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Major Article

Exploring inappropriate certified nursing assistant glove use in long-term care

Deborah Patterson Burdsall PhD, RN-BC, CIC [a,*], Sue E. Gardner PhD, RN [a], Thomas Cox PhD, RN, MSW [b,c], Marin Schweizer PhD [b,c], Kennith R. Culp PhD, RN [a], Victoria M. Steelman PhD, RN, CNOR [a], Loreen A. Herwaldt MD [d]

[a] The University of Iowa College of Nursing, Iowa City, IA
[b] Iowa City VA Health Care System, Iowa City, IA
[c] Department of Internal Medicine, University of Iowa Carver College of Medicine, Iowa City, IA
[d] Department of Epidemiology, University of Iowa College of Public Health, Iowa City, IA

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Background: Certified Nursing Assistants (CNAs) frequently wear gloves when they care for patients in standard precautions. If CNAs use gloves inappropriately, they may spread pathogens to patients and the environment, potentially leading to health care–associated infections (HAIs).

Methods: Using a descriptive structured observational design, we examined the degree of inappropriate health care personnel glove use in a random sample of 74 CNAs performing toileting and perineal care at 1 long-term care facility.

Results: During the 74 patient care events, CNAs wore gloves for 80.2% (1,774/2,213) of the touch points, failing to change gloves at 66.4% (225/339) of glove change points. CNAs changed gloves a median of 2.0 times per patient care event. A median of 1.0 change occurred at a change point. CNAs failed to change their gloves at a glove change point a median of 2.5 times per patient care event. Most (61/74; 82.4%) patient care events had >1 contaminated touch point. Over 44% (782/1,774) of the gloved touch points were defined as contaminated for a median of 8.0 contaminated glove touch points per patient care event. All contaminated touches were with gloved hands ($P < .001$).

Conclusions: Inappropriate glove use was frequently observed in this study. Contaminated gloves may be a significant cause of cross-contamination of pathogens in health care environments. Future research studies should evaluate strategies to improve glove use to reduce HAIs.

BACKGROUND

In the United States, 1 in 25 hospitalized patients acquires at least 1 health care–associated infection (HAI), accounting for 1.7 million infections and almost 99,000 deaths annually.[1,2] Researchers estimate that between 1.6 million and 3.8 million infections occur in long-term care facilities (LTCFs) annually.[3] Infections in LTCFs cause approximately 388,000 deaths per year[4] and cost between $673 million and $2 billion annually.[3-6]

The Centers for Disease Control and Prevention (CDC) Healthcare Infection Control Practices Advisory Committee's "2007 Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings" recommends the use of standard precautions and transmission-based precautions to prevent transmission of infectious agents to both health care personnel (HCP) and patients. Standard precautions require that all HCP, including Certified Nursing Assistants (CNAs), wear personal protective equipment, especially gloves, to avoid contact with blood, secretions, excretions, nonintact skin, or other potentially infectious materials which may contain pathogens.[7] HCP must change gloves as a standard precaution at the following glove change points during patient care: (1) when the HCP's gloves have touched blood or body fluids, (2) after the HCP completes a patient task, (3) after HCP's gloves touch a potentially contaminated site before touching a clean site, and (4) between patients.[7-9] A failed glove change occurs if HCP

* Address correspondence to Deborah Patterson Burdsall, PhD, RN-BC, CIC, The University of Iowa College of Nursing, 608 S. Bennett Avenue, Palatine, IL 60067.
E-mail address: dburdsall@gmail.com (D.P. Burdsall).
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do not change their gloves at any glove change point in the sequence of patient care.

When HCP wear gloves for self-protection during patient care events, they may not change gloves at glove change points and they may continue to touch patients or multiple surfaces in the patient environment for extended periods, leading to numerous contaminated touch points.[10,11] This behavior is especially problematic when the HCP's risk of contact with secretions and excretions is high, such as during perineal care and toileting assistance. HCP who continue to use contaminated gloves increase the chance that patients or HCP will acquire pathogens that subsequently cause infections. In fact, researchers report an association between contaminated gloves, contaminated patient environments, and transmission of pathogens to patients and HCP.[12,13]

To our knowledge, to date, characteristics of glove use have not been systematically studied in either acute care hospitals or LTCFs. The purpose of this study was to describe the degree of inappropriate glove use in a LTCF when HCP, including CNAs, help patients with toileting or while doing perineal care. This study addresses a significant nursing issue because nursing personnel provide most patient care in LTCFs. The information this study provides on the frequency of inappropriate glove use may help improve glove use practice and thereby decrease the risk of HAI.

METHODS

We conducted a descriptive structured observational study to examine the degree of inappropriate glove use at a LTCF when HCP help residents with toileting or perineal care. The University of Iowa Institutional Review Board approved the study protocols. Because the purpose of this study was to examine processes of glove use during patient care events, written consent from HCP was not required.

Sample and setting

The target sample included 105 randomly selected HCP permitted to assist with toileting and perineal care including (1) Registered Nurses (RNs; licensed by the state), (2) Licensed Practical Nurses (LPNs; licensed by the state), and (3) CNAs (certified by the state) who provided direct patient care. Recruitment and enrollment of HCP for the study occurred in 3 steps. First, the principal investigator (PI) held meetings to educate HCP and elicit their cooperation with the study procedures. The PI informed them that they could refuse to be observed during the study. Second, the PI used a random number generator to select RNs, LPNs, and CNAs stratified by HCP category, shift, and patient care unit. The randomly selected sample consisted of 22 RNs, 6 LPNs, and 77 CNAs, which mirrored the proportion of HCP in each category. Third, the PI asked the randomly selected HCP for permission to observe them as they assisted patients with toileting or perineal care. The PI stated that the purpose of the study was to watch for barriers to HCP hand hygiene. She used this minor deception to minimize the Hawthorne effect. It was at this point that 74 CNAs and 2 RNs gave permission to be observed. However, the nurses' primary responsibilities did not include toileting or perineal care in this setting. Because of this, most nurses were too busy with their primary job responsibilities to participate. Therefore, only CNA glove-use observations were included in the analysis. At the conclusion of a patient care event, the PI read a short debriefing statement to the CNAs informing the CNA that the true purpose of the study was to observe glove use. She then asked the CNA for permission to include the information from the observed patient care event in the study. Although CNAs frequently used gloves during other patient care activities, such as dressing, bathing, and grooming, the goal of this study was to describe how HCP, including CNAs, used gloves when interacting with patients and the environment during toileting and perineal care.

The study setting was a 296-bed, suburban LTCF with 11 licensed units that had an average of 28.7 beds (range, 10-42 beds). The PI had 24-hour access to the study units, allowing her to observe patient care events on all days and shifts. The patient care provided on these units was representative of care in U.S. LTCFs (Table 1).

Gloves were readily available on all units in public areas, shower rooms, patient rooms, and patient bathrooms to enhance availability and workflow. The LTCF's policies and procedures for toileting or perineal care followed Centers for Medicare and Medicaid Services and the CDC/World Health Organization guidance for hand hygiene and glove use during standard precautions.

Data collection

To measure inappropriate glove use, the PI developed and validated (validation data not shown) the glove use surveillance tool (GUST), which allows trained observers to record how HCP use gloves while practicing standard precautions (GUST available on request). The PI developed the GUST to examine glove use specifically during standard precautions because the definitions for appropriate and inappropriate glove use differ for standard precautions and for transmission-based precautions. The GUST is a 6-category tool that allows trained observers to record the type of surface (ie, environment, equipment, patient's body sites and body fluids, HCP's body), the sequence in which a HCP touched surfaces during a patient care event, whether the HCP wore gloves, and whether the HCP changed gloves.

The primary study variable was inappropriate glove use. The PI used information that she recorded on the GUST to assess the 5 facets of glove use: (1) the number of touch points, (2) the number of gloved touch points, (3) the number of glove change points, (4) the number of actual glove changes, and (5) the number of glove changes at glove change points. From the 5 facets of glove use, the PI

Table 1
Description of the patient care units

Level of care	No. of units	No. of beds	Duration of care	Patient characteristics	CNA/patient ratio
Sheltered	1	10	Long-term	Patients needing cues and reminders to minimal assistance from HCP	1:5 to 1:10
Intermediate	2	36	Long-term	Patients with dementia needing moderate assistance from HCP	1:6 to 1:18
Skilled	5	24-34	Long-term	Patients needing extensive assistance to total care from HCP	1:6 to 1:13
Postacute	3	26	Postacute	Patients needing postoperative supervision to total care from HCP	1:5 to 1:9

NOTE. All patient care units were in 1 long-term care facility located in the Midwestern United States. Sheltered care patients required medication management and administration, cues, reminders, and supervision with occasional physical assistance from HCP. Intermediate care patients required consistent physical assistance with some activities of daily living, and medication administration but did not require skilled services. Skilled care patients required skilled services, such as monitoring for acute change of a chronic illness, complex medication management, intravenous fluids, parenteral nutrition, and skilled therapy services. Postacute patients were short-term patients who were recovering from operations, receiving treatments for acute infections or wound care, or receiving extensive physical, occupational, speech, or respiratory therapy.
CNA, Certified Nursing Assistant; *HCP*, health care personnel.