Compliance of Hand Hygiene in the Operation Theatre in a Tertiary Care Hospital: An Observational Study.

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ABSTRACT

Background: Lack of hand hygiene inside the operation theatre (OT) is a major cause of health care associated infection (HCAI) leading to increased morbidity and mortality. There is need to strengthen the hand hygiene protocol adherence to reduce the same. Aim: We tried to qualitatively observe compliance of hand hygiene amongst the various OT staff while handing patients and equipments and put it into quantitative terms. Methods: Various operation theatre staff was monitored discreetly during 45 surgical procedures while performing their daily shifts. The number of hand hygiene opportunities were counted compliance of hand hygiene was recorded. Results: In 5476 minutes of operative time, 623 hand hygiene opportunities were created. The compliance of hand hygiene was 28.57%, most compliant being the medical students (46.26%) followed by multipurpose workers (38.55%) and anesthetists (34.23%). Ophthalmology OT had the highest incidence of hand hygiene compliance (57.89%) followed by orthopaedics OT (33.34%). Conclusion: Compliance of hand hygiene was found to be quite low amongst the staff inside the OT. Strict hand hygiene protocols in place and administrative implementation of the same can increase the overall compliance. A monitoring team for the same would be beneficial for strict adherence of hand hygiene protocol.

Keywords: Hand hygiene, operation theatre, OT staff, health care associated infection.

INTRODUCTION

Hand mediated transmission is the major contributing factor to healthcare associated infection (HCAI). Nosocomial pathogens can be recovered from body fluids or infected areas of skin in patients, but also from intact skin of hospitalised patients. Health care workers can contaminate their hands with nosocomial flora even when performing clean procedures involving direct patient contact such as taking blood pressure or touching a patient’s hand or shoulder.

The operating room (OR) is quite a distinctive area given the high frequency of contacts between healthcare workers’ hands, environmental surfaces, patients’ body surfaces, and intravascular devices. Furthermore and despite general beliefs, surfaces within the OR, including anesthesia machines, are not adequately disinfected at the end of each working day. Not surprisingly, reports describe horizontal transmission of organisms between consecutive cases performed within the OR. There is now evidence that horizontal transmission of pathogens occurs between the anesthesia environment and patients and that operating room surfaces are infrequently disinfected. Health care associated infections (HCAI) cause prolonged hospital stay, high amount of economical cost of patients, unnecessary laboratory investigations, high cost of drugs, and result in serious morbidity and mortality. Evidence suggests that proper hand hygiene practice is regarded as the single most effective and simple inexpensive strategy for reducing the prevalence of hospital-acquired infections. However, adherence to good hand hygiene practice remains consistently poor in the clinical setting.

MATERIALS AND METHODS

This observational study was performed in a tertiary care hospital in India after institutional ethical clearance. The observations were made in major surgical operating rooms during non-emergency hours. All observations were done by a single trained observer as discreetly as possible and recorded in hand written notes. Our institution’s hand hygiene
policy includes performing hand hygiene upon entering and exiting a patient room or before and after touching a patient or his immediate surroundings, consistent with CDC and WHO recommendations. A washing alcove is situated adjacent to each OT, comprising scrub sinks, soap dispensers, and alcohol-based hand rub dispensers. Members of staff are required to enter the OT via the washing alcove and clean their hands on entering and leaving. There is no other entrance for the sterile area. Non-sterile gloves are to be donned for the insertion of a tracheal tube, nasogastric tube, peripheral venous catheter, and peripheral arterial catheter. Sterile gloves are required for insertion of a central venous catheter, spinal needle, epidural catheter and urinary tract catheter. The observer kept the washing alcove in view in order to observe the hand-hygiene practices of OT staff. An ‘hand hygiene indication’ is defined as the reason for why the hand hygiene action is required at a specific point of care and is synonymous with “a moment” as in “My five moments for hand hygiene”. A ‘hand-hygiene application’ was defined as any usage of alcohol-based hand rub, irrespective of duration and amount of cleaning product used. A ‘hand-hygiene opportunity’ was defined as a situation requiring hand-hygiene application. The HHOs were analyzed and categorized according to “My five moments for hand hygiene”. 

Professionally, OT staff were categorized as anesthesiologists, anesthesia assistant, surgeons, nurses, medical students and multi task worker. Staff who had performed a surgical scrub and donned sterile gown and gloves were excluded from observation. Surgeons were observed only before their surgical prep and after the surgical procedure had been completed. The observational period for nurses depended on their respective functions during the operation: scrub nurse (not observed while in sterile attire) or circulating nurse (non-sterile attire, continuously observed). Other staff members were observed continuously. When any invasive procedure was performed, notes were made on whether gloves were put on as specified in the guidelines.

The number of OT personnel wearing watches or jewellery was counted, since this was in violation of the hand-hygiene protocol. Finally, detailed observations of the incentives for the application of hand hygiene and glove usage were recorded using free text.

Data analysis
Statistical analysis was done using Microsoft office excels. Data analysis resulted in counts of the type of surgery, duration of surgery, the type of anesthesia, number of operations and number of staff members. Data was expressed in terms of mean, standard deviation and percentages.

RESULTS
All observations were done in various OTs in a tertiary care hospital from July 2016 to January 2017. A total of 45 surgical procedures were observed from random OTs in routine emergency hours during weekdays, totalling 5476 minutes of operative time.623 hand hygiene opportunities were observed during this time. The average duration of each surgery was 121.68 minutes with a standard deviation of 27.29 minutes. The average number of OT staff present in each OT was 10.86 (Range 8-14 people). Rings and watches were worn by 5.93% of people (29 out of 489 people). An average 13.85 hand hygiene opportunities occurred in each surgery with a standard deviation of 2.8. The average hand hygiene compliance in each surgery was 3.95 times out of 13.84 hand hygiene opportunities with a SD of 1.22. Ophthalmology OT had the highest incidence of hand hygiene compliance (57.89%) followed by orthopaedics OT (33.34%). General surgery, obstetrics and gynaecology, urology and surgical oncology had similar hand hygiene compliance [Table 1]. Hand hygiene compliance was similar in both general anesthesia and regional anesthesia (28.1 % and 29.1 % respectively) as shown in Table 2. A total of 120 gloves were used (61 sterile gloves and 59 unsterile gloves).

The overall hand hygiene compliance was 28.57%. It was highest amongst the medical students (46.26%) followed by multipurpose workers (38.55%) and anesthetists (34.23%). The lowest hand hygiene compliance was seen amongst the surgeons (7.57%) followed by the anesthesia assistants (7.95%) as shown in Table 3. As shown in Table 4, hand hygiene was more common after a procedure than before.

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Observed hand hygiene Opportunities</th>
<th>Adherence to HH Guidelines (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General surgery</td>
<td>215</td>
<td>52(24.18%)</td>
</tr>
<tr>
<td>Obstetrics and gynaecology</td>
<td>112</td>
<td>27(24.1%)</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>147</td>
<td>49(33.34%)</td>
</tr>
<tr>
<td>Surgical oncology</td>
<td>41</td>
<td>11(26.82%)</td>
</tr>
<tr>
<td>Urology</td>
<td>70</td>
<td>17(24.28%)</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>38</td>
<td>22(57.89%)</td>
</tr>
</tbody>
</table>

Table 1: Hand hygiene opportunities per type of surgery and hand hygiene compliance.

<table>
<thead>
<tr>
<th>Type of anesthesia</th>
<th>Observed hand hygiene opportunity</th>
<th>Adherence to hand hygiene guidelines (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General anesthesia</td>
<td>338</td>
<td>95(28.1%)</td>
</tr>
<tr>
<td>Regional anesthesia</td>
<td>285</td>
<td>83(29.12%)</td>
</tr>
</tbody>
</table>

Table 2: Hand hygiene opportunities per type of anesthesia and hand hygiene compliance.
Hand hygiene compliance was highest amongst medical students posted in the operation theatre followed by the multipurpose workers, probably because of ‘someone always looking out for the juniormost guy’ in the room. Overt observation may alter subjects’ behaviour, a phenomenon known as the ‘Hawthorne effect’. We tried to minimize this effect by being as unobtrusive as possible, as a part of the anesthesia team. Thus, these finding can also be attributed to the strict hand washing protocols set by our administrators similar to another previous study where nurses’ hand washing intentions were influenced by peer pressure from physicians and administrators. Anesthetists were found to be compliant in 34.23% cases.

The number of OT staff found to be wearing rings or watches was 5.93% in violation of hand hygiene guidelines, despite several studies showing the skin underneath the rings to be more heavily colonized than comparable areas of the skin on fingers without rings. The relatively average hand hygiene compliance in our study can be attributed to the fact that training had positive relationship with hand hygiene compliance in all medical staffs as inferred by several studies. This might be due to the fact that regular training in our institute built the capacity of health care providers which had a significant association in hand hygiene compliance. Compliance rate prior to any procedure was 30.45% which is near estimated compliance rates between 2-18% in the OT. As with other studies, compliance was higher after a procedure than before, a common motivation being ‘self-protection’. One of the main limitations of our study was ‘Hawthorne effect’. Although all attempts were made at being covert and discreet, the findings may not reflect the actual practices because of this effect. A larger sample size may have helped in offsetting the effects of hawthorne to a great extent.

REFERENCES

DISCUSSION

The present observational study was conducted as discreetly as possible to see the hand hygiene compliance amongst the OT staff while handling patients and equipments. Insufficient or very low compliance rates have been reported from both developed and developing countries. Adherence of health care workers to recommended hand hygiene procedures has been reported as variable, with mean baseline rates ranging from 5% to 89% and an overall average of 38.7%. Hand hygiene compliance in our study was 28.57%, which correlated with these statistics. The compliance to hand hygiene also differed amongst the various surgical OTs. Ophthalmology OT had the highest hand hygiene compliance followed by orthopaedic OT, which might reflect the application of special safety protocols associated with both these OTs. [17]

CONCLUSION

Although hand hygiene is the primary measure proven to be effective in preventing HCAI and the spread of antimicrobial resistance, our study showed hand hygiene compliance being quite low amongst the healthcare staff working inside the OT. Compliance was slightly higher when strict hand hygiene protocols were already in place, thus reaffirming the importance of strict implementation of hand hygiene protocols.

Table 3: Overall hand hygiene compliance (%).

<table>
<thead>
<tr>
<th>Profession</th>
<th>Anesthesiologist</th>
<th>Anesthesia Technician</th>
<th>Surgeon</th>
<th>Surgical Nurse</th>
<th>Student</th>
<th>Multipurpose Worker</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene opportunities</td>
<td>111</td>
<td>88</td>
<td>66</td>
<td>207</td>
<td>67</td>
<td>83</td>
<td>623</td>
</tr>
<tr>
<td>Overall compliance</td>
<td>38(3.423%)</td>
<td>7(7.95%)</td>
<td>5(5.7%)</td>
<td>58(2.01%)</td>
<td>31(4.626%)</td>
<td>32(3.55%)</td>
<td>178(28.57%)</td>
</tr>
</tbody>
</table>

Table 4: Usage of gloves (sterile and non-sterile) for invasive procedures.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No gloves</th>
<th>With gloves (Sterile and unsterile)</th>
<th>Hand hygiene before procedure</th>
<th>Hand hygiene after procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central venous catheter</td>
<td>18(100%)</td>
<td>18(100%)</td>
<td>18(100%)</td>
<td>18(100%)</td>
</tr>
<tr>
<td>Uterine catheter</td>
<td>25(100%)</td>
<td>5(20%)</td>
<td>17(68%)</td>
<td></td>
</tr>
<tr>
<td>Tracheal intubation</td>
<td>17(68%)</td>
<td>8(32%)</td>
<td>17(68%)</td>
<td></td>
</tr>
<tr>
<td>Ryles’ tube insertion</td>
<td>5(27.78%)</td>
<td>13(72.23%)</td>
<td>13(72.23%)</td>
<td></td>
</tr>
<tr>
<td>Extubation</td>
<td>2(8%)</td>
<td>23(92%)</td>
<td>15(60%)</td>
<td></td>
</tr>
<tr>
<td>Peripheral venous catheter</td>
<td>30(66.67%)</td>
<td>15(33.33%)</td>
<td>43(95.55%)</td>
<td></td>
</tr>
<tr>
<td>Arterial line</td>
<td>18(100%)</td>
<td>9(50%)</td>
<td>9(50%)</td>
<td></td>
</tr>
</tbody>
</table>


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