Gender influences handwashing rates in the critical care unit

Thea F. van de Mortel
Southern Cross University

Robyn Bourke

Joanne McLoughlin

Miriam Nonu

Maria Reis

Publication details

American Journal of Infection Control home page available at www.elsevier.com/wps/product/cws_home/623083

The publisher’s version of this article is available at http://dx.doi.org/10.1067/mic.2001.119511
Gender influences handwashing rates in the Critical Care Unit

Corresponding author: Dr. Thea van de Mortel
RN, BSc (Biology) (Hons), MHSc., PhD, IC Cert. FCN, FRCNA
Southern Cross University,
PO Box 157, Lismore, 2480. NSW. Australia.
Ph 02 66 203305; Fax 02 66 203022
Email: tvandemo@scu.edu.au

Robyn Bourke, RN, BSc (Biology), IC Cert, Clinical Nurse Specialist
Joanne McLoughlin, RN, BSc (Biology), IC Cert. Dip. Ed., Nurse Educator
Miriam Nonu, RN, RPN, IC Cert., Dip. Crit. Care, Transplant Co-ordinator
Maria Reis, RN, IC Cert, Dip. Clinical Education, Clinical Nurse Specialist
ABSTRACT

Background
Nurses tend to wash their hands more often than doctors; and among non-health care workers, females tend to wash their hands more often than males. This study examined the influence of gender on the handwashing rates of health care workers (HCWs). The null hypotheses were that there would be no intergender difference in: a) handwashing rates in HCWs across professions, or b) within professional groups.

Methods
Handwashing by nurses, doctors, wardspersons, X-ray technicians and physiotherapists following patient contact in a critical care unit (CCU) was determined through covert observation. The gender and profession of the subjects were recorded, but their identity was not.

Results
Female CCU staff washed their hands significantly more often than males following patient contact (p = 0.0001). When the results were examined for the influence of profession on handwashing, significant intergender differences remained for doctors (p = 0.0468) and wardspersons (p = 0.0001). There was also a non-significant trend (p=0.07) towards higher rates of handwashing among female X-ray technicians. There were no statistically significant intergender differences in handwashing rates among nurses (p = 0.7588) and physiotherapists.

Conclusions
It appears that gender may influence handwashing rates in HCWs in the CCU, although this difference appears to be modified in particular professional groups. Further research should
examine factors that modify handwashing rates within professional groups, and in settings other than the CCU.

Keywords: handwashing, compliance, gender, profession, critical care
INTRODUCTION

Nosocomial infection rates occur in approximately 20% of intensive care patients,\(^1\)\(^-\)\(^3\) and contribute to increased morbidity, mortality, length of stay and hospital costs.\(^4\) Although increased compliance with handwashing protocols has been shown to decrease infection rates,\(^5\)\(^-\)\(^7\) handwashing compliance remains poor, particularly among some professional groups. Studies of handwashing frequency have recorded handwashing rates following patient contact ranging from 10.6% to 61\%,\(^8\)\(^-\)\(^{12}\) and significant differences have long been noted in handwashing frequency between professional groups such as nurses and doctors.\(^9\),\(^13\),\(^14\)

A study by van de Mortel et al.\(^{12}\) found that registered nurses (RNs) washed their hands following patient contact significantly more often than doctors in the Intensive Care Unit (ICU). The RNs washed their hands 71% percent of the time, whilst junior and senior resident doctors (RMOs) washed their hands 50% of the time and specialists washed only 25% of the time. The authors postulated that failure to handwash may be a gender-related phenomenon. The proportion of female nurses is considerably higher than the proportion of female doctors. In the above study, 90% of the nurses were female; 45% of RMOs and 6% of specialists were female.

Studies of school children and the general adult population have shown that in a non-hospital environment, females of all ages were more likely to handwash than males, and scored higher on handwashing technique. When evaluating a program to teach disabled children to handwash, Day et al.\(^{15}\) found that girls washed their hands more frequently than boys and also generally had a better handwashing technique. The study, while interesting, was limited
by its small sample size (n = 13). Guinan et al.\textsuperscript{16} examined handwashing practices in high school students and found that 58\% of girls handwashed following toileting compared to 48\% of boys. Girls also washed their hands for longer periods and were more likely to use soap. A study conducted in public toilets in a hospital toilet, found that women were more likely to wash their hands after going to the toilet than men.\textsuperscript{17}

Several studies have examined, among other variables, the influence of gender on handwashing frequency in HCWs; however, these studies arrived at conflicting conclusions. Meengs et al.\textsuperscript{9} found that handwashing frequency in the emergency department was lower among female nurses, RMOs and specialists than among males within each of those groups, however, the sample size of the study was small (n = 13 nurses, 11 RMOs, and 11 specialists). In contrast, in an extensive study of handwashing practices in two countries, Zimakoff et al.\textsuperscript{18} found that female HCWs reported washing their hands more frequently than males, regardless of occupational group. However, this study was based on self-reported practices collected by questionnaire, and a degree of bias may have been introduced due to the fact that non-responders may have exhibited different behavior than responders. There is also a tendency for people to overestimate socially desirable behavior when answering questionnaires. To illustrate the latter point, Tibballs\textsuperscript{8} collected data on handwashing frequency among doctors, both by means of questionnaires and by covert observation. He found that doctors estimated that they washed their hands 73\% of the time, but the data collected by covert observation showed the percentage of doctors washing their hands following patient contact was in fact only 10.8\%.

In order to change behavior is it helpful to have some understanding of the factors that influence the behavior in question. Thus the aim of this study was to determine the
relationship between gender and handwashing rates among hospital staff. The null hypotheses were:

1. There would be no significant difference in handwashing rates between female and male HCWs across professions, and
2. There would be no significant difference in handwashing rates between females and males within professional groups (i.e., RNs, doctors [MDs], wardspersons [WPs], X-ray technicians [X-ray], and physiotherapists [PTs]). The wardsperson in Australian hospitals is someone who helps with patient turns and lifts, and transporting of patients within departments in the hospital.

METHODS

Definitions

For the purposes of this study:

1. Handwashing was defined as any attempt to clean the hands using a handwashing agent.\(^1^9\)
2. Any contact by the HCW’s hands (regardless of whether they were gloved or ungloved) with an invasive device or the skin, secretions, excretions or blood of a patient was considered patient contact. Contact with bed linen, monitoring equipment or patient records was not considered patient contact.\(^1^9\)

Ethics

Approval for this study was obtained from the Human Research Ethics Committees (HREC) that operated according to the guidelines of the National Health and Medical Research Council of Australia. In order to satisfy conditions imposed by the HREC, the hospital in
which the study was conducted, and the specific time period during which the study was carried out have not been identified.

**Setting**

The study was carried out in a 16-bed critical care unit (CCU) at a 250 bed city hospital. The CCU is divided into a 10-bed general intensive care (ICU) and a six-bed high dependency (HDU) area. The unit was organized into individual bays that opened onto the central area of the unit. Each patient bay in the ICU had its own sink with a Triclosan Skin Cleanser (Triclosan 1%) pump, a Chlorhexidine Surgical Handwash (Chlorhexidine gluconate 4% w/v) pump and a Chlorhexidine Surgical Handwash (Chlorhexidine gluconate 2% w/v) pump. Similar handwashes were available in the HDU, but there was one sink for every two bays.

**Subjects**

The exact number of subjects is unknown because of a condition of the Human Research Ethics Committees that staff identities should not be recorded. However, the pool of staff from which observations were made included approximately 70 RNs, 44 WPs, 17 PTs, 68 MDs and 15 X-Ray personnel. The same staff worked in both the ICU and the HDU.

**Procedures**

Handwashing by all CCU staff coming into patient contact was observed covertly. The gender and profession of the staff were recorded; however, the names of individuals were not recorded. Four nursing staff who had been instructed in the method of observation recorded handwashing data. All of the observers were participant observers, and signed a
confidentiality agreement to ensure that the identities of individuals who handwashed or failed to handwash were not disclosed to anyone.

Observing staff covertly has ethical implications. As subjects may modify their behavior if they are aware that they are being observed, it is necessary that a study of behavior such as handwashing must be conducted covertly in order to collect accurate data. To illustrate this point, Pederson et al.\textsuperscript{20} found that there was a significantly higher handwashing rate following use of toilets when an obvious observer was present, compared to the handwashing rates seen when the observer was “hidden” in a toilet cubicle. Thus, covert observation improves the accuracy of behavioral data collection, particularly when there is a degree of social desirability attached to the behavior.

Data were collected on all three shifts over a three-month period, at times when the observers were able to watch staff-patient interactions. The observers frequently worked as shift supervisors and as such did not have a patient load. Thus they were ideally placed to observe staff-patient interactions throughout the shift, on doctor’s rounds, during routine turns, radiography, and physiotherapy.

\textbf{Data analysis}

The significance of intergender and interprofessional differences in handwashing incidence were assessed via Chi square contingency tests using SPSS 6.1.\textsuperscript{21}

\textbf{RESULTS}
Two hundred and forty-nine observations were made; 93 on females and 156 on males (Table 1). The number of observations made on PTs, RNs, WPs, X-Ray and MDs were 21, 42, 56, 60 and 70, respectively (Table 1). When profession was disregarded, female staff washed their hands significantly more often than males following patient contact (p = 0.0001). Handwashing rates were more than 33% higher among female HCWs when compared to rates for males (Fig 1).

When the results were broken down into professional groups, the significant gender difference remained for MDs (p = 0.0468) and WPs (p = 0.00014). However, there was a non-significant trend (p = 0.07) towards higher rates of handwashing among female Radiographers. Female MDs were 34% more likely to wash their hands following patient contact than male MDs, and female WPs washed their hands with nearly double the frequency of male WPs. Female Radiographers washed their hands 24.5% more often than their male counterparts. There were no statistically significant intergender differences in handwashing rates in the RN (p = 0.7588) and PT groups. Male RNs washed their hands slightly more often than females (4%), and both female and male PTs handwashed 100% of the time.

DISCUSSION

Handwashing as a function of gender

The results of this study suggest that there may be intrinsic differences in handwashing rates between male and female HCWs. This is supported by the studies of handwashing frequency in schools and among adults in public toilets, which showed that females handwashed more frequently than males following use of toilet facilities. The results of the Zimakoff et al.18
study found that female HCWs reported handwashing more frequently, which also adds support to this hypothesis. Day et al.\textsuperscript{15} suggested that intergender differences in handwashing behavior may be the result of intrinsic differences in the emphasis parents place on hand hygiene for girls and boys. It also may be the case that females tend to be more compliant.\textsuperscript{22}

**Handwashing as a function of profession**

The study data clearly show that while there was a marked intergender difference in handwashing rates among HCWs across professions, these differences were not apparent within some professional groups (e.g., RNs and PTs). The low numbers of observations made on some groups (e.g., male RNs and PTs, and female MDs) may have influenced the findings. Other factors that may influence professional differences in handwashing rates may include the presence/absence of an orientation program or some level of training that stresses handwashing. A previous study of the self-reported handwashing practices of a group of North American PTs found similar intergender differences in handwashing.\textsuperscript{10} The study examined practices in a group of physiotherapy graduates who had undergone structured teaching on infection control practices during their undergraduate training. This is not the whole story, however, as many studies show little effect of teaching programs on handwashing rates in HCWs.\textsuperscript{23}

One factor that became apparent when reviewing the literature on handwashing was that HCWs may take their behavioral cues from strong role models within their environment. For example Muto et al.\textsuperscript{24} noted that doctors followed the example set by a leading specialist. If the leading specialist washed his or her hands following patient contact on doctor’s rounds, all the other doctors followed suit. However, if the leading doctor failed to handwash, none of the other doctors washed their hands either.
Larson et al.\textsuperscript{23} suggested that the “culture” in the workplace contributes to the likelihood of handwashing among HCWs. For example, the culture of an operating room is such that staff monitor each other to ensure that everyone participating in surgery has scrubbed. To take this idea further, it may be that the cultures of some professions, such as nursing, facilitate handwashing more than the culture of others, such as medicine. Pinpointing how these cultural differences arise may provide a means of boosting handwashing frequency in professional groups that currently have suboptimal handwashing rates.

The study had several limitations. Firstly, the sample size in some groups was small. Secondly, as individual HCWs were not identified, multiple observations may have been made on some of the same individuals, which may have biased the results if such individuals were not representative of their group. However, as the observations were made by four different data collectors on different shifts over a three-month period, the likelihood that the results were greatly biased by multiple observations on a small number of individuals is reduced. While the study was small, the fact that similar patterns of handwashing have been seen other surveys of health care workers suggests that the findings are reliable. Although the study was conducted in the CCU, all of the HCWs, with the exception of the RNs, either rotated through the CCU from other hospital areas (junior MDs) or were located in departments external to the CCU and visited the CCU to provide care (e.g., specialists, PTs, WPs, and X-ray personnel), which suggests that the findings are not limited to the CCU environment.

CONCLUSIONS
This study has demonstrated that female HCWs wash their hands more often than males. These intergender differences, which are also evident in children and in the general adult population, also occurred in some professional groups such as doctors and wardspersons, but did not occur in other groups such as nurses and physiotherapists in this study. Socialization factors within professional groups and organizations that may contribute to differences in handwashing rates should be examined in order to better formulate effective programs aimed at increasing handwashing rates in the health professions.

REFERENCES


19. van de Mortel TF, Heyman L. Performance feedback increases the incidence of handwashing by staff following patient contact in intensive care. Aust Crit Care 1995; 8:8-13


**Fig 1.** Percentage of CCU staff handwashing by gender and profession following patient contact.

**Table 1.** Handwashing by CCU staff by gender and profession following patient contact.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>85</td>
<td>89</td>
</tr>
<tr>
<td>MD</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>PT</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>WP</td>
<td>93</td>
<td>44</td>
</tr>
<tr>
<td>X-Ray</td>
<td>84</td>
<td>39</td>
</tr>
<tr>
<td>Overall</td>
<td>64</td>
<td>51</td>
</tr>
<tr>
<td>Gender</td>
<td>Handwashed</td>
<td>RN</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>----</td>
</tr>
<tr>
<td>Female</td>
<td>Yes</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
</tr>
<tr>
<td>Male</td>
<td>Yes</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>

*p = 0.0001

#p = 0.0468