Hand-Washing Frequency and Factors That Influence It in a Family Practice Clinic

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Ignaz Semmelweis first linked hand washing before examining women in labor with favorable outcomes in 1847.[1] Although initially ignored, hand washing has become a mainstay in reducing the spread of infections in all patient encounters. Multiple studies have confirmed that health care workers are the major cause of spreading nosocomial infections from patient to patient in the hospital setting.[2] These infections cost an estimated $5 billion to $10 billion annually.[3] Despite general acceptance of the importance of hand washing and the staggering economic impact of nosocomial infections, compliance in all health care settings studied is suboptimal. Hand-washing rates between patient encounters in intensive care units range from 17 to 75 percent, on pediatric wards the rate is 57 percent, and in the emergency department 32 percent.[4] The purpose of our study was to evaluate compliance with hand washing in a family practice residency clinic and its relation to clinical setting, level of training, and direct observation by a medical student.

Methods

The hand-washing habits of residents and faculty were directly observed by a first-year medical student (MC) who was accompanying the physician during patient visits. All observations were made at an urban family practice residency clinic with 22 examination rooms. A functioning sink was available in each examination room. Before the study there were no clinic policies or orientations addressing hand-washing compliance. The level of training of the physician and the age, sex, and chief complaint (caused by infectious or noninfectious conditions) of the patient were noted. Hand washing was counted if done at any time in the examination room regardless of its temporal relation to patient contact. Duration of hand washing and use of antiseptic soap were not assessed.

Conditions were judged to be infectious or noninfectious by general consensus of the authors. For example, otitis, pharyngitis, cellulitis, and sinusitis were considered infectious. Conditions were considered noninfectious if a microbial cause for the complaint was not likely. Common noninfectious conditions included hypertension, diabetes, sprains, and well-child visits. Visits in which a pelvic examination was done for any reason were included in the infectious category. Glove use was not considered a substitute for hand washing.

Residents and faculty, excluding the authors, observed during the study were selected randomly. The student was assigned to work with a different provider each day and worked with the same provider for no more than 2 days. To obtain an accurate description of the hand-washing practices at the clinic, care was taken to keep the nature of the study undisclosed. Physicians were told that the student was working in the clinic as part of a primary care clerkship, which is a routine occurrence at the center.

The study also included a second group of patient visits in which there was no direct observation during the encounter. This unobserved group contained a cross-section of the same physicians, and the same provider and patient data were collected. Hand-washing compliance was judged by observing the sink in each examination room after the encounter. A wet sink, as observed by the nursing staff, was indicative of provider hand washing. It was assumed that use of the sink by the patient or provider for nonwashing purposes was infrequent. The sink was manually dried after each visit, thus preparing for the next encounter. To ensure reliability of this tech-

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Table 1. Characteristics of Study Groups.

Characteristic	Observed Group No.(%)	Nonobserved Group No.(%)	*P* Value
Number of visits	140	82	> 0.05
Infectious condition	50 (36)	22 (27)	> 0.05
Female patient	101 (72)	61 (74)	> 0.05
Male patient	39 (28)	21 (26)	> 0.05
Patient age 0-5 years	24 (17)	10 (12)	> 0.05
Patient age 6-20 years	27 (19)	14 (17)	> 0.05
Patient age >20 years	89 (64)	58 (71)	> 0.05
First-year resident	36 (26)	17 (21)	> 0.05
Second-year resident	29 (21)	37 (45)	0.0001
Third-year resident	46 (33)	25 (31)	> 0.05
Faculty provider	29 (21)	3 (4)	0.0005

nique, both the student and nurses collected data on the same providers for two afternoons (10 encounters), and their findings showed 100 percent correlation. The data points from these visits were not included for the unobserved group. Data were analyzed using EpiInfo software.[5]

Results

Data were collected on 140 observed patient visits and 82 nonobserved visits. The two groups were similar in most respects; however, there was a significant difference in the number of second-year residents and faculty providers in the two groups (Table 1).

The frequency of hand washing at any time during a patient encounter was 54 percent in the observed group and 60 percent in the nonobserved group. In the observed group, however, hands were washed before examining the patient 24 percent of the time and after examining the patient 33 percent of the time. They were washed both before and after examining the patient 4 percent of the time. Because there was no significant difference in hand-washing frequencies in both groups, the data for both groups were analyzed together.

When analyzed in total, hand washing took place in 56 percent of patient encounters. Hands were washed 74 percent of the time when the patient was younger than 6 years. This rate dropped to 55 percent with patients aged 6 to 20 years, and to 51 percent with patients older than 20 years ($P = 0.048$ comparing hand washing for patients aged less than 6 years with that for patients aged more than 6 years). There was a nonsignificant trend toward more frequent hand washing when the patient had an infectious condition (63 percent) compared with a noninfectious condition (53 percent, $P = 0.17$). There was a similar trend toward more frequent hand washing when the patient was female (59 percent) than when the patient was male (47 percent, $P = 0.09$). Level of training did not significantly affect frequencies of hand washing. Percentages varied from 56 percent for first-year residents, 57 percent for second-year residents, 60 percent for third-year residents, and 47 percent for faculty providers ($P = 0.71$).

Finally, it should be noted that gloves were used in 28 of the observed encounters (19 percent), but in only 20 instances were they worn in conjunction with hand washing. In 9 of the observed visits (6 percent), there was minimal or no direct contact between the patient and provider.

Discussion

Previous studies of hand washing show poor frequency in hospital settings, averaging 41 percent.[4] The overall rate of hand washing in our study was 56 percent, a rate that is much higher than that reported in previous inpatient studies, where the vast majority of research of hand washing has taken place.[4,6-8] Our rate was also higher than the 49 percent frequency observed in a pediatric ambulatory setting.[9] Residency clinics generally have fewer patients per hour than private clinics, which leaves more time for hand washing. The academic setting of the clinic might have contributed to hand-washing compliance. There was no difference in frequency between the observed and nonobserved group ($P > 0.05$), so we can assume that the presence of an observer (the student) did not influence hand-washing behavior

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in our study. Because in most cases the student was directly involved in patient care, the usual amount of patient-provider contact might have been decreased, and thus the provider might have felt less compelled to engage in hand washing. Hand-washing behavior of the student was not monitored. This method did not account for hand washing that could have occurred outside the examination rooms. There were also 9 instances in which contact during the visit was minimal, such as when writing a prescription or making a referral. In these cases hand washing might not have been considered important.

The only significant influence on hand-washing frequency was the age of the patient. There was a nonsignificant trend toward more hand washing during visits when a patient had an infectious disease. This finding was expected, and we were surprised that the difference was not greater. Perhaps our sample size or the subjective classification of visits for infectious or noninfectious conditions was a limiting factor. There was also a nonsignificant trend toward more hand washing during visits with female patients, which might be explained by the number of obstetrics patients in our clinic and the subsequent pelvic examinations and vaginal checks in our female patients (39 encounters).

There was no significant difference associated with level of training. The lack of improvement or decline associated with level of training suggests that hand-washing behavior is learned prior to residency training and remains relatively constant with postgraduate education. Perhaps handwashing training early in medical education or directed training in postgraduate education could improve compliance.

After the study 7 providers were randomly asked whether they were aware of the study. None knew the study was being done, suggesting that the observed practices were genuine.

Hand washing before and after every patient visit might be an unobtainable goal. Nevertheless, the current rate of hand washing needs to be improved. Future studies evaluating the effect of interventions on hand-washing frequency would be useful.

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