






Concise Communication

Hand hygiene knowledge and practices of family caregivers in inpatient pediatrics

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Abstract

Family caregivers are essential inpatient pediatric care partners, yet their handwashing knowledge and compliance are rarely studied. Through hand hygiene audits and self-administered questionnaires, we observed 9% compliance, significantly lower than self-reported practice. We suggest interventions to improve caregiver handwashing behaviors to decrease infection transmission risk to hospitalized children.

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Hand hygiene (HH) is an effective means of preventing healthcare-associated infections (HAIs). Healthcare-associated viral respiratory infections and bloodstream infections together constitute substantial HAI burden in pediatric hospitals.^{1,2}

Family caregivers are an integral part of the inpatient care team, but they may contribute to their child's risk of infection acquisition during admission.² Hospital HH strategies primarily target healthcare providers (HCPs), and overlook caregiver education, despite prior studies demonstrating that caregivers recognize the importance of HH in preventing HAIs.^{3–5} We compared self-reported and real-world HH practices of family caregivers of children admitted to a pediatric tertiary-care hospital to identify targeted improvement opportunities.

Methods

Study setting

This study was conducted at a 120-bed, tertiary-care, pediatric hospital in Ontario with >6,700 annual admissions. Caregivers of patients admitted to inpatient medicine, surgery, and the pediatric and neonatal intensive care units were eligible for participation and were recruited by convenience sampling.

Questionnaire design and administration

A self-administered questionnaire based on validated surveys^{3,4} was developed by the research team and was critically reviewed by the hospital research institute's Patient and Family Advisory Committee. The study was exempted from full review by the

research ethics board as part of a hospital-wide hand hygiene quality improvement initiative.

The questionnaire was distributed from June 24 to August 31, 2019 (Appendix 1 online) to 1 English-speaking adult caregiver per patient. The questionnaire was offered when convenient to families in paper or electronic form by or completed with a study team member. Open-ended questions and Likert scales assessed caregivers' self-reported HH knowledge and practices.

Caregiver hand hygiene audits

HH practices among inpatient family caregivers were separately audited from May 24 to August 7, 2019. An auditor observed and recorded their HH before entering and after exiting the patient room. The auditor was outside patient rooms and did not interact with study participants. Audits were recorded using the "iScrub" application.

Statistical analysis

Using R programming, inpatient characteristics were analyzed with descriptive statistics. Categorical variables were described with frequencies, and the continuous variable (age) was described with median and interquartile range (IQR). A Wilson score with 95% confidence intervals was calculated for the proportion of caregivers who received information from an HCP, self-reported and observed HH performance. We used χ^2 testing to analyze differences in proportions in observed HH moments and compared reported and observed practices. The cutoff of 3 years was chosen as a developmental age when children may begin completing tasks (eg, feeding, toileting, handwashing) independently.

Multivariable logistic regression modeling was performed on responses to self-reported HH on entering versus existing the room to determine whether inpatient age, length of stay, or prior

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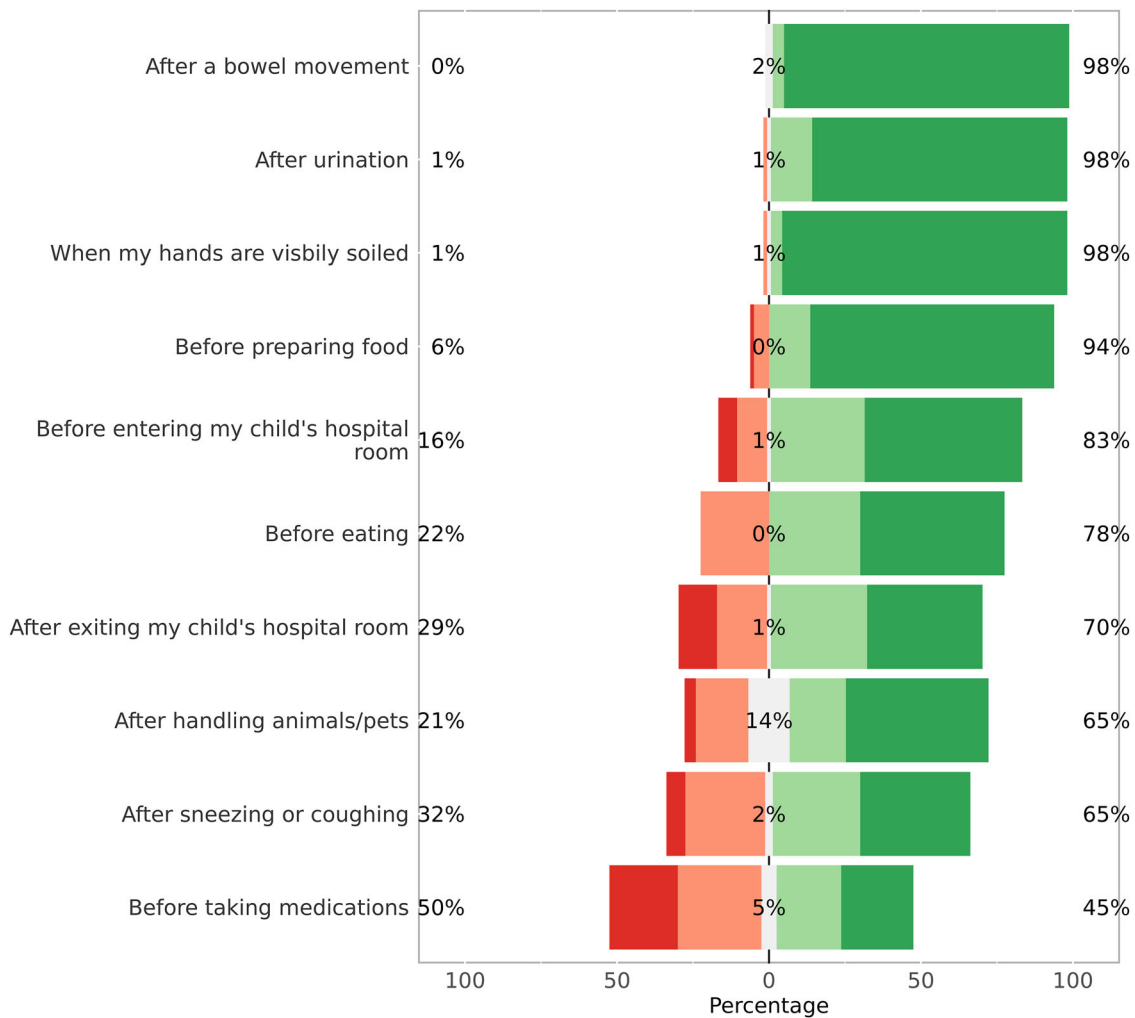


Figure 1. Likert plots demonstrating caregiver questionnaire responses regarding caregiver HH. Shading represents combined percentage for responses “strongly agree/agree” or “always,” “often” (right), “neither agree nor disagree” or “not relevant” (middle/white), and “strongly disagree/disagree” or “never,” “sometimes” (left).

admission was associated with better self-reported HH practice (Appendix 2 online).

Results

Demographics and inpatient characteristics

Among 81 completed questionnaires, the median patient age was 4.0 years (IQR, 0.9–13.0). Among them, 42 patients (54%) were first admissions; 22 patients (27%) had been admitted for ≤ 1 day; and 45 patients (56%) had been admitted for > 3 days. Most patients were admitted to inpatient medical and surgical units ($n = 71$, 88%) (Appendix 3 online).

Caregiver-reported HH knowledge and practice

Caregivers reported strong knowledge of HH timing (94%) and technique (96%) in the hospital environment and affirmed the importance of HH for hospital visitors (96%) to protect others (99%) and to prevent illness in hospital (93%) (Appendix 4 online). Knowledge gaps were identified regarding HH moments including before eating (22%), after sneezing or coughing (32%), and upon entry and exit of their child’s hospital room (16% and 29%, respectively) (Fig. 1). More than half of respondents also reported

not often or always ensuring that their child has washed their hands upon entering or exiting their hospital room (Appendix 4 online). The rate of missing data for Likert question completion was consistently $< 5\%$ for each question. Also, 6 caregivers (8%) reported respiratory or gastrointestinal symptoms; all but 1 caregiver remained with their hospitalized child while symptomatic.

Two multivariable models examined factors associated with higher reported HH (Table 1). Caregivers experiencing first admissions to hospital were 3 times more likely to report HH after exiting their child’s room than those in subsequent admissions (odds ratio, 3.15; 95% CI, 1.11–9.65).

HH Education

Posters were the most commonly reported source of HH information ($n = 61$, 75%), followed by information in the room ($n = 25$, 31%), and from an HCP ($n = 19$, 24%). Most caregivers (85%) preferred to receive HH education at admission or within 24 hours. Many expressed a desire for more signage (64%) compared to videos (28%), pamphlets (25%), demonstrations (25%), or websites (12%). Reported barriers to HH included hand irritation (27%) and perceived frequency (19%).

Table 1. Multivariable Modeling for Self-Reported HH for (1) Entry of Room (“I wash my hands before I enter my child’s hospital room”) and (2) Exit of ROOM (“I wash my hands after I exit my child’s hospital room”)

| Outcome | Variable | Outcome, n/N (%) | Adjusted OR (95% CI) | P Value |
|---------------|-----------------------------|------------------|----------------------|---------|
| Entry of room | Age | | 1.01 (0.92–1.13) | .79 |
| | First admission | | | .21 |
| | No | 28/36 (77.8) | 1.0 | |
| | Yes | 37/42 (88.1) | 2.22 (0.64–8.40) | |
| | Days in the hospital | | | .16 |
| | 0–1 | 17/22 (77.3) | 1.0 | |
| | 2 | 10/14 (71.4) | 0.70 (0.14–3.52) | |
| Exit of room | Age | | 1.01 (0.92–1.10) | .90 |
| | First admission | | | .03 |
| | No | 21/36 (58.3) | 1.0 | |
| | Yes | 32/40 (80.0) | 3.15 (1.11–9.65) | |
| | Days in the hospital | | | .16 |
| | 0–1 | 14/20 (70.0) | 1.0 | |
| | 2 | 7/14 (50.0) | 0.35 (0.07–1.53) | |
| 3+ | 34/45 (75.6) | 1.27 (0.35–4.38) | | |

Note. There were 67 events in which respondents answered “always/often” among n=78 respondents with complete data for (1) entry of room and 55 events where respondents answered “always/often” among n = 76 respondents with complete data for (2) exit of room.

Caregiver HH audits

Among 200 observations, overall caregiver HH compliance was 9% (95% CI, 5.8%–13.8%), significantly lower ($P < .001$) than self-reported rates before entering [7.2% (95% CI, 3.7%–13.6%) observed vs 82.7% (95% CI, 73.1%–89.4%) self-reported] and after exiting the room [11.2% (95% CI, 6.2%–19.5%) observed vs 69.6% (95% CI, 58.8%–78.7%) self-reported] (Appendix 5 online).

Discussion

Our study revealed that caregivers possess good knowledge of general HH indications but lack consistent knowledge of hospital-specific HH practices, including performing HH before entering and after exiting the patient’s room and ensuring that the child washes their hands after sneezing or coughing and before taking medication. Caregiver HH audit compliance of 9% was substantially lower than self-reported compliance but was comparable to the 9%–24% reported in other pediatric settings.^{3,6,7} Most symptomatic caregivers reported staying with their child, which contributes to the child’s risk of infection acquisition during hospitalization. Caregivers expressed desire for HH education, preferably within 24 hours of admission, yet fewer than half had received information from an HCP.

Addressing healthcare-specific knowledge gaps can enhance caregiver involvement in HAI prevention. Prior studies have demonstrated that caregivers understood HH importance in HAI prevention: participation in their child’s care was empowered by

education^{3,4} and improved caregiver HH positively reinforced HCP HH.⁵ Our study adds insight into timing and types of multimodal education strategies toward improving caregiver HH compliance.^{3,8} Conventional strategies including education sheets and posters and interactive methods have proven effective among children and caregivers.^{5,7,9} Alternatively, a multifaceted and unit-specific “frontline ownership” model of HH education can be used that includes posters, caregiver education, and staff role modeling. This approach was more effective in improving HH than conventional interventions.⁶

Interestingly, we detected an association between first admission to hospital and increased caregiver HH self-reporting after exiting their child’s hospital room. “Admission fatigue” has been reported,⁴ which underscores the importance of multimodal education to achieve HH compliance in subsequent admissions.

Our study had several limitations. We may have overreported HH compliance and underreported negatively perceived behaviors. Although caregivers were unaware of covert HH audits, prior questionnaire completion and a screening Hawthorne effect may have increased HH behaviors.¹⁰ The audits included caregivers not surveyed, limiting comparability between observed and reported HH behavior. The relatively small sample size from a single institution during summer months limited our ability to detect association in both models and limits the generalizability of our results. The study recruiter did not seek the patient’s primary inpatient caregiver but requested completion by an authorized decision maker or family member involved in the child’s care.

We speculate that community HH practices may have improved during the COVID-19 pandemic. This study provides valuable information on caregiver HH knowledge and behavior, and our findings emphasize the need for multifaceted HH education incorporating caregivers’ needs and engaging them as essential infection prevention partners for pediatric inpatients.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/ice.2023.204>

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