Patient Hand Hygiene Practices in Surgical Patients

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Patient hand hygiene practices in surgical patients

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Inpatient
Postoperative
Educational intervention

Background: Little is known about the hand hygiene practices of surgical patients. Most of the research has been directed at the health care worker, and this may discount the role that hand hygiene of the surgical patient might play in surgical site infections.

Methods: A quasiexperimental, pretest/post-test study was conducted in which patients (n = 72) and nurses (n = 42) were interviewed to examine perceptions and knowledge about patient hand hygiene. Concurrently, observations were conducted to determine whether surgical patients were offered assistance by the nursing staff. Following an initial observation period, nursing staff received an educational session regarding general hand hygiene information and observation results. One month after the education session, patient/nurse dyads were observed for an additional 6 weeks to determine the impact of the educational intervention.

Results: Eighty observations, 72 patient interviews, and 42 nurse interviews were completed pre-intervention, and 83 observations were completed postintervention. In response to the survey, more than half of patients (n = 41, 55%) reported that they were not offered the opportunity to clean their hands, but a majority of the nursing staff reported (n = 25, 60%) that they offered patients the opportunity to clean their hands. Prior to the educational intervention, nursing staff assisted patients in 14 of 81 hand hygiene opportunities. Following the intervention, nursing staff assisted patients 37 out of 83 opportunities (17.3% vs 44.6%, respectively, [χ²(1) = 13.008, P = .0003]).

Conclusion: This study suggests that efforts to increase hand hygiene should be directed toward patients as well as health care workers.

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might contribute to SSI rates. We found 3 published articles that examined patient hand hygiene practices. Only one of these studies had rigorous methods for systematically examining patient hand hygiene in the hospital setting. Burnett et al found that, despite staff and patients identifying patient hand hygiene as an important part of preventative infection control strategies, patients who required assistance were rarely offered the opportunity to wash their hands in the hospital. Based on this, the primary aims of this study were to (1) explore nurses’ and patients’ perceptions of patient hand hygiene and (2) determine the effectiveness of an educational intervention directed at the nursing staff about patient hand hygiene. Evidence indicates that audit and feedback can be effective in improving professional practice and can stimulate quality improvement activities at the hospital level. These effects are generally small to moderate.

METHODS

Setting and sample

The clinical study site was a 434-bed academic medical center in an urban environment that serves pediatric and adult oncologic populations. Approximately 19,000 surgical procedures are performed there annually. Last fiscal year, the site had over 24,000 admissions, the average patient stay was 5.9 days, and the bed occupancy rate was 83.7%. The study site employs over 11,000 clinicians and support staff. Three specific inpatient units were selected for this study, based on their high volume of surgical patients.

Patients were included only if they were surgical patients, had some level of dependency on nursing staff, were over 18 years old, and were willing to participate. The dependency scoring system was adapted from Burnett et al. Patients were excluded if they were medically unstable, cognitively impaired, or non-English speaking.

All professional nursing staff on the predetermined inpatient units were eligible for inclusion. Professional nursing staff included registered nurses, patient care technicians, and certified nursing assistants. Registered nurses are graduates of diploma, 2-year associate programs or 4-year baccalaureate degree programs and have passed a national certification examination for nurses. Patient care technicians and certified nursing assistants at this institution all have a minimum of a high school diplomas, have completed a certification course, and passed a national examination.

From previous research, out of 75 opportunities for nurses to assist with patient handwashing, only 1 such intervention was noted (1.3%). We assumed a preintervention rate of 10%. We estimated a small effect size, and the sample size was calculated to confer 80% power and an α of .05, resulting in a sample size for the number of events observed in the preintervention group of 72 and 72 in the postintervention group. To account for attrition, we examined 80 events in each group.

Design and intervention

This was a quasieperimental, pretest/post-test study. Approval by the institutional review boards at both the university and the hospital was obtained, and verbal consent was obtained from patients and nursing staff to be interviewed and observed. We chose verbal consent only as opposed to written consent so that patients and nurses surveyed could maintain complete anonymity. During the first phase, a cohort of nurses and patients participated in a survey. Concurrently, opportunities for assistance with patient handwashing were observed by a volunteer team of trained observers (see Data collection and training of data collectors section).

Approximately 2 months after this preintervention phase, the nursing staff participated in an educational initiative. This was a 30-minute presentation by the primary investigator (PI) that included a brief history of HAIs, handwashing efforts, and aggregate audit results of phase I. Another member of the research team was present at each educational intervention to ensure consistency among all 3 educational interventions. There was also an opportunity for questions, and an electronic version of the presentation was given to the unit nurse leaders to be shared with staff who were not present for the on-site intervention, although, if these presentations were shared, it was not recorded by this research group.

One month after the educational intervention, the same nursing staff and a new patient cohort were observed for assistance opportunities with patient handwashing over a period of 6 weeks. The observational data between the baseline and post-test groups were analyzed and compared. Descriptive statistics were used on the patient and nurse surveys. Descriptive statistics were also used for baseline and postintervention observations, and χ² test was used for comparison.

Data collection and training of data collectors

Three volunteers were trained to assist with data collection: 2 were registered nurses pursuing a master’s degree, and 1 was an advanced practice nurse at the clinical site. Volunteer training consisted of a half-day workshop and included information on HAI and study design. Survey administration was standardized using participant role playing and mock interviews. Three scenarios were used to determine inter-rater reliability of scoring handwashing opportunities observations using the standardized instruments. Inter-rater reliability of the observation scenarios was 100%.

Interviews

The original survey was tested for reliability and validity by Burnett et al. The survey questions utilized in this study were slightly modified by content experts on the research team for grammar, and gender was omitted from the nursing staff survey. Professional nursing level (registered nurses, patient care technicians, and certified nursing assistants) was not recorded nor was years of service. The survey for both groups consisted of 10 structured questions to explore both nurses’ and patients’ perceptions of hand hygiene and infection control. The patient survey consisted of 2 dichotomous (yes/no) questions, 5 questions that employed a Likert-type scale, 1 multiple choice question, and 2 short answer questions (Table 2). The nurse survey was composed of 1 dichotomous question, 6 questions that utilized a Likert scale, 1 multiple choice question, and 3 short answer questions (Table 2).

Observations

Hand hygiene opportunities were recorded in 1 of 6 categories (Table 2), which were adapted from the previous research study on patient hand hygiene, and from content experts on the research team. Observational sessions and interviews concurrently took place in the preintervention phase over a 2-month period and four 3-hour sessions. Each session included a member of the volunteer team and the PI. Three sessions took place between 8:00 AM and 11:00 AM, and the remaining session occurred from 6:00 PM to 9:00 PM. During the observations, patients were observed for no more than 2 opportunities. After each observational session, the PI reviewed the
<table>
<thead>
<tr>
<th>Nursing staff question</th>
<th>Nursing staff responses (n = 42)</th>
<th>Patient question</th>
<th>Patient responses (n = 71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you offer facilities to your patients today to enable them to wash/clean their hands?</td>
<td>Yes – 60%</td>
<td>1. Were you offered the chance to wash/clean your hands this morning?</td>
<td>Yes – 45%</td>
</tr>
<tr>
<td>2. If no, why?</td>
<td>Most common responses –</td>
<td>2. If yes, what method was offered?</td>
<td>Soap and water &lt;br&gt; Shower</td>
</tr>
<tr>
<td></td>
<td>▪ “didn’t think of it”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ “had other priorities”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ ”assumed the patient did it themselves”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. If facilities were offered, what were they?</td>
<td>Most common – hand sanitizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Patients are encouraged to carry out hand hygiene at specific times on this unit, such as after going to the toilet and before meals.</td>
<td>Always – 43% &lt;br&gt; Often – 48% &lt;br&gt; Rarely – 7% &lt;br&gt; Never – 0%</td>
<td>4. Are you encouraged to wash/clean your hands by staff at specific times (ie, after using the toilet, before meals, or when they become dirty)?</td>
<td>Yes – 87% &lt;br&gt; Always – 14% &lt;br&gt; Often – 34% &lt;br&gt; Sometimes – 15.5% &lt;br&gt; Rarely – 11% &lt;br&gt; Never – 25.5%</td>
</tr>
<tr>
<td>5. Patients who require assistance with personal hygiene are offered appropriate facilities in this unit to enable them to carry out hand hygiene.</td>
<td>Always – 69% &lt;br&gt; Often – 24% &lt;br&gt; Sometimes – 7% &lt;br&gt; Rarely – 0% &lt;br&gt; Never – 0%</td>
<td>5. Hand hygiene is an important aspect of everyday life.</td>
<td>Agree/strongly agree – 100%</td>
</tr>
<tr>
<td>6. I think hand hygiene is an important aspect of preventing infection in the hospital.</td>
<td>Strongly agree – 100%</td>
<td>6. Hand hygiene is an important part of preventing infection in the hospital.</td>
<td>Agree/strongly agree – 100%</td>
</tr>
<tr>
<td>7. From your experience working in this hospital, do you think the nurses feel their own hand hygiene is an important part of preventing infection?</td>
<td>Strongly agree – 100%</td>
<td>7. From your experience in the hospital, do you think the nurses feel their own hand hygiene is an important part of preventing infection?</td>
<td>Agree/strongly agree – 99.7% &lt;br&gt; Disagree – 3%</td>
</tr>
<tr>
<td>8. From your experience working in this hospital, do you think the nurses view patient hand hygiene as an important part of preventing infection?</td>
<td>Strongly agree – 47.5% &lt;br&gt; Agree – 47.5% &lt;br&gt; Disagree – 0% &lt;br&gt; Strongly disagree – 0% &lt;br&gt; Unsure – 5%</td>
<td>8. From your experience in hospital, do you think the nurses view patient hand hygiene as an important part of preventing infection?</td>
<td>Strongly agree – 23% &lt;br&gt; Agree – 37% &lt;br&gt; Disagree – 17% &lt;br&gt; Strongly disagree – 2% &lt;br&gt; Unsure – 21% &lt;br&gt; Hand wipes – 21% &lt;br&gt; Sanitizer – 60% &lt;br&gt; Soap and water – 19% &lt;br&gt; More signs &lt;br&gt; Better reminders &lt;br&gt; Personal hand sanitizer</td>
</tr>
<tr>
<td>9. If your patient is unable to get to a sink, which of the following do you think is the most acceptable for cleaning their hands in hospital?</td>
<td>Hand wipes – 9% &lt;br&gt; Sanitizer – 60% &lt;br&gt; Soap and water – 31% &lt;br&gt; Improved signs &lt;br&gt; More reminders &lt;br&gt; Improved patient access to sanitizer stations</td>
<td>9. If you are unable to get to a sink, which of the following do you think is the most acceptable for cleaning your hands in hospital?</td>
<td></td>
</tr>
<tr>
<td>10. In your opinion, what more could be done in order for patients to clean their hands in hospital?</td>
<td></td>
<td>10. In your opinion, what more could be done in order for patients to clean their hands in hospital?</td>
<td></td>
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</tbody>
</table>
observation sheet with the volunteer team to check for accuracy. Subsequent to the educational intervention, the nursing staff and a new patient cohort were observed a second time. In this phase, observational sessions consisted of four 2-hour sessions over a period of 6 weeks. Three sessions occurred between 8:30 AM and 10:30 AM with a volunteer and the PI, and 1 session occurred between 7:00 PM and 9:00 PM with only the PI.

**RESULTS**

**Interviews**

Seventy-five patients were approached for interviews, and 3 patients declined to participate. Seventy-two patients were interviewed. One patient was not a surgical patient and was excluded from analysis, resulting in a final sample of 71 patients. Seventy percent of the patients interviewed were older than 55 years of age, and 64% of the respondents were male. A majority of patients (n = 41, 55%) reported that they were not offered handwashing by the nursing staff. Additionally, 19% disagreed with the statement "nurses view patient hand hygiene as important," and 21% reported that they were "unsure" of how nurses viewed patient hand hygiene (Table 1). The final question of the survey asked respondents their suggestions for interventions to encourage patients to wash their hands. The most common responses included to post more signs, place posters in the bathroom (akin to the "employees must wash hands" signs found in restaurants), increase the number of reminders by staff, and provide personal hand sanitizer to each inpatient. Several patients suggested a video on loop on the hospital television station as an additional reminder to patients and visitors.

A total of 42 members of the nursing staff was interviewed, and no one declined to participate. Gender was not recorded, and most reported their age between 25 and 45 years old. A majority of the nursing staff (n = 25, 60%) reported they assisted patients with washing their hands, and the most common method offered was hand sanitizer. The difference between patient and nurse reports of how often patients were assisted with hand hygiene (45% and 60%, respectively) was not statistically significant ($\chi^2 = 2.497, P = .11$).

**Observations**

In the preintervention phase during 4 sessions, there were 81 observations with 71 patients, and the nursing staff offered or assisted the patient with handwashing 14 times (17.3%). Approximately 1 month after the educational initiative, the team observed the same nursing staff and a new cohort of patients. In this phase, there were 83 opportunities with 75 patients for handwashing, and the nursing staff assisted or reminded the patients to wash their hands 37 times (44.6%) (17.3% vs 44.6%, respectively [$\chi^2 = 13.008, P = .0003$]).

Although the study was not powered to evaluate each individual category of hand hygiene opportunities (Table 2), it was interesting to note that, in both the preintervention and the postintervention cohorts, the most frequent missed opportunity for nurse-assisted patient hand hygiene was after the patient touched contaminated equipment followed by prior to eating. Furthermore, the volunteer observers noted that, on each patient unit, reminders to patients to clean their hands were suboptimal. It was noted that static reminders were not present, presented as a confusing algorithm, or posted in a suboptimal place that was partially obstructed. Additionally, several patients remarked that on multiple occasions they attempted to cleanse hands, but the hand sanitizing station was empty.

**Table 2**

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Preintervention frequency</th>
<th>Postintervention frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>After using the toilet, commode, or urinal</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>Prior to eating</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Prior to contact with visitors</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>After touching contaminated objects (eg, urinary catheter, hallway, equipment, intravenous pole, and others)</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>After contact with own body fluid/secretions (eg, sneeze, cough, blood, and others)</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Patients and nurses agreed about the importance of hand hygiene and that nursing staff were doing a good job of cleaning their own hands. However, differences were found among patient-reported assistance by the nursing staff, nurse-reported patient hand hygiene, and direct observations by the research team. More than half of the patients reported (55%) that they were not offered handwashing by the nursing staff, and over one-third of the sample reported that they were rarely or never (35%) encouraged to wash hands by the nursing staff at specific times. In our sample, there was also a sizable portion of patients who did not think that nurses viewed patient hand hygiene as an important part of preventing infection (19%) or were unsure of what nurses' think about patient handwashing (21%).

The fact that there was a 3-fold increase in the nursing staff intervention rate from baseline to post-test after the on-site educational intervention suggests that providing education to the staff about the importance of patient hand hygiene may be an effective behavior change strategy and increase staff awareness of the need to assist patients with hand hygiene. Furthermore, in previous research related to patient hygiene, nurses receiving infection control training in the clinical setting were statistically more likely to exhibit favorable behavior toward patient hand hygiene. There are some limitations to this study. The observation difference may have been due to the Hawthorne effect because the volunteer observers did not change from baseline to post-test. We chose a convenience sample of inpatient units, which may have resulted in selection bias. Also, this study occurred at a single site with a specific oncology population and only included professional nursing staff. Furthermore, the time period between the pretest and the post-test is relatively short, and future studies are needed to determine the sustainability of such educational interventions over time. Last, although the research team is confident that no other hand hygiene or infection control interventions were concurrent with this inquiry because of the relatively short time period, we cannot conclude with certainty that the increase in patient hygiene interventions were solely because of our interventions.

The problem of HAI and SSI is multifactorial, and resolution requires a systematic approach. Human behavior is complex, and, although nurses and patients perceive that hand hygiene is important, it is clear from this study and from previous research that perceptions and actions can at times be contradictory. It is promising that there is some evidence that demonstrated that systematic decontamination of patients' hands was associated with
reduced rates of methicillin-resistant *Staphylococcus aureus.*\(^1\)

Patients may constitute a critical missing link in efforts to reduce SSI. Based on our findings, we conclude that efforts to increase hand hygiene should not only be directed toward HCW but also that patients and hospital staff must be encouraged to remind and assist patients to perform frequent hand hygiene.

**Acknowledgment**

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**References**