

Characteristics of wet work in the cleaning industry

F. H. W. JUNGBAUER¹, J. J. VAN DER HARST¹, M. L. SCHUTTELAAR¹, J. W. GROOTHOFF² AND P. J. COENRAADS¹

¹Department of Dermatology, Groningen University Hospital, and ²Department of Social Medicine, Northern Center for Health Care Research, University of Groningen, Groningen, the Netherlands

Wet work is the main cause of occupational contact dermatitis in the cleaning industry. Dermatologists and occupational physicians need to base their primary and secondary prevention for workers in the cleaning industry on the characteristics of wet work exposures. We quantified the burden of wet work in professional office cleaning activities with a continuous standardized observation by trained observers of 41 office cleaners. Duration and frequency of wet work exposure and of different cleaning activities were assessed. Wet work made up 50% of such cleaning work. Within a typical 3-hr shift, a mean frequency of 68 episodes of wet work was observed, which classifies office cleaning as wet work. Skin exposure to irritants was markedly different among cleaners who did the same cleaning activities. Reduction in skin irritation can be achieved by training the workers. Because this group of workers, who have a low level of education, has a high risk of developing irritant hand dermatitis, a special effort on training and instruction should be made. A reduction of exposure can be achieved by: using gloves more often; using gloves for a shorter period of time; using gloves while doing activities that otherwise cause the skin to be in contact with water and cleaning substances and washing hands with water only, reserving soap for when the hands are visibly dirty.

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Hand dermatitis has a high prevalence among workers in the cleaning industry (1–5). Employees in the office cleaning industry have their hands exposed to water and other skin irritants for a large part of the day. ‘Wet work’ is one of the most important causes of occupational skin disease (2, 3, 6, 7). An overview of different skin exposures is summarized in Table 1; it is based on a descriptive study by the Netherlands Ministry of Social Affairs and Employment on exposures to skin hazards in the cleaning industry (8).

This report labels all types of cleansers used in office cleaning as agents containing skin allergens and irritating substances.

Cleaning activities, like nursing, can cause hand dermatitis in many ways (5–7, 9–24). The main risk factor for developing hand dermatitis in cleaning activities is formed by exposure to agents that are weakly toxic to the skin (irritants), i.e. water and detergents and the use of occlusive gloves. The most important activities in office cleaning are floor cleaning, restroom cleaning, furniture cleaning and dustbin cleaning. All these activities carry a risk to the skin. Products that contain irritant and

allergenic substances are used on a daily basis; skin contacts with these products occur often. Most surface-active substances irritate the skin because they dissolve the lipids of the upper skin layer (stratum corneum). Additional risk factors with respect to skin irritation are the multiple contacts of the hands with water and the occlusion of the skin by wearing gloves.

Hand dermatitis, as for any occupational disease, has a major economic impact. Cleaning is a labour-intensive enterprise: approximately 80% of the operating costs are wages (8). The turnover of personnel and the sickness absence rate are both very high. Prevention activities, primary as well as secondary, for irritant contact dermatitis focus on reduction in (occupational) exposure to skin irritants. Reducing the risk of occupational irritant hand dermatitis will need long-lasting adjustments in occupational behaviour (25, 26). The risk to the skin from exposure to irritants depends upon the quality and the quantity of the exposure. Besides assessment of the potency of different exposures to skin irritating substances, an accurate assessment of the quantity

Table 1. Overview of skin exposure with the use of several types of cleaning products used in office cleaning

Type of cleanser	Skin contact	Frequency
Floor cleanser	No	Weekly
Floor maintenance	No	Monthly
Daily restroom cleanser*	Yes	Daily
Periodic restroom cleanser†	Yes	Weekly
Toilet cleanser	No	Daily
Furniture cleanser	Yes	Daily
Glass/window cleanser	No	Twice monthly
Moquette shampoo	No	Twice yearly
Kitchen cleanser	Yes	Weekly

*Daily restroom cleansers are slightly acid to neutral and are mainly composed of water, surface-active substances, acids, solvents and additives (stabilizers, foam, fragrances, etc.).

†Periodic restroom cleansers are acid fluids from water, surface-active substances, acids and additives (stabilizers, foam, fragrances, etc.).

of exposure to irritants is also important (27). Therefore, understanding of the burden and characteristics of the wet work in the cleaning industry is important for both dermatologists' and occupational physicians' advisory role in prevention of contact dermatitis.

Materials and Methods

Similar to our wet work assessments in nursing (28), we defined wet work as all occupational activities that (i) cause the skin of one or both hands to be in contact with water or watery soap solutions and (ii) necessitate the wearing of protective gloves over a prolonged period of time, thus causing the hands to become moist from perspiration.

In this study, we applied a specific observation method to assess the duration and frequency of wet hands and protective gloves.

We used a method for labour observation techniques, developed by the IMAG Institute, Wageningen, the Netherlands: this is a time-study method developed by Barnes (29) and adjusted for efficiency studies in agriculture by Hendrix et al. (30). Time studies can be carried out by continuous observation or by interval observations. Although an interval study is far less time consuming, we decided to use a continuous observation because this method is more accurate. We trained 3 observers in accurately using this time-study method.

A video film of office cleaning activities was made and used to train the observers. For accurate observations, all observers should use same starting and end points of cleaning activities, and, even more important, the same definitions for different wet exposures.

For the observation, we used a list of the most frequent office cleaning activities and skin exposures to irritants, in accordance with the instructions by Hendrix et al. (31). For our purpose, we could use the basic principles and definitions of these instructions.

In the Netherlands, the largest subsection of the cleaning industry is office cleaning, employing approximately 170 000 people. About 65% of the employees are female, and a large proportion are part-timers. Because it is the largest subsection of the cleaning industry, we chose to observe the characteristics of wet work exposure in office cleaning. The observations were among the part-time cleaners who worked according to the so-called 4-bucket method: 2 clean water buckets (1 for restrooms and 1 for other rooms) and 2 dirty water buckets (1 for restrooms and 1 for other rooms). All cleaners had an 'area duty allocation' (cleaning all floors, offices and restroom in an area) instead of an 'activity duty allocation' (cleaning only offices or only floors or only restrooms). An area duty allocation is widely seen in this subsection of the industry.

A sample of 41 randomly chosen office cleaners were observed during their occupational activities on 41 different 3-hr afternoon shifts of office cleaning in the same office building. Cleaners with medical restrictions that interfered with their work were excluded from the study. Occupational skin exposures to irritants in office cleaning activities were divided into exposure of the skin to occlusion: use of gloves, exposure of the skin to soap and water (with detergents) and having dry hands. Office cleaning activities with possible skin exposure to irritants were divided into furniture cleaning, restroom cleaning, floor cleaning, dust-bin cleaning, kitchen cleaning, other cleaning activities and hand washing.

Recording a wet activity started when one of the hands became wet and lasted until both hands were dried. The recording of a glove activity started when a glove was put on one of the hands and terminated when both hands were free of gloves.

Because our observations should not interfere with normal activities, our observers were instructed not to ask why an activity was done with gloves.

Results

On average, during the 3-hr observation period the skin of the hands was exposed to wet work activities for 90 min (50% of the working time), with a mean frequency of 70 episodes. The skin of the hands was exposed to occlusion (in gloves) for a mean of 62 min, with a mean frequency of 44 episodes, in this 3-hr period. The observed

duration of different office cleaning activities and the number of wet episodes during the 3-hr observation period are summarized in Table 2.

The hands were washed with a mean of less than 1 time during this period and a mean duration of about 30 s, 78% of the hand washings being done with soap and water.

Discussion

The mean duration of wet work during our 3-hr observation was 90 min, i.e. 50% of the time, with a frequency of 70 episodes of wet hands. Although wet work causes occupational skin problems, many countries have no regulations regarding wet work exposure. In Germany, TRGS (Technische Regeln für Gefahrstoffe) 531 regulates the duration of wet work. This guideline stipulates that work that consists of more than 25% of activities involving wet hands (more than 2 hr and/or frequent; more than 20 times per 8-hr shift) should be considered as an occupation with a risk for hand dermatitis. Specific prevention programmes should be implemented for such occupations.

The Netherlands has no regulations regarding wet work; the part-time cleaning work described in this article would qualify for the German wet work regulations.

The standard deviations from the mean duration and frequency of the different skin exposures showed during our observations were relatively large, while the standard deviations from the mean duration and frequency for the actual cleaning activities were relatively small. This implies that different cleaners performed similar tasks but with different levels (duration and frequency) of skin exposure. Dry work was often unnecessarily carried out using gloves, while wet work activities were often carried out without glove protection. Hands were washed with soap, whereas hand alcohol or even just water could also have been used.

Table 2. Duration and frequency of wet work exposure in office cleaning

	Glove use	Wet hands	Dry hands
All activities*	62 (58)	28 (28)	51 (36)
Wet work†	44 (47)	24 (26)	32 (27)
Furniture cleaning*	13 (16)	18 (20)	0 (1)
Kitchen cleaning*	0 (3)	1 (3)	0 (4)
Floor cleaning*	11 (12)	0 (0)	18 (16)
Dustbin cleaning*	17 (14)	1 (3)	11 (12)
Restroom cleaning*	12 (9)	4 (5)	1 (2)
Other wet work*	11 (14)	3 (3)	21 (14)

*Average duration in minute (with standard deviation) and †average number of episodes (with standard deviation) in 45 cleaners during a 3-hr shift.

Many cleaners started their work wearing occlusive gloves and only took them off after finishing the 3-hr shift. Others did not want to use gloves at all and even cleaned toilets with bare hands. None of the cleaners observed used an emollient during the observation period.

Office cleaners need to protect their skin because of their wet work occupation. The broad scale of occupation-related skin diseases in office cleaning, as in other wet work occupations, indicates the need for implementing a skin protection programme (1, 6). Skin protection programmes are based on reducing the level of exposure to skin irritants and increasing the use of protection and skin care products (26). A skin protection programme can only be successful when adequate changes are realized in the attitude of the exposed worker. A change in attitude towards exposure to irritants and the use of personal skin protection and skin care products will only be achieved if people know why and how to use it. The level of education in this group of employees is generally low. An education and training in work practices programme needs to be set up for this group of workers, who suffer from a high risk of developing irritant hand dermatitis.

Based on our observations and the dermatological effects of wearing gloves (21, 22), this educational programme could focus on: (i) using gloves more often; (ii) using gloves during activities that would cause the skin to be in contact with water and cleaning substances; (iii) using gloves only for short periods of time and not during dry work activities and (iv) washing hands with water only, reserving soap for when the hands are visibly dirty.

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Address:

Dr F. H. W. Jungbauer
Department of Dermatology
Groningen University Hospital
PO Box 30.001
9700 RB Groningen
The Netherlands
Tel: +31 050 361 2520
Fax: +31 050 361 2624
e-mail: f.h.w.jungbauer@derm.azg.nl