Handwashing Practices Among Occupational Therapy Personnel

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Handwashing is the most effective method of preventing the spread of nosocomial infection. Despite its simplicity, handwashing is frequently omitted by healthcare personnel. To date there have been no studies of the handwashing practices of occupational therapists. A telephone survey of 50 occupational therapy personnel indicated that the majority (60%) washed their hands with a liquid, antimicrobial soap 5 or more times during the work day with a wash duration of 10 seconds or less. Analyses revealed no statistically significant differences between handwashing frequency and duration and age, years in practice, position, academic degree, or work setting. Overall, handwashing technique was found to be lacking.

All respondents stated that handwashing was important to occupational therapy practice and most agreed that it was just as important for therapists as it was for physicians and nurses. Most agreed that hands should be washed both before and after each patient contact. However, few respondents actually did so regularly. Most respondents indicated that they received their knowledge of handwashing from in-service training at their place of employment. Their occupational therapy educational programs did not provide basic information on handwashing techniques.

Nosocomial, or hospital acquired, infections occur in approximately 5% of all patients. Such infections can mean pain, disability, a longer hospital stay, or even death (Mooney & Armington, 1987). Up to 32% of nosocomial infections are preventable, but only 9% are being successfully prevented (Haley, 1986). It has been estimated that the cost of nosocomial infection is $1,800 per infection (Haley, White, & Culver, 1987) with an annual cost of $5 billion to $10 billion (Wenzel, 1988).

The transient organisms found on the hands of both patients and staff are often implicated in cross-infection (Jacques, Mathieu, Baumann, & Rousel, 1983; Warren & Gulati, 1986). In particular, gram-negative bacteria are the cause of most nosocomial infections, and health care workers have been shown to carry the epidemic strain of gram-negative rods on their hands (Cleary, MacIntyre, & Castro, 1981; French, Casewell, Roncorone, Knight, & Phillips, 1980). Furthermore, they have been implicated as “passive vectors” in the spread of specific pathogens (Bovee, 1989; Haley, Hightower, & Khatib, 1982; Rhinehart et al., 1987).

Handwashing is a universally accepted practice to reduce contact transmission of microorganisms (Larson, 1988) and it is considered to be the single most important procedure for preventing nosocomial infections (Pender, 1982; Simmons, 1983; Steere & Mallison, 1975). Despite the evidence, however, compliance of health care workers with the standards established by the Centers for Disease Control (CDC) is poor (Larson, 1988). Although handwashing before and after general patient care is considered important by health care professionals, it is regularly practiced by few (Larson, 1989). Studies indicate that less than half of all patient-care contacts, even when the patient is known to have an infectious disease, are preceded or followed by handwashing (Donowitz, 1987; Korniewicz, Laughon, Crr, Lyle, & Larson, 1990; Larson, 1983; Preston, Larson, & Stamm, 1981). To date, there have been no studies of the handwashing practices of occupational therapy personnel. The purpose of this study is to gain an overview of the handwashing habits of occupational therapy personnel to determine whether there is a need for improvement.

Occupational therapists are hands-on professionals and thus are exposed to numerous pathogens in the course of their workday. Coincidently, they may serve as sources of infection to their patients. “Since the hands are in more constant contact with the environment than any other part of the body, they are a prominent site for contamination” (Larson, 1985, p. 14).

Occupational therapy personnel work with many populations at high risk for nosocomial infections, including children (Lopez, Diliberto, & McGuckin, 1988), the elderly (Haley et al., 1982), persons with burns (Bale, Kealey, Massanari, & Strauss, 1990), persons with spinal cord injuries (Nicolle, Buffet, Alfieri, & Tate, 1988), and persons with AIDS (Pomeroy & Egdun, 1987). Therefore,
it is imperative that proper hand hygiene be learned and practiced as a regular part of the treatment process.

A number of variables can influence the effectiveness of handwashing, including the type and amount of agent used, the amount of friction applied, the frequency and duration of washing (Larson, Eke, Wilder, & Laughon, 1987) and the hand drying method.

There are two groups of handwashing agents, plain soaps and detergents and antimicrobial containing products. The CDC recommends plain soap for most general patient contact (Garner & Favero, 1985). However, Larson (1989) indicated that plain soap only removes transient organisms; it does not kill them and it is ineffective against resident flora that exist in both superficial and deep epidermal layers. Liquid soap is preferred because bar soap can become contaminated with gram-negative bacilli (Jacques et al., 1983). Many commercially available soaps contain antimicrobial agents, and waterless, alcohol-based products can be used whenever traditional handwashing facilities are inaccessible (Larson, 1989).

Handwashing technique, including the amount of friction used, the frequency, and the duration of washing, appears to be the most important factor in effective handwashing. The CDC defined handwashing as “vigorous, brief rubbing together of all surfaces of the hands for at least 10 seconds” (Garner & Favero, 1985, p. A8–116).

The frequency of handwashing has a direct effect on the number and types of bacteria on the hands (Larson, 1989). Studies have shown that health care workers who wash their hands more than eight times per day had significantly lower bacteria counts on their hands (Larson, 1984). Washing at least after every patient contact is recommended (CDC, 1970; American Hospital Association, 1974).

It has been demonstrated that during the washing process some parts of the hand are frequently missed, most often the thumb and parts of the fingers (Taylor, 1978) and that the nondominant hand is washed more thoroughly than the dominant hand (Fox, Langner, & Wells, 1974). Areas commonly neglected include the wrists, under fingernails, and under rings and wristwatches (Gidley, 1987). Rings should be removed, as higher bacteria counts have been associated with the wearing of rings (Hoffman, Cooke, McCarville, & Emmer­son, 1985; Jacobson, Thiele, McCune, & Farrell, 1985).

Microorganisms can survive for extended periods on environmental surfaces (Brady, Evans, & Cuartas, 1990); therefore, water taps should be turned off with a fresh paper towel to avoid recontamination. Elbow or foot water taps are preferred to prevent cross-contamination (Watts, 1989).

How the hands are dried is also important. Three methods are commonly available: fabric towels, paper towels, and warm-air driers (Blackmore, 1987). Although fabric towels remove more bacteria than paper towels (Weiler, 1965), they are effective only if they are used once and then laundered. Continuous fabric towels are acceptable, although bacteria can still be transferred from one user to the next and the end of the roll can become a communal towel if the roll is not changed immediately (Blackmore, 1987).

Paper towels are common in health care settings and are more apt to be used for reasons of convenience and economy. A paper towel provides the equivalent of an individual use towel because only the user touches it (Blackmore, 1987).

Warm-air driers are a popular method of hand drying, although there is disagreement as to their efficacy. After prolonged use the drier’s filter can become saturated with bacteria that is blown out in the airstream and over the users’ hands (Blackmore, 1987).

Handwashing is often omitted when gloves are worn (Larson, 1983). Many believe that gloves provide adequate protection to keep hands clean. To the contrary, “gloves provide a warm, moist environment in which microorganisms already on the hands can proliferate” (Larson, 1989, p. 939). Additionally, it has been found that viruses can leak through gloves (Korniewicz et al., 1989). The CDC (1988) stated that gloving does not replace handwashing and that hands should be washed before putting on gloves.

Method

Subjects

The subjects were occupational therapy personnel randomly selected from a computer-generated list of physical disability-related fieldwork facilities on file in the Department of Occupational Therapy, School of Health Related Professions, State University of New York at Buffalo. The facilities were located throughout the United States which, for the purpose of this study, was divided into six regions: Northeast, Southeast, North Central, South Central, Western, and Pacific. Each facility was contacted by telephone and a survey was administered anonymously to each respondent. The subjects were selected randomly according to their availability and willingness to participate. Only personnel with direct patient contact were surveyed.

Instrument

A four-part, 50-item questionnaire was designed for the study based on literature in infection control procedures specifically related to hand hygiene. Part 1 was a subjective description of the respondents’ handwashing methods. Answers to part 1 were used to test the reliability of the objective responses in part 3.

Part 2 provided demographic information: professional status, gender, age, state of residence, number of years in practice, level of occupational therapy education, type of work setting, and employment status. Part 3 cen-
sisted of questions on handwashing technique, frequency, duration, amount of friction applied, use of gloves, and hand drying methods. Also included were questions on formal education about hand hygiene as well as questions on handwashing habits when faced with "clean versus dirty" activities.

Part 4 examined attitudes toward handwashing with a Likert-type scale. The questionnaire was pilot-tested on 10 occupational therapists and was modified according to their responses and recommendations in order to increase both content and face validity.

Results

Demographic Characteristics of Respondents

Information was collected from 50 respondents. This group was composed of 46 occupational therapists and 4 occupational therapy assistants, 49 women and 1 man, with an average age of 35.44 years and an average of 10.75 years in practice. The educational level of the sample ranged from the associate's level (8%) to the master's level (32%), with the majority (60%) holding a bachelor's degree. Fifty-two percent worked in rehabilitation centers, 38% in acute care hospitals, 8% in school systems, and 2% in nursing homes. Eighty percent of the subjects were employed full-time and treated an average of 9 to 12 patients per day.

Frequency and Duration of Handwashing

Thirty-four percent of the respondents reported that they washed their hands an average of 9 to 12 times during the work day, whereas 40% reported that they washed less often and 26% washed more often. The majority (56%) reported always washing after each patient contact, 34% reported that they sometimes washed after each patient. Only 38% always washed before contact with a patient, whereas 54% washed sometimes and 8% never washed before each patient contact. Thirty-two percent of the respondents reported a washing time of 2 to 4 seconds, whereas 28% washed 6 to 10 seconds, 14% washed 11 to 15 seconds, and 24% washed for 16 seconds or more.

To determine any differences in handwashing frequency and duration by age and years in practice, one-way analyses of variance (ANOVA) were performed (see Table 1). Chi-square tests were employed to determine any differences in handwashing frequency and duration by work position (occupational therapist or occupational therapy assistant), academic degree, and work setting. There were no statistically significant differences among the variables.

Handwashing Method

Ninety-eight percent of the subjects used liquid soap during the washing process: 62% reported using an antimicrobial agent, 6% reported using plain soap, and 24% were unsure if the soap they used was plain or antimicrobial. Eight percent of subjects did not respond to this question.

It was assumed that all respondents washed the palms of their hands, and 90% reported that they always washed the backs of their hands. However, only 60% always washed between their fingers, and only 18% reported always washing under their fingernails. Most respondents (64%) washed up to their wrists, whereas 12% washed their hands only and 24% washed to the midforearm level. Only 2% always removed rings, whereas 18% sometimes removed them and 58% never removed them. Similarly, 2% always removed their wristwatch, 28% sometimes removed it, and 54% never removed it.

The majority (96%) reported that they used paper towels to dry their hands after washing; 2% reported using an individual textile towel and 2% used a communal textile towel to dry their hands. When asked what method they used to turn off the water faucet after washing, 38% reported using direct hand-to-faucet contact, 46% used a paper towel, and 16% used either an elbow or a foot tap.

Use of Gloves

Ninety-two percent of the respondents reported that they wore rubber or latex gloves in the course of patient treatment. Of these, 30% always washed their hands before gloving, 34% sometimes washed, and 36% reported never washing their hands before gloving. However, 80% reported washing after removing their gloves, compared with 14% who sometimes washed and 6% who never washed after removing gloves.

Handwashing Education

When asked if they were taught to wash their hands before and after each patient treatment in their occupational therapy curriculum, 20% responded yes, 50% responded no, and 30% could not remember. Only 4% reported that they were taught proper handwashing techniques while in school. The remaining subjects reported that they had not been taught proper techniques.
(84%) or that they could not remember (12%). When asked where they obtained their current knowledge of handwashing techniques, 94% cited in-service training at their place of employment and 6% cited independent study.

Situational Factors and Attitudes Toward Handwashing

The subjects were presented with a number of work related situations, which were subjectively classified into "clean" and "dirty" categories, and asked to state whether or not they washed their hands in each situation (see Table 2).

The results regarding attitudes towards handwashing are presented in Table 3. Reasons cited for reduced handwashing frequency included being too busy to wash more often (50%), inconvenient location of handwashing facilities (6%), lack of handwashing facilities (4%), dry skin caused by frequent handwashing (6%), and no need to wash more often (34%).

Discussion

Although most of the respondents washed their hands nine or more times during the work day, few always washed immediately before each patient contact. Many respondents verbalized that they washed their hands between patients and did not feel it was necessary to wash after one patient and before the next.

As expected, most persons washed their hands in specific situations that are typically considered to be dirty, such as before eating and after toileting oneself or a patient. However, whereas most of the subjects stated that they always washed their hands after working with a patient known to have an active disease, little more than half always washed after working with noncontagious conditions. There were also significantly fewer handwashing behaviors before treating all of these patient groups. Similarly, only half of the subjects reported handwashing after sneezing or coughing into their own hands, whereas many more always washed after a patient sneezed or coughed on them. This finding suggests that most of the respondents consider their patients more contagious to them than they are to their patients.

That more than half of the respondents washed their hands for less than 10 seconds suggests that this behavior needs to be changed if antisepsis is to be maintained. The literature indicates a minimum washing time of between 10 and 15 seconds followed by rinsing under a steady stream of water (Ojajarvi, 1981; Garner & Favero, 1985).

The results indicate that handwashing technique is lacking overall. Although frequency and duration of handwashing are important, how the hands are washed is of equal importance. According to the literature, the areas of the hands that require special attention during the washing process are between the fingers and under the fingernails, two common sites of bacterial colonization (Gidley, 1987; Taylor, 1978). Similarly, most respondents removed neither their rings nor their wristwatches during handwashing—two other areas in which bacteria can proliferate (Hoffman et al., 1985; Jacobson et al., 1985).

Paper towels were used most often to dry the hands due to their economy and availability. This method is preferred (Blackmore, 1987). However, in turning off the water faucets by hand, many respondents recontaminated their hands before patient contact.

### Table 2

<table>
<thead>
<tr>
<th>Handwashing Behaviors in Clean vs Dirty Situations</th>
<th>Always (%)</th>
<th>Sometimes (%)</th>
<th>Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before eating (D)</td>
<td>80</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>After eating (C)</td>
<td>56</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Before self-toileting (C)</td>
<td>52</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td>After self-toileting (D)</td>
<td>98</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Before PROM (C)</td>
<td>28</td>
<td>50</td>
<td>12</td>
</tr>
<tr>
<td>After PROM (D)</td>
<td>58</td>
<td>38</td>
<td>4</td>
</tr>
<tr>
<td>Before contact with a patient known to be HIV/HBV positive (C)</td>
<td>66</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>After contact with a patient known to be HIV/HBV positive (D)</td>
<td>96</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Before toileting patient (C)</td>
<td>38</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td>After toileting patient (D)</td>
<td>82</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Before working with a CVA, orthopedic, or pediatric patient (C)</td>
<td>30</td>
<td>66</td>
<td>4</td>
</tr>
<tr>
<td>After working with a CVA, orthopedic, or pediatric patient (D)</td>
<td>62</td>
<td>38</td>
<td>4</td>
</tr>
<tr>
<td>Before sneezing or coughing in your hand (D)</td>
<td>54</td>
<td>44</td>
<td>2</td>
</tr>
<tr>
<td>After a patient sneezes or coughs on you (D)</td>
<td>80</td>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

**Note.** HIV = human immunodeficiency virus; HBV = hepatitis B Virus; CVA = cerebral vascular accident; PROM = passive range of motion; C = clean, D = dirty

### Table 3

Attitudes Toward Handwashing

<table>
<thead>
<tr>
<th>Handwashing is important in occupational therapy practice</th>
<th>Strongly Agree (%)</th>
<th>Agree (%)</th>
<th>Not Certain (%)</th>
<th>Disagree (%)</th>
<th>Strongly Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I wash my hands as often as I should</td>
<td>92</td>
<td>8</td>
<td>28</td>
<td>42</td>
<td>10</td>
</tr>
<tr>
<td>Hands should be washed before each patient contact</td>
<td>52</td>
<td>40</td>
<td>8</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Hands should be washed after each patient contact</td>
<td>80</td>
<td>20</td>
<td>8</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

**Note.** (n = 50)
The results suggest that many of the subjects wear gloves in lieu of washing their hands. Although most reported washing their hands after removing gloves, many commented that they did so because the powder inside the gloves made their hands feel grimy.

The most common source of handwashing knowledge was the workplace rather than the school curriculum. Perhaps because it is considered so basic, the importance of handwashing has been overlooked in the education process.

Although most of the subjects agreed that handwashing is just as important in occupational therapy practice as it is in other health professions, and that hands should be washed before and after each patient contact, the results of this study indicate that these beliefs are not practiced. Although the findings demonstrate a reasonable compliance to handwashing protocol in a physical disability setting, this compliance must increase if cross-infection is to be reduced.

There are limitations to this study. First, the sample size was small and, although randomly selected, it may be construed as a sample of convenience rather than a true random sample. The survey format may have influenced the outcome of the data. The telephone format was chosen over a mailed survey to reduce the possibility of socially desirable responses (Dillman, 1978). The most accurate method of determining the actual handwashing habits of the subjects would be by discrete observation using an objective checklist.

Conclusions

Occupational therapists must begin to examine their role in the prevention of cross-infection. Handwashing is a simple act, yet it is the most effective method of preventing the spread of pathogens to other persons, to objects, and to oneself. Due to the hands-on nature of the profession, it is paramount that proper handwashing protocol be adhered to at all times to protect both patient and therapist.

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References


