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Abstract

The hand hygiene knowledge and competence of staff in an adult Intensive Care Unit (ICU) was measured at a 450 bed Australian metropolitan teaching hospital. Staff working in or entering the ICU to perform patient care over a two-month period were asked to complete a questionnaire that examined their knowledge on current hand hygiene policy and procedures. Hand hygiene practice was also assessed by observation. Sixty-six staff participated including 50 registered nurses (RNs), eight medical staff (MOs), five surgical dressers (SDs) and three radiographers (X-Ray technicians). Radiographers were excluded from the statistical analysis due to low numbers participating. Scores on the knowledge component of the questionnaire ranged from 5-10/10 (mean 7.39 ± 1.04 std. dev). Scores on the practical component ranged from 3-6/6 (mean 5.83 ± 0.56). Mean knowledge scores by profession were: 7.75 (MOs), 7.38 (RNs), and 6.60 (SDs). Mean competence scores by profession were: 5.75 (MOs), 5.88 (RNs), and 5.80 (SDs). There were no significant differences in hand hygiene knowledge (p= 0.178) and hand hygiene competence between professions (p=0.780). The greatest knowledge deficit lay in what constituted a routine handwash and in which situations routine handwashing was required.

Introduction

The goal of competency assessment is to evaluate the performance of an individual or group in order to determine if they are able to effectively apply knowledge and skills in the clinical setting to ensure the best patient care. Competency testing can also provide feedback to educators on knowledge deficits that need to be addressed, or on the efficacy of current educational programs, and at the same time highlight for the staff themselves areas in which their knowledge and skills need updating. Additionally, competency testing offers a way of encouraging staff to be accountable for their practice.

As hand hygiene is a vital component of any infection control program, it is important to know what health care workers know about hand hygiene policies and procedures, and how competent they are at applying their knowledge. While many studies have been conducted on hand hygiene compliance and hand hygiene behaviour, a search of the terms competence, competency, handwashing and hand hygiene on the databases CINAHL and MEDLINE revealed no literature on the topic of hand hygiene competence.

Thus the aim of this study was to examine hand hygiene knowledge and competence amongst a group of health care workers in the Intensive Care environment in order to determine if there were deficits in hand hygiene knowledge or practice. The research questions were:
1. What do health care workers know about current hand hygiene policy and procedures?
2. Is there a relationship between hand hygiene knowledge and hand hygiene competence?
3. Does profession influence hand hygiene knowledge or hand hygiene competence?
Methods

Ethics

Approval for this study was obtained from the relevant University and Health Service Human Research Ethics Committees that operated according to the guidelines of the National Health and Medical Research Council of Australia. In order to satisfy conditions imposed by the Human Research Ethics Committees, the specific period during which the study was conducted and the identities of participants have not been disclosed.

Setting

The study was conducted in a 12-bed Intensive Care Unit (ICU) at a 450-bed metropolitan teaching hospital. The ICU has six beds separated by curtains and six isolation rooms. Each isolation room had its own sink and there were six sinks available for the other non-isolation bays, although the latter were located outside the bays. The hand hygiene solutions used in the unit during the study period were Microshield T (Triclosan 1.0% w/w) hand hygiene solution, Microshield (methyl hydroxybenzoate and propyl hydroxybenzoate) hand hygiene solution, and Avagard Antiseptic Handrub (Chlorhexidine Gluconate 0.5% w/v 70% v/v ethanol).

Subjects

Sixty-six staff participated in the study: 50 RNs, eight MOs, five SDs, and three X-Ray technicians. The participation rate for RNs was 76.9%. As the other groups visit the ICU sporadically but are not all rostered there, participation rates for the other professional groups could not be calculated.

Procedures

When time allowed, ICU staff and staff entering the ICU to give patient care were asked to complete a questionnaire that examined their knowledge of current hand hygiene policy and practices (Table 1). The data were collected over a two-month period. The hand hygiene practices of staff who completed the questionnaire was also overtly observed on one occasion. The average time of each observation period was 15 minutes.

The hand hygiene competencies were administered as part of a larger multi-factor study aimed at improving hand hygiene compliance. Two trained data collectors, who had signed confidentiality agreements to protect the privacy of participants, carried out questionnaire administration and hand hygiene observations.

Questionnaire and Observation Tool

The questionnaire and observation tool were developed using the Centers for Disease Control (CDC)’Guideline for Hand Hygiene in Health Care Settings” as a basis (Table 1). On the questions of wearing rings when carrying out aseptic techniques, and the provision of direct
patient care while hand had weeping skin lesions the Department of Health and Ageing (DHA)’s Infection Control Guidelines for the health care setting were followed as the CDC guidelines did not make recommendations on the issue. We also followed the DHA guidelines on the question of the length of time required for a handwash prior to performing an aseptic technique as these were the guidelines in use in the hospital. The checklist for the observer included whether the staff member:

- cleansed their hands prior to exiting the unit.
- cleansed their hands prior to and following patient contact.
- cleansed hands for the appropriate duration.
- used the appropriate cleansing solution for the situation.
- removed rings prior to carrying out aseptic procedures.

The unit’s Nurse Educator reviewed the questionnaire for content validity and readability.

Data analysis

The significance of inter-professional differences in hand hygiene knowledge and competence was assessed via a One-Way ANOVA using SPPS 10.0 (Chicago, Ill). The relationship between knowledge scores and scores on the practical component was assessed via a regression analysis.

Results

Radiographers were excluded from the statistical analysis due to their low participation rate. Scores on the knowledge component of the questionnaire ranged from 5-10/10 (mean 7.39 ± 1.04 std. dev) (Table 2). The percentage of correct responses for each of the questions is displayed in Table 1. The differences in hand hygiene knowledge between professions were not significant (p=0.178).

Scores on the practical component ranged from 3-6/6 (mean 5.83 ± 0.56) (Table 2). All staff washed hands following patient contact, however, two staff failed to wash hands prior to patient contact, two did not wash hands upon exiting the unit, four failed to remove rings prior to carrying out an aseptic technique, two washed hands for an insufficient duration and one used an inappropriate solution for the situation. The differences in hand hygiene competence between professions were not significant (p=0.780).

There was no statistically significant relationship between knowledge scores and scores on the practical component of the test (p=0.484; R=-0.093).

Discussion

While there was not a significant difference in scores between professions, there was a non-significant trend for hand hygiene knowledge to increase with educational level, ie. SDs had the lowest scores, RNs’ scores were intermediate, and MOs had the highest scores. It is not
surprising that SDs scored lower on the knowledge component as they are not required to carry out aseptic techniques although the hospital provides a mandatory annual session on infection control and the infection control Clinical Nurse Consultant provides intermittent education to all staff categories. Registered nurses scored slightly better than the other two groups on the practical assessment. There is some evidence in the literature that RNs tend to be more compliant with handwashing recommendations than physicians.\textsuperscript{6} While this may have some relationship to discipline there is some evidence that it is probably due in part at least to gender, as females are generally more compliant in terms of handwashing recommendations than males, and the RN group tends to contain a higher proportion of females than the MO group.\textsuperscript{6}

Almost all staff agreed that skin surfaces contaminated with blood or body fluids should be cleaned as soon as possible, and that hands should be washed following the use of gloves. They were less clear on how to deal with rings and false fingernails, or with weeping skin lesions and a small number felt that an alcohol-based handrub could safely be used to clean visibly soiled hands. The participants had most difficulty with the questions regarding the type of hand hygiene to carry out in different circumstances. Almost all participants did not know what was involved in a routine handwash, and almost half did not know what type of handwash would be used prior to carrying out an aseptic technique. Despite this knowledge deficit, in practice most of the participants performed hand hygiene competently, which suggests that the problem was more one of lack of familiarity with the terminology rather than ability to practice competently.

The study had several limitations. The small sample size in the MO and SD groups limited the ability to extrapolate the results to the wider population of health care workers. Additionally, as the competency testing was carried out over a period of several months, there was ample time for health care workers to research the correct answers if they so chose, which may have influenced the results. As the overall aim of the primary study was to improve handwashing compliance this was not discouraged.

Conclusion

This study demonstrates that competency testing can provide a means for determining where knowledge and skill deficits lie, allowing the practitioner to update their knowledge and skills, and at the same time highlighting for educators areas that need to be addressed in education programs. Repetition of this study with a larger sample size in the non-RN groups would improve the ability to generalise the findings.

Acknowledgements

We appreciate the assistance of Greg Edward with data collection.
References


Table 1. Hand hygiene knowledge questionnaire (correct answers in bold type).

<table>
<thead>
<tr>
<th>Question</th>
<th>Percentage correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. An alcohol-based hand rub is not an appropriate hand-cleansing agent when hands are visibly soiled. <strong>True/False</strong></td>
<td>87.9</td>
</tr>
<tr>
<td>Q2. Skin surfaces that are contaminated with a patient’s blood or body substances must be cleaned as soon as possible. <strong>True/False</strong></td>
<td>98.5</td>
</tr>
<tr>
<td>Q3. Hands don’t need to be cleansed if the health care worker has worn gloves when in contact with the patient. <strong>True/False</strong></td>
<td>95.5</td>
</tr>
<tr>
<td>Q4. Paper towels or single-use cloth towels should be used to dry hands in patient care areas. <strong>True/False</strong></td>
<td>98.5</td>
</tr>
<tr>
<td>Q5. Under which of the following circumstances must hands be cleansed (please tick each applicable item)? <strong>Some right: 54.5, All right: 45.5</strong></td>
<td>Some right: 54.5, All right: 45.5</td>
</tr>
<tr>
<td>a. Following emptying of a drainage reservoir, eg. a catheter or drainage bag</td>
<td></td>
</tr>
<tr>
<td>b. Prior to and following venipuncture</td>
<td></td>
</tr>
<tr>
<td>c. Prior to administration of an injection</td>
<td></td>
</tr>
<tr>
<td>d. Following handling of patient notes</td>
<td></td>
</tr>
<tr>
<td>e. Following contact with, or physical examination of a patient</td>
<td></td>
</tr>
<tr>
<td>f. When entering or leaving the intensive care unit</td>
<td></td>
</tr>
<tr>
<td>g. When entering or leaving an isolation room</td>
<td></td>
</tr>
<tr>
<td>h. Upon contact with bed linen if the patient is on additional contact precautions</td>
<td></td>
</tr>
<tr>
<td>Q6. A routine handwash is used in situations where an aseptic procedure is going to be carried out. <strong>True/False</strong></td>
<td>51.5</td>
</tr>
<tr>
<td>Q7. A routine handwash is: <strong>6.1</strong></td>
<td></td>
</tr>
<tr>
<td>a. 10-15 seconds in duration and does not require the use of an antimicrobial solution</td>
<td></td>
</tr>
<tr>
<td>b. 10-15 seconds in duration and requires the use of an antimicrobial solution</td>
<td></td>
</tr>
<tr>
<td>c. 1 minute in duration and does not require the use of an antimicrobial solution</td>
<td></td>
</tr>
<tr>
<td>d. 1 minute in duration and requires the use of an antimicrobial solution</td>
<td></td>
</tr>
<tr>
<td>Q8. Hand creams should be used to prevent chapping and dermatitis on the hands of health care workers. <strong>True/False</strong></td>
<td>87.9</td>
</tr>
<tr>
<td>Q9. Health care workers with weeping skin lesions should not perform direct patient care until the skin lesion resolves. <strong>True/False</strong></td>
<td>81.8</td>
</tr>
<tr>
<td>Q10. Rings and false fingernails can be worn when carrying out patient care. <strong>True/False</strong></td>
<td>83.3</td>
</tr>
</tbody>
</table>
Table 2. Hand hygiene knowledge and competency scores by profession.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Mean Knowledge Score (std dev)</th>
<th>Mean Competency Score</th>
<th>Competency Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Officers</td>
<td>7.75 (1.04)</td>
<td>5.75 (0.71)</td>
<td></td>
</tr>
<tr>
<td>Registered Nurses</td>
<td>7.38 (1.01)</td>
<td>5.88 (0.50)</td>
<td></td>
</tr>
<tr>
<td>Surgical Dressers</td>
<td>6.60 (1.34)</td>
<td>5.80 (0.45)</td>
<td></td>
</tr>
</tbody>
</table>