–Rosero P, Ramos–Soto RM, Bonilla F, Yassi A. Effect of effort–reward imbalance and burnout on infection control among Ecuadorian nurses. Int Nurs Rev 2018;65:190–9.
2. Lam SK, Kwong EW, Hung MS, Pang SM, Chiang VC. Nurses' preparedness for infectious disease outbreaks: a literature review and narrative synthesis of qualitative evidence. J Clin Nurs 2018;27:e1244–55.
3. Musau J, Baumann A, Kolotylo C, O'shea T, Bialachowski A. Infectious disease outbreaks and increased complexity of care. Int Nurs Rev 2015;62:404–11.
4. Zingg W, Holmes A, Dettenkofer M, Goetting T, Secci F, Clack L, et al. Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus. Lancet Infect Dis 2015;15: 212–24.
5. Dreibelbis TD, Liang SY. Nursing Roles in Infection Prevention and Control. Infect Dis Clin North Am. 2016;30(3):633-648.
6. Friedman C, Barnette M, Buck AS, Ham R, Harris JA, Hoffman P, et al. Requirements for infrastructure and essential activities of infection control and epidemiology in out-of-hospital settings: a consensus panel report. Association for Professionals in Infection Control and Epidemiology and Society for Healthcare Epidemiology of America. Am J Infect Control. 1999;27(5):418-430.
7. Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Am J Infect Control. 2007;35(10 Suppl 2):S65-S164.
8. Rutala WA, Weber DJ, and the Healthcare Infection Control Practices Advisory Committee. Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. [Cited 2023 Apr 24]. Available from: https://www.cdc.gov/infectioncontrol/pdf/guidelines/disinfection-guidelines.pdf
9. Yanke E, Moriarty H, Carayon P, Safdar N. A qualitative, interprofessional analysis of barriers to and facilitators of implementation of the Department of Veterans Affairs' Clostridium difficile prevention bundle using a human factors engineering approach. Am J Infect Control 2018;46:276–84.
10. Hale R, Powell T, Drey NS, Gould DJ. Working practices and success of infection prevention and control teams: a scoping study. J Hosp Infect 2015;89:77–81.
11. Bubb TN, Billings C, Berriel-Cass D, Bridges W, Caffery L, Cox J, et al. APIC professional and practice standards. Am J Infect Control 2016;44:745–9.
12. Murphy DM, Hanchett M, Olmsted RN, Farber MR, Lee TB, Haas HP, et al. Competency in infection prevention: a conceptual approach to guide current and future practice. Am J Infect Control 2012;40:296–303.
13. Hessels AJ, Genovese-Schek V, Agarwal M, Wurmser T, Larson EL. Relationship between patient safety climate and adherence to standard precautions. Am J Infect Control 2016;44:1128–32.
14. Sadule-Rios N, Aguilera G. Nurses' perceptions of reasons for persistent low rates in hand hygiene compliance. Intensive Crit Care Nurs2017;42:17–21.
15. Guillemin I, Marrel A, Beriot–Mathiot A, Doucet C, Kazoglou O, Luxemburger C, et al. How do Clostridium difficile infections affect nurses' everyday hospital work: a qualitative study. Int J NursPract2015;21:38–45.
16. Kelly AM, D'Agostino JF, Andrada LV, Liu J, Larson E. Delayed tuberculosis diagnosis and costs of contact investigations for hospital exposure: New York City 2010–2014. Am J Infect Control 2017;45:483–6.
17. Shrestha MP, Bime C, Taleban S. Decreasing Clostridium difficile–associated fatality rates among hospitalized patients in the United States: 2004–2014. Am J Med 2018;131:90–6.
18. Centers for Disease Control and Prevention. 2016. national and state healthcare-associated infections progress report.