Evaluation of two self-administered questionnaires to ascertain dermatitis among metal workers and its relation with exposure to metal working fluids

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Background

- Workers exposed to MWF account for 8% of all work-related skin diseases
- Incidence rate of 10 per 10,000 metal workers per year
- Few large epidemiological studies
- Need for validated self-administered questionnaires on dermatitis
- One attempted to assess dermal exposure quantitatively
Objectives

*An exploratory study to:*

- evaluate two self-administered questionnaires assessing dermatitis
- investigate a possible exposure-response relation between dermal exposure to semi-synthetic metal working fluids (SMWF) and dermatitis.
Methodology 1.

- Cross-sectional study
- Truck factory
- 80 Metal workers exposed to semi-synthetic metal working fluids (SMWF)
- 67 Referents
  - assembly line workers
- Dermal exposure to SMWF
  - semi-quantitatively (DREAM)
  - quantitatively VITAE
Methodology 2. Dermatitis

Traditional questionnaire (Smit et al., 1993)

One or more reported symptoms in the past 12 months

- red swollen hands or fingers
- red hands or fingers with fissures
- vesicles on the hands or at the sides of the fingers
- scaling hands or fingers with fissures
- itching hands or fingers with fissures)

that were recurrent or lasted more than three weeks
Methodology 3. Dermatitis

Skin-screening list (ISTI, 2001)

- a positive answer to the question: “did you have a skin disorder in the past 12 months that is similar to one or both pictures”
Methodology 4.

• Two dermatologists examined workers’ hands in a subset of the studied subjects (N=47), within two to six weeks (three weeks on average) after filling in the questionnaires.

• Information was obtained on factors possibly related to dermatitis such as age, working years, hand washing, glove use, leisure activities, hay fever, infantile eczema, smoking, and educational level.
## Results 1. Self-reported dermatitis

<table>
<thead>
<tr>
<th></th>
<th>Metal workers (N 80)</th>
<th>Referents (N 67)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hands</td>
<td>21.3 (12.3 – 30.2)</td>
<td>28.4 (17.6 – 39.2)</td>
</tr>
<tr>
<td><strong>Pictures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hands</td>
<td>15.0 (7.2 – 22.8)</td>
<td>10.5 (3.1 – 17.7)</td>
</tr>
<tr>
<td>Hands, fore arms and face</td>
<td>23.8 (14.4 – 33.1)</td>
<td>10.4 (3.1 – 17.8)</td>
</tr>
</tbody>
</table>
Results 2. Validity statistics of self-reported hand dermatitis (N 47)

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<tr>
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<th>Pictures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td>0.86 (0.77 – 0.96)</td>
<td>0.36 (0.23 – 0.50)</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>0.64 (0.50 – 0.78)</td>
<td>0.84 (0.74 – 0.94)</td>
</tr>
</tbody>
</table>

Cohen’s kappa 0.45, 95% CI: 0.28 – 0.68
**Results 3. Crude Prevalence Ratios**

*Low (N 33) and high (N 47) exposed workers versus referents (N 67)*

<table>
<thead>
<tr>
<th>Dermal exposure to SMFW</th>
<th>Traditional Hands</th>
<th>Pictures Hands</th>
<th>Pictures Hands, fore arms, and face</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low (N 33)</strong></td>
<td>0.7 (0.3 – 1.6)</td>
<td>2.0 (0.6 – 3.4)</td>
<td>2.0 (0.8 – 5.3)</td>
</tr>
<tr>
<td><strong>High (N 47)</strong></td>
<td>0.8 (0.4 – 1.5)</td>
<td>1.0 (0.3 – 3.0)</td>
<td><strong>2.4 (1.0 - 5.7)</strong></td>
</tr>
</tbody>
</table>
Results 4. Prevalence Ratios adjusted for hand washing and car repairing

Low (N 33) and high (N 47) exposed workers versus referents (N 67)

<table>
<thead>
<tr>
<th>Dermal exposure to SMFW</th>
<th>Traditional Hands</th>
<th>Pictures Hands</th>
<th>Pictures Hands, forearms, and face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (N 33)</td>
<td>1.0 (0.5 - 2.4)</td>
<td>2.6 (0.9 - 7.2)</td>
<td>2.0 (0.7 - 5.1)</td>
</tr>
<tr>
<td>High (N 47)</td>
<td>0.8 (0.4 - 1.6)</td>
<td>1.1 (0.4 - 3.2)</td>
<td>2.4 (1.0 - 5.8)</td>
</tr>
<tr>
<td>Hand washing</td>
<td>0.7 (0.4 - 1.2)</td>
<td>0.9 (0.4 - 2.1)</td>
<td>1.0 (0.5 - 1.9)</td>
</tr>
<tr>
<td>Car repairing</td>
<td>1.8 (1.0 - 3.3)</td>
<td>1.4 (0.6 - 3.7)</td>
<td>0.9 (0.4 - 2.1)</td>
</tr>
<tr>
<td>Gardening</td>
<td>1.5 (0.9 - 2.7)</td>
<td>1.4 (0.6 - 3.3)</td>
<td>1.5 (0.7 - 3.2)</td>
</tr>
<tr>
<td>&gt; 7 company working years</td>
<td>0.6 (0.3 - 1.0)</td>
<td>0.4 (0.2 - 1.0)</td>
<td>0.7 (0.4 - 1.5)</td>
</tr>
</tbody>
</table>
Limitations

- Cross-sectional design → selection bias e.g. healthy worker effect?
- Small study size
- Moderate response rate
  - Exposed 62%
  - Referents 66%
  - Non-responders similar age and working years
- Assembly workers: appropriate referent group?
Conclusions

• The questionnaires appeared to detect different degrees of dermatitis

• Picture-based
  - More severe cases of dermatitis
  - Possible exposure-effect relation for reported dermatitis on hands, fore arms, and face
  - Seemed more appropriate due to higher specificity resulting in less false-positives

• Repeat study in larger study population with a prospective design
¡Gracias por su atención!
Quantitative dermal Exposure Assessment
VITAE