Wet work in relation to occupational dermatitis
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Wet work assessment with a continuous time study method, using a activity and lapse-time registration device.
Chapter 6

Characteristics of wet work in nurses

F.H.W. Jungbauer, F. B. Steenstra, J. W. Groothoff, P.J. Coenraads

Abstract

Background/objectives: Nursing is known for its high prevalence of hand dermatitis, mainly caused by the intense exposure to wet work in nursing activities. We aimed to study the characteristics of wet work exposure in nursing activities.

Method: Trained observers monitored the duration and frequency of different wet work activities in 45 randomly chosen nurses from different wards during a morning shift using a method of continuous observation based on labour-observation techniques.

Results: Wet work in Intensive Care units accounts for 24% of the overall morning shift duration with a frequency of 49 incidents. This is 16% in dialysis wards with a frequency of 30 incidents and 9% on regular wards with a frequency of 39 incidents. The wet work activities have short mean duration cycles. The mean duration of occlusion by gloves is 3.1 minutes on regular wards and 6.7 minutes in Intensive Care units.

Discussion: The characteristics of wet work in nurses differ substantially depending on the ward. According to the German regulation TRGS 531 our observations classify nursing as a wet work occupation due to the frequency of the wet work exposure incidents rather than their duration. The mean duration of occlusion in our observations is short, which makes an occlusion-induced irritating effect doubtful. Reduction in wet work exposure in nursing on regular wards could focus on the reduction of the frequency of hand-washing and patient-washing activities. We suggest increasing the use of gloves in the procedure of patient washing. Although this will increase exposure to occlusion from gloves, it may reduce the frequency of exposure to water and soap by about a quarter.

Key words: hand dermatitis, wet work, health care

Background/objectives
Nursing activities can cause hand dermatitis in many ways. The main risk factor for developing hand dermatitis in nursing activities lies in the exposure to agents that are weakly toxic to the skin (irritants), i.e. water and detergents and the use of occlusive gloves. In a population of 822 hospital/nursing home workers we observed that 15% showed signs of hand dermatitis, while a Finnish study even reported a prevalence of 44% of hand dermatitis in 617 hospital-workers. In North Bavaria an incidence rate of 7.3 cases per 10,000 health care workers per year was reported for severe hand dermatitis.
(i.e. severe enough for disability compensation) \(^2\). The widely different outcomes are caused by differences in determining factors such as gender, exposure and assessment methods. Besides reducing the risk of exposure to allergens, prevention of hand dermatitis in hospital work should be achieved by reducing exposure to water, soap and prolonged skin occlusion. Earlier studies on skin irritant exposures showed hospital work to be anything but uniform. On regular hospital wards wet work mostly consists of exposure to water and soap, while in special care units the predominant cause of skin occlusion is the use of gloves \(^8\).

In order to be able to develop hand dermatitis prevention programs in nursing activities, the various activities causing skin irritation must be specified. In this study we aim to specify characteristics of wet work in nursing.

Method

We used a method based on labour-observation techniques developed by the IMAG institute in Wageningen. This time-study method was developed by Barnes \(^1\) and adjusted for efficiency studies in agriculture by Hendrix \(^6\).

Time studies can be carried out through continuous observation or through interval observations. Although an interval study is far less time consuming, we opted for a continuous observation, because this method is more accurate, particularly in situations involving a wide variety of activities like nursing. Observers were trained in accurately using the time study method, observing nursing activities and skin irritant exposure factors in accordance with the instructions detailed by Hendrix \(^5\). For our purpose we could use the basic principles and definitions of these instructions. A random sample of 45 nurses from a population of 822 nurses was observed during morning shifts. The prevalence of occupational skin disease in this population was studied previously, we found 4% of the population had current hand dermatitis \(^7\). Nurses with active medical restrictions interfering with their work, such as a history of atopic dermatitis, were excluded from the observation. Nurses with less than one-year experience in their jobs were excluded from the observations. Of each subject in this sample the duration and frequency of wet work during at least 2 separate morning shifts were registered. Because of the expected different kind of activities and exposure to wet work, we divided the many different nursing wards into 3 different groups: regular hospital wards and special care units (subdivided into: dialysis ward and Intensive Care unit). Occupational skin exposure to irritants in nursing activities was divided into a) exposure of the skin to water and soap; b) exposure to disinfectants (hand alcohol) and c) exposure of the skin to occlusion by gloves.

Nursing activities with possible skin exposure to irritants, excluding glove activities, were divided into patient washing; hand washing; other (than patient washing) patient-related wet work and non-patient related wet work (e.g. housekeeping activities).

Our observation method was unable to differentiate between the different reasons for the use of gloves - our observers were instructed not to ask nurses...
why a particular activity was carried out using gloves, as it was essential that the observations did not interfere with the activities.

Results

Demographic characteristics

We observed 45 nurses during 92 morning shifts. Table 1 shows the demographics for the nurses observed (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>Regular ward</th>
<th>Intensive Care unit</th>
<th>Dialysis ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>68</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Number of nurses</td>
<td>32 (26 f, 6 m)</td>
<td>7 (6 f, 1 m)</td>
<td>4 (3 f, 1 m)</td>
</tr>
<tr>
<td>Mean age</td>
<td>38.4 year</td>
<td>39.6 year</td>
<td>45.0 year</td>
</tr>
</tbody>
</table>

Table 1: demographics of the 45 observed nurses: f=female, m=male.

Wet work in nursing activities concerns occlusion from gloves or exposure to water, soap and disinfectants. The duration of wet work as part of a morning shift differed per ward type (Figure 1). The longest duration of wet work was seen in the Intensive Care unit: 24% of the morning shift. On regular wards this was 9% and on the dialysis ward the duration of wet work was 16%.

The observation method served to divide the overall burden of wet work into different types of exposure and activity. On regular wards (Figure 2) wet work consisted mainly of patient washing (34%), activities with glove use (31%) and hand washing (26%).

On the dialysis ward 49.7% of the wet work activities involved glove activities.
and 48.6% patient-related (non patient-washing) activities carried out without gloves. Wet work in the Intensive Care Unit concerned mostly glove activities (82%) and hand washing (15%).

Besides the duration of exposure of the skin to irritants, the frequency of these exposure incidents was also essential in developing irritant contact dermatitis, as per Malten’s hypothesis.

In Malten’s working hypothesis, the pathogenesis of irritant contact dermatitis was based on the frequency of irritating events. Dermatitis occurs when the sequence of events that irritate the skin rises above a certain frequency for a certain period of time.

Hands were wet between 30 and 49 times. The most frequent wet activities were
hand washing (with disinfectant or water and soap) and glove activities (Figure 3). Nursing activities with hand skin exposure to irritants involve mainly hand washing, patient washing and glove activities. The mean duration of a single activity cycle on a regular ward is 3.6 minutes for patient washing, 1.4 minutes for hand washing and 3.1 minutes for glove use. Wet nursing work on a regular ward is characterised by short-term cycles of exposure to water and soap involving patient washing and hand washing. In an Intensive Care unit wet work is characterised by hand skin exposure to frequent and longer occlusion from the use of gloves compared with nursing on a regular ward: bare hand patient washing: mean duration 1.3 minutes; glove use: mean duration of 6.7 minutes and hand washing: 1.7 minutes. For the dialysis ward these figures were a mean duration of one glove use cycle of 3.4 minutes and patient-related wet work of 6.7 minutes.

Discussion

As regards their duration, wet work activities account for a substantial part of the overall nursing activities during a morning shift. In Germany work is regarded as a wet occupation if more than 25% is wet work (TRGS 531). With our observations nursing can be classified as a wet work occupation because of the frequency of wet activities rather than the duration of wet work. The characteristics of wet work in nurses differ substantially on different wards. Frequent short-term wet work exposure incidences account for 10-25% of all nursing activities. The importance of the frequency of events that irritate the skin during a certain period is stressed by Malten in his hypothesis on the development of irritant dermatitis (16,17). Malten considers an irritant dermatitis the result of a chronic sequence of skin irritating events: each event taking place before the skin could recuperate from the former event. We recorded the total duration of glove activities as wet work, since the exact moment at which an occlusion-induced perspiration begins to irritate the skin can not be recognised. The observation that the mean duration of occlusion when using gloves in nursing is only 3 minutes makes a skin-irritating effect of occlusion-induced perspiration by using gloves doubtful. The skin-protective effect of glove use by preventing exposure to water and soap may be greater than its irritating effect. Reduction in wet work exposure in nursing on regular wards could focus on the reduction of the frequency of hand washing and patient washing activities. We suggest using gloves in the procedure of patient washing and activities that may cause the hands to become visibly dirty. This may reduce the frequency of exposure to water and soap by 24%, although it will increase the exposure to occlusion by gloves. First a reduction of 12% water and soap exposures could be realised, and secondly another 12% reduction could be achieved as nurses can use a hand alcohol instead of water and soap for hand disinfection following a patient-related wet activity. The effect on hand skin by implementing our suggestions will require further research before they can be recommended.


(13) Lammintausta K, Kalimo K, Havu VK. Occurrence of contact allergy and hand eczemas in hospital wet work. Contact Dermatitis 1982; 8:84-90.


