

Prevalence of Hand Dermatitis in Inpatient Nurses at a United States Hospital

Heather P. Lampel, Nisha Patel, Kathryn Boyse, Sarah H. O'Brien, and Matthew J. Zirwas

Background: Hand dermatitis is a significant problem among inpatient nurses. Accurate population-based data on the prevalence and risk factors for hand dermatitis in this group are lacking.

Objective: To determine the prevalence of hand dermatitis in inpatient nurses at a US hospital.

Methods: Each nursing unit in a single hospital was visited twice by a single physician. All nurses working at the time of each visit were questioned and examined. No nurses were enrolled twice.

Results: Fifty-five percent (92 of 167) of the nurses had hand dermatitis. Among intensive care unit (ICU) nurses, the prevalence was 65% (35 of 54); among non-ICU nurses, the prevalence was 50% (57 of 113). In nurses with self-reported atopic dermatitis, the prevalence was 71% (12 of 17); in nurses without self-reported atopic dermatitis, it was 53% (80 of 150). Data collection on variables such as hand hygiene and glove use relied on subject recall and was considered unreliable. There was a low prevalence of atopic patients.

Conclusions: Hand dermatitis affects over 50% of inpatient nurses. Hand dermatitis appears to be more common in the ICU setting and in nurses with a self-reported history of atopy.

IT IS WELL KNOWN THAT hand hygiene is encouraged and even mandated in the health care profession in order to reduce the spread of nosocomial infections.¹⁻⁵ Hospital workers who provide direct patient care are encouraged to wash their hands frequently.¹ Hospitals offer both soap and water (SW) and alcohol-based cleansers (ABCs) for hand hygiene. Both SW and ABCs have been associated with hand dermatitis although it appears that the risk with ABCs is lower than with SW.⁶

The aim of this study was to determine the prevalence and risk factors for hand dermatitis in an unselected cross section of intensive care unit (ICU) and non-ICU inpatient hospital nurses at a US hospital. In reviewing the existing work on this topic, we performed literature searches with keywords and word combinations including both "hand dermatitis" and "nurses/nursing staff/hospital staff." Several studies in the United States used self-reporting or questionnaires,⁷⁻¹¹ some of which included physical measurements of epidermal characteristics.¹² This search revealed no studies in the United States that rely on direct standardized examination by a single physician. This

method of data collection would be expected to provide a more accurate measure of the prevalence of hand dermatitis.¹³

Methods

Data were collected from January 2005 through May 2005 at a large academic hospital. Institutional review board approval was obtained prior to beginning the study. Each inpatient floor was visited twice by an occupational medicine physician; each visit occurred during a different nursing shift to maximize nurse participation. All nurses working at the time of each visit were asked to participate, and 98% (167 of 170) participated.

After verbal consent was obtained, each participant was surveyed in a standard manner. Survey questions regarding potential risk factors were derived primarily from the authors' experience (Table 1). A visual examination of the hands was then recorded (Table 2). Fissuring, blistering, erythema, and edema were noted on a scale of 0 to 5. A nurse was defined as having hand dermatitis if the investigator graded erythema as greater than or equal to 1 and graded scaling, fissuring, or both as greater than or equal to 1. These criteria were designed to differentiate simple xerosis (scaling and/or fissuring without erythema) and simple palmar erythema (due to hormonal or other causes) from true hand dermatitis. The prevalence of hand dermatitis in ICU versus non-ICU nurses and in nurses with and without self-

From the Department of Dermatology University of Pittsburgh Medical Center.

Address reprint requests to Matthew J. Zirwas, MD, 5965 E. Broad St., Suite 290, Columbus, OH 43213. E-mail: Matt.zirwas@osumc.edu

DOI 10.2310/6620.2007.06024

Table 1. Survey Questions

1. How many hours do you work per week?
2. On average, how many times do you cleanse your hands per hour during work? What percentage is with soap and water versus waterless cleanser?
3. On average, how many times per hour do you don gloves?
4. What percentage of your workday do you wear gloves?
5. What type of gloves do you use? (Powder, powder free, latex, latex free?)
6. Do you have a history of asthma, eczema, or hay fever?

Table 2. Examination Parameters*

1. Erythema
2. Scaling
3. Fissuring
4. Blistering[†]

Hand dermatitis was defined as a score ≥ 1 for erythema and a score ≥ 1 for scaling, fissuring, or both.

*Recorded on a scale of 0 to 5.

[†]No nurses demonstrated blistering, so this element was not considered.

reported histories of atopic dermatitis was compared with the chi-square test. Possible risk factors for hand dermatitis were analyzed with logistic regression.

Results

The subjects were 167 nurses. The overall prevalence of hand dermatitis was 55% (92 of the 167 nurses). We found a hand dermatitis prevalence of 65% (35 of 54) in ICU nurses whereas the prevalence in non-ICU nurses was 50% (57 of 113). Twelve (71%) of 17 nurses with self-reported atopic dermatitis were deemed positive for disease by direct observation whereas 80 (53%) of 150 nurses without a self-reported atopic dermatitis history were judged positive for disease by direct observation. There was no correlation found between the presence of disease and the number of hand washings, hours worked per week, the use of soap and water or waterless cleanser (both of which were widely available on all wards), or glove use. The standard gloves available on the wards were powdered latex gloves, so the effects of powdered versus nonpowdered gloves and latex versus nonlatex gloves could not be assessed.

Discussion

The overall prevalence of hand dermatitis, based on direct examination of a cross-sectional convenience sample of

inpatient nurses, was 55% (92 of 167). Owing to the methods of data collection and the low likelihood of selection bias, we believe that these are the most accurate data available on the prevalence of hand dermatitis in inpatient nurses in the United States. Our results are generally consistent with those of prior studies that used questionnaires (rather than direct examination) for case ascertainment and detected hand dermatitis in 47.3%, 35.0%, 25.9%, 21.2%, and 17.0% of inpatient nurses.^{14–18}

We found a higher prevalence of hand dermatitis among ICU nurses than among non-ICU nurses. This difference was not statistically significant, most likely owing to the lack of power of our study. However, the data suggest that factors surrounding an ICU may contribute to hand dermatitis. Assuming that our prevalence data are accurate, we would have needed 450 nurses in our study to attain a significance of $p < .05$.

Atopic dermatitis is considered a risk factor for hand dermatitis in hospital workers.¹⁹ In the present study, 71% of nurses with a self-reported history of atopic dermatitis had active observable hand dermatitis whereas 53% of nurses who did not report a history of atopic dermatitis were found to have objective hand dermatitis. This difference did not reach statistical significance, also most likely owing to lack of power. A population of more than 760 nurses would have been necessary for statistical significance, assuming that the prevalence data collected were accurate.

It is notable that only 10% (17 of 167) of our patient population had self-reported atopic dermatitis. This is a lower prevalence of atopic dermatitis than expected, and we hypothesize that it was due to the self-selection of nurses without atopic dermatitis via a “healthy worker” effect. If this low prevalence of atopic dermatitis was due to self-selection, it is likely that the same effect would occur at other inpatient hospitals; but if this is not the case, this effect would lead to a significant bias in our data.

No correlation of hand dermatitis prevalence was found with hours worked per week, frequency of glove use, percentage of time wearing gloves, frequency of hand cleansing, or use of soap and water versus use of alcohol-based cleansers. This is in contrast to the findings of Larson and colleagues who found that the type of soap used and the number of gloves used per shift correlated with the skin damage.¹⁸ There are several possible reasons why none of these factors significantly correlated with hand dermatitis. The method of data collection for these variables relied completely on patient recall, and it is likely that the data collected were unreliable as a result. We believe that this is the most likely reason none of these variables were associated with hand dermatitis. However, it is also possible that these

factors are simply not related to the risk of hand dermatitis, or it may be that the data failed to demonstrate a relationship because of a lack of statistical power.

Conclusions

Hand dermatitis is a common occupational disease among hospital-based nurses. Accurate prevalence data are important for judging the burden of disease and allowing the design of future studies of interventions to reduce hand dermatitis. We believe that the prevalence data presented provide the best estimate of the true prevalence of hand dermatitis in inpatient nurses in the United States and that these data can help provide a basis for designing future studies on the risk factors, prevention, and treatment of hand dermatitis in inpatient nurses.

References

1. Boyce JM, Pittet D. Guideline for hand hygiene in health-care settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51(No. RR-16):1-45.
2. Steere AC, Mallison GF. Handwashing practices for the prevention of nosocomial infections. *Ann Intern Med* 1975;83:683-90.
3. Garner JS, Favero MS. CDC guidelines for the prevention and control of nosocomial infections. Guideline for handwashing and hospital environmental control, 1985. Supersedes guideline for hospital environmental control published in 1981. *Am J Infect Control* 1986;14:110-29.
4. Larson EL. APIC guideline for handwashing and hand antisepsis in health care settings. *Am J Infect Control* 1995;23:251-69.
5. Hospital Infection Control Practices Advisory Committee: Guideline for isolation precautions in hospitals. *Infect Control Hosp Epidemiol* 1996;17:53-80.
6. Boyce JM, Kelliher S, Vallande N. Skin irritation and dryness associated with two hand-hygiene regimens: soap-and-water hand washing versus hand antisepsis with an alcoholic hand gel. *Infect Control Hosp Epidemiol* 2000;21:442-8.
7. Kavli G, Forde OH. Hand dermatoses in Tromsø. *Contact Dermatitis* 1984;10:174-7.
8. Smit HA, Burdorf A, Coenraads PJ. Prevalence of hand dermatitis in different occupations. *Int J Epidemiol* 1993;22:288-93.
9. Stauss RM, Gawkrödger DJ. Occupational contact dermatitis in nurses with hand eczema. *Contact Dermatitis* 2001;44:293-6.
10. Soter K, Salomon J, Horanin M, et al. Atopy as the main predisposing factor to hand dermatitis in hospital staff: a preliminary self-assessment questionnaire study. *Environ Dermatol* 2001;8:163-6.
11. Forrester BG, Roth VS. Hand dermatitis in intensive care units. *J Occup Environ Med* 1998;40:881-5.
12. Schmid K. Incidence of hand dermatitis in a prospectively followed cohort of apprentice nurses. *Contact Dermatitis* 2005;52:247-53.
13. Vermeulen R, Kornhout H, Brunynzeel DP, De Boer EM. Ascertainment of hand dermatitis using a symptom-based questionnaire: applicability in an industrial population. *Contact Dermatitis* 2000;42:202-6.
14. Telksniene R, Januskevicius V. Occupational skin diseases in nurses. *Int J Occup Med Environ Health* 2003;16:241-7.
15. Smith DR, Ohmura K, Yamagata Z. Prevalence and correlates of hand dermatitis among nurses in a Japanese teaching hospital. *J Epidemiol* 2003;13:157-61.
16. Stingeni L, Lapomarda V, Lisi P. Occupational hand dermatitis in hospital environments. *Contact Dermatitis* 1995;33:172-6.
17. Kavli G, Angell E, Moseng D. Hospital employees and skin problems. *Contact Dermatitis* 1987;17:156-8.
18. Larson E, Friedman C, Cohran J, et al. Prevalence and correlates of skin damage on the hands of nurses. *Heart Lung* 1997;26:404-12.
19. Nilsson E, Mikaelsson B, Andersson S. Atopy, occupation and domestic work as risk factors for hand eczema in hospital workers. *Contact Dermatitis* 1985;13:216-23.