Exploring Occupational Irritant Hand Dermatitis amongst Healthcare Workers in NHS Grampian

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OEESC 16\textsuperscript{th} Sep 2019
Exploring Occupational Irritant Hand Dermatitis amongst Healthcare Workers in NHS Grampian

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- Literature Review
- Aims & Research Questions
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- Study I
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Skin Functions
- Immunity barrier
- Prevention of water loss
- Thermoregulation
- Sensory organ (touch, pain, temperature)
- Production and storage of vitamin D

Skin Layers
Epidermis
- Provides a protective barrier against mechanical, thermal and physical injury and hazardous substances

Dermis
- Provides the skin with structural strength; flexibility and elasticity

Hypodermis
- Connects the skin to the underlying, muscle and bone
- Absorbs shock and insulates tissue
- Participates in diverse biological functions such as immunity (adipose tissue)
Occupational Skin Disease (OSD)

‘...any disorder of the skin which is caused by or made worse by work or any workplace activity...’ (HSE 1998).

Causes of dermal exposure that can develop in OSDs: physical/mechanical, biological, chemical and psychological hazards.

There are three main types of OSDs:
- Allergic Contact Urticaria (sensitisation)
- Allergic Contact Dermatitis (sensitisation)
- Irritant Contact Dermatitis (damage to skin cells from irritant(s))

Occupational Irritant Hand Dermatitis (OIHD)

OIHD can cause long-term ill-health and have adverse career implications for wet workers.

Healthcare workers and especially nurses are amongst the occupations with the highest incidence rates of OIHD attributed to wet work and frequent hand washing (WHO 2009).

Patient treatment can be impacted adversely.

Cost to the NHS.

Work-related ill-health cost (including OSDs) in the UK during 2016/2017, was estimated at 9.7 billion pounds (HSE 2018).
Introduction & Background

Health & Health well-being at the workplace
It is of extreme significance for the employer, the employee as well as the wider context of community and society. Positive impact of health and well-being programmes at work contribute to a holistic approach to the employee’s wellness.

Prevention & Early Interventions
Are equally important elements from a moral, social and economic perspective. Workplaces should become the key setting for improving people’s health and well-being (Black 2008).

Conceptual model for employee’s wellness, adapted from PricewaterhouseCoopers, 2008.
Literature Review: Epidemiology of OSD

- **International Level**
  - OSDs are recognised occupational diseases by the International Labour Organisation (ILO).
  - Prevention of OSD is also a recognised responsibility by the occupational health services (ILO).

- **European Level**
  - By European Union law, employers must protect their employees from hazardous substances at work and carry out risk assessments, provide information and offer training.
  - Legislation regarding the recognition of occupational diseases vary amongst the different countries. There is no standardised schemes for the recognition and reporting of OSD.

- **National Level**
  - In the UK, disease reporting within the statutory requirements (RIDDOR) is retained by the HSE.
  - Recognition of OSD is based on an official list however, the available statistics are based on voluntary schemes (THOR: EPIDERM and OPRA).
In the UK the reported occupations with the highest rates of work-related skin disease between 2007 and 2017 according to the annual HSE report in 2018 were:

- florists (76.7 cases per 100,000 workers per year),
- hairdressers and barbers (67.5 cases per 100,000 workers per year),
- cooks (62.9 cases per 100,000 workers per year),
- beauticians (69.9 cases per 100,000 workers per year), and
- metal working machine operatives (43.7 cases per 100,000 workers per year) (HSE 2018).

Other occupations with high incidence rates (over 25 new cases per 100,000 workers per year) included dental practitioners, nurses, and moulders.

Similar occupational sectors (manufacturing, construction, health and social care, beauticians, cooks, cleaners) with high incidence rates of OSD have also been reported across Europe.
The initial review of the literature identified a body of mainly quantitative studies dedicated to:

- Exploring effectiveness of interventions to prevent OIHD amongst high-risk occupations, across different countries
- Reporting incidence of OIHD

OSDs (including OIHD) are significant problems for wet workers.

OSDs were listed the second most common occupational health problem in Europe in 2008.

Recognition and reporting of OSD amongst wet workers differs between, the UK, Europe and U.S.

Underreporting of OSD is a common theme globally.

OSDs for wet workers in healthcare industries pose a significant problem to upon the health of the individual, the patient care delivery and also cost to health services.

Early intervention and assessment are crucial in achieving long-term outcomes for healthcare workers.
Aim
Based on the MRC Guidance for Developing and Evaluating Complex Interventions (Craig et al. 2008), this research project aimed to inform the development of an evidence-based intervention designed to promote self-care and to prevent OIHD in HCWs within NHS Grampian and other healthcare institutions.

Research Questions
1. establish the period prevalence and incidence of OIHD, on a local and national level
2. identify, appraise and synthesise the best available evidence on the effectiveness of interventions aimed at OIHD prevention
3. capture HCWs’ opinions, beliefs and experiences about skin health and care at the workplace
4. inform the development of an evidence-based intervention informed by the outcomes of the objectives 1, 2 and 3
Methodology

**Study I:**
An Exploration of the period prevalence and incidence of OIHD in NHS Grampian and the UK
- Review of databases (Local and National)
- Paradigm: Positivist
- Methodology: Quantitative
- Method: Survey

**Study II:**
Effectiveness of Interventions for the prevention of OIHD: A quantitative systematic review
- Systematic Review of the world-wide Literature
- Paradigm: Positivist
- Methodology: Quantitative
- Method: Systematic Review

**Study III:**
A mixed-methods exploration of the OIHD in wet workers in NHS Grampian
- Mixed Methods
- Paradigm: Pragmatic
- Methodology: Quantitative and Qualitative
- Method: Questionnaires and Semi-structured Interviews
Study I: An exploration of the period prevalence and incidence of OIHD in the UK & the NHS Grampian

Study I was set out to determine the reported scale of OIHD amongst HCWs locally and nationally by reviewing the relevant databases.

**UK**
- Review study
- Between 2010 and 2015
- Annual reports available from the national databases (HSE, EPIDERM, THOR-GP)
- UK working population:
  - new cases of individuals who developed skin problems at the workplace
  - individuals in employment for the past 12 months who self-reported skin problems at work by the Labour Force Survey

**NHS Grampian**
- Repeated cross-sectional study
- Between 2010 and 2015
- Local database from Occupational Health Service of NHS Grampian
- Wet workers under the annual skin surveillance scheme
**Study I: An exploration of the period prevalence and incidence of OIHD in the UK**

<table>
<thead>
<tr>
<th>Estimated Prevalence (in thousands)</th>
<th>Rate per 100,000 employed in the past 12 months</th>
<th>95% CI (upper and lower bounds)</th>
<th>95% CI (upper and lower bounds)</th>
<th>Whether rates statistically significantly higher/lower than previous period</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009/2010</td>
<td>22 (14-30)</td>
<td>75 (48-100)</td>
<td>No numbers</td>
<td></td>
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<tr>
<td>2010/2011</td>
<td></td>
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<tr>
<td>2011/2012</td>
<td>15 (8-22)</td>
<td>50 (28-71)</td>
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<td>2013/2014</td>
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<tr>
<td>2014/2015</td>
<td>20 (12-27)</td>
<td>61 (37-86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015/2016</td>
<td>18 (10-25)</td>
<td>54 (30-78)</td>
<td>No numbers</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Incidence (in thousands)</th>
<th>Rate per 100,000 employed in the past 12 months</th>
<th>95% CI (upper and lower bounds)</th>
<th>95% CI (upper and lower bounds)</th>
<th>Whether rates statistically significantly higher/lower than previous period</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007/08, 2009/10</td>
<td>9 (6-12)</td>
<td>31 (21-41)</td>
<td>No numbers</td>
<td></td>
</tr>
<tr>
<td>2010/11, 2011/12</td>
<td></td>
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<tr>
<td>2013/14</td>
<td>5 (3-7)</td>
<td>17 (10-24)</td>
<td>Lower numbers</td>
<td></td>
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<tr>
<td>2014/15, 2016/17</td>
<td>6 (4-9)</td>
<td>19 (11-28)</td>
<td>No numbers</td>
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</tbody>
</table>
**Study I: An exploration of the period prevalence & incidence of OIHD in NHS Grampian**

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalence (All Surveillance Cases)</strong></td>
<td>168</td>
<td>187</td>
<td>369</td>
<td>204</td>
<td>343</td>
<td>487</td>
</tr>
<tr>
<td><strong>Incidence (New Surveillance Cases)</strong></td>
<td>102</td>
<td>107</td>
<td>131</td>
<td>148</td>
<td>178</td>
<td>157</td>
</tr>
<tr>
<td><strong>Referral Cases</strong></td>
<td>63</td>
<td>23</td>
<td>74</td>
<td>10</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td><strong>Referrals as % of All Surveillance Cases</strong></td>
<td>37.5%</td>
<td>12.3%</td>
<td>20.1%</td>
<td>4.9%</td>
<td>3.5%</td>
<td>7.4%</td>
</tr>
<tr>
<td><strong>NHS Grampian Total Headcount</strong></td>
<td>15073</td>
<td>13932</td>
<td>13950</td>
<td>14037</td>
<td>14299</td>
<td>14533</td>
</tr>
<tr>
<td><strong>Source: Information Services Division Scotland</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Period Prevalence</strong></td>
<td>1.11%</td>
<td>1.34%</td>
<td>2.65%</td>
<td>1.45%</td>
<td>2.40%</td>
<td>3.35%</td>
</tr>
<tr>
<td><strong>Incidence Rate</strong></td>
<td>0.68%</td>
<td>0.77%</td>
<td>0.94%</td>
<td>1.05%</td>
<td>1.24%</td>
<td>1.08%</td>
</tr>
</tbody>
</table>

Prevalence and Incidence summary table for NHS Grampian wet workers
Study I: An exploration of the period prevalence and incidence of OIHD in NHS Grampian

Age & Gender

Over half of the wet workers declared having pre-existing skin conditions prior to entering the surveillance scheme.

Dermatitis/eczema had the highest rate of incidence 39.1% (348), latex allergy came second with 5.3% (47) and psoriasis third with 5.2% (46).

Combinations of these three main types of pre-existing skin conditions previously declared by the wet workers consisted of 7.1% (63) of the sample.

Occupational Groups

Highest rates of OIHD appeared amongst:
- Nursing/midwifery
- Medical practitioners
- Allied health professionals
- Support services (domestics)
- Administrative services
The key findings outlined that the numbers of wet workers in healthcare locally affected by OIHD have been increasing annually between 2010 and 2015. Conversely, the estimated numbers of new cases as reported in HSE’s 2018 annual report, were lower in the past five years when compared to ten years ago (HSE 2018).

Contributory factors to the observed discrepancy between the reported cases locally and nationally may have been the following:

- adhering to different reporting routes of work-related skin disease to the THOR network at a local level,
- using different criteria of escalating/reporting new cases to the THOR network at a local level
- effective management/interventions of skin disease on a local level may have prevented escalation/reporting to THOR.
A systematic review of the international literature on the effectiveness of interventions for the prevention of OIHD aimed to:

Identify, appraise and synthesize the best available evidence on the effectiveness of moisturisers, barrier creams, protective gloves, skin protection education and complex interventions (a combination of two or more of the interventions listed here) in preventing OIHD in wet workers, comparing each intervention to an alternative intervention or to usual care (workers’ regular skin care regimen).

The specific review question was:

What is the effectiveness of moisturisers, barrier creams, protective gloves, skin protection education and complex interventions in preventing OIHD in wet workers?
Study II: Effectiveness of interventions for the prevention of OIHD: A quantitative systematic review

Peer Reviewed Publications


The key findings of study II outlined that:

• A number of studies was identified with published evidence of interventions focused on the prevention of OSD.

• No primary prevention studies were found where all participants were without pre-existing skin conditions.

• It was not possible to extract separately the data relating to participants without pre-existing skin conditions from within the studies that employed mixed populations. Hence, it was not possible to ascertain whether any skin changes were due to the effectiveness of the intervention(s) or due to the improvement of symptoms related to pre-existing skin conditions. This finding implies that there are gaps in the design of interventions for the prevention of OIHD in a way the one can confidently assess their effectiveness.
The aims of Study III were:

- to explore the distribution and determinants of OIHD in a sample of wet workers referred to OHS in NHS Grampian in 2015

- to explore the demographics of the sample as well as experiences, perceptions and needs of wet workers in relation to prevention of OIHD using a mixed methods approach.

Methods:

- Quantitative data was obtained using the Nordic Occupational Skin Questionnaire (NOSQ-2002/SHORT) (n=369)
- Qualitative data was obtained using semi-structured interviews (n=25)
Study III: A mixed-methods exploration of the OIHD in wet workers in NHS Grampian

Quantitative

The key findings from the quantitative part of Study III suggested that:

• **Wet work, hand hygiene products as well as use of PPE (particularly rubber gloves) were risk factors for both the development and/or exacerbation of OIHD amongst HCWs.**

• **Strong association was found between OIHD and the development of atopic symptoms.**

• **The findings highlighted that onset of OIHD in most cases can develop into atopy (tendency to develop allergies) which has the potential for severe and long-term impact on the health and well-being of the individual.**
Interviews

• **The key findings pertaining to the skin health and care facilitators were:**
  - Hand hygiene/care products, teamwork and provision of supportive mechanisms at work for skin care.
  - In addition, skin care self-awareness and adequate time to carry out skin care at work were amongst the most strongly voiced facilitators.

• **Regarding skin health and care inhibitors, key findings were:**
  - Lack of support at work including lack of understanding from the patients, work environment and lack of information/training/knowledge at work for skin care.

• **The key findings relating to physical and mental effects of skin issues, concerned the:**
  - Increased risk of infection, visual and sensory aspects, as well as quality of life outside work.
  - A range of psychological issues were raised by the interviewees in relation to the effects of skin issues. Specifically, feelings of embarrassment, being aware of how patients will perceive the HCWs (fit or not fit to be looking after patients), not looking professional (to themselves, their colleagues and patients) and having distorted self-image about their skin.
Developing an evidence-based multicomponent intervention to prevent OIHD

The Theoretical Domains Framework (TDF) is a framework widely used across healthcare systems to explain and address implementation issues as well as to inform interventions. The uniqueness of TDF lies in the use of multiple behaviour change domains that incorporate broad categories of intervention functions.

The TDF could be applied to define the problem in terms of behaviour, in order to understand:

- existing behaviours within different contexts
- the target behaviours of HCWs
- the full range of possible interventions how to identify specific behavioural change techniques

<table>
<thead>
<tr>
<th>TDF Domain</th>
<th>Key findings mapped across TDF domains</th>
<th>Intervention components</th>
<th>Method of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>-Information HCWs have regarding skin issue prevention</td>
<td>-Exploration of OIHD and skin care knowledge amongst HCWs</td>
<td>-Face to face Interviews and/or Questionnaires</td>
</tr>
<tr>
<td></td>
<td>-Self-awareness/rationale of skin care compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>-Skin care competence</td>
<td>-Training programme and information regarding OIHD and skin care</td>
<td>-Face to face training and educational leaflets/brochures</td>
</tr>
<tr>
<td>Beliefs about consequences</td>
<td>-Risk of infection for the HCW and the patient</td>
<td>-Hand hygiene and skin care regime</td>
<td>-Support from skin role model</td>
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<tr>
<td></td>
<td>-Not looking professional, therefore affects the quality of care given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinforcement</td>
<td>-Supportive mechanisms/interventions at work</td>
<td>-Reinforcement from a skin role model at work</td>
<td>-Support from skin role model</td>
</tr>
<tr>
<td></td>
<td>-Information/training/ skin care knowledge</td>
<td>-Peer support from colleagues</td>
<td>-Key messages in the area of work</td>
</tr>
<tr>
<td>Environmental Context and Resources</td>
<td>-Work environment -Products</td>
<td>-Provide moisturisers</td>
<td>-Provide small samples moisturisers</td>
</tr>
<tr>
<td>Social Influences</td>
<td>-Patients’ expectations</td>
<td>-Use of moisturisers</td>
<td>-Provide small samples moisturisers</td>
</tr>
<tr>
<td></td>
<td>-Quality of life outside work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotion</td>
<td>-Visual aspect -Sensory aspect -Distorted self-image -Embarrassment</td>
<td>-Peer support from colleagues</td>
<td>-Support from skin role model</td>
</tr>
<tr>
<td>Behavioural regulation</td>
<td>-Self-awareness for skin care</td>
<td>-Compliance with skin care regime at work and at home</td>
<td>-Support groups using mobile technology/applications</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>-Reminders via internet (emails or use of mobile technology/applications)</td>
</tr>
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</table>
Whilst the findings of this thesis have furthered the understanding regarding the determinants of skin health and care at the workplace, additional work would be required prior to implementing an intervention.

An important goal would be for HCWs to foster behaviours targeted at reducing the formation of OIHD.

It is therefore, imperative to consider the identified findings as potential behavioural intervention targets.
Any Questions?

Thank you