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Reporting of self-reported hand eczema as an occupational disease in hospital cleaners: A cross-sectional questionnaire-based study

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Abstract

Background: Hand eczema (HE) is a prevalent disease among professional cleaners.

Objectives: To investigate how often cleaners have their self-reported HE, induced or worsened by cleaners' occupational activities, reported as an occupational disease to the authorities in Denmark and to identify reasons for underreporting. In addition, consultation by physicians and treatment for HE among cleaners were also investigated.

Methods: This cross-sectional questionnaire-based study included hospital cleaners at three different hospitals in Region Zealand, Denmark.

Results: We included 224 out of 234 cleaners from three hospitals (response rate: 96%). The lifetime prevalence of self-reported HE with onset in adulthood was 18.3% ($n = 41$), with cleaners believing every case to be caused or exacerbated by their occupation. Only 9.7% ($n = 4/41$) of the cases were reported as an occupational disease to the authorities. The most common reasons for non-reporting were a lack of perceived seriousness of the disease (40.5%) and unawareness of the risk of self-reported HE being of occupational origin (32.4%). Remarkably, only 75.7% ($n = 28/37$) of workers with unreported cases had consulted a physician at some point. Additionally, among cleaners who self-reported HE attributed or aggravated by their occupation, but not officially reported as such, only 56.8% ($n = 21/37$) had ever used hand moisturisers, while less than 45% had ever used topical steroids or calcineurin inhibitors.

Conclusion: Our findings reveal substantial underreporting of self-reported HE, perceived to be induced or worsened by the cleaner's occupational activities, as an occupational disease to the authorities.

KEYWORDS
cleaning, occupational, prevention, reporting

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1 | INTRODUCTION

Occupational skin diseases (OSDs) represent a substantial and prevalent health concern that affects a diverse workforce across various industries.[1–5] Among all OSDs, occupational hand eczema (OHE) stands out as a highly prevalent disease, which contributes to 80%–95% of all OSDs.[6] Annually, around 2100 cases of suspected OHE are reported in Denmark, with authorities acknowledging it as an occupational disease in 7 out of 10 cases.[7] OHE is a skin condition that frequently affects high-risk occupational groups such as cleaners.[8–10] This is attributed to their regular and extended exposure to irritants, particularly wet work, the friction from wearing protective gloves, contact with rubber allergens, and skin exposure to allergens primarily found in cleaning products.[11] The lifetime occurrence of OHE in cleaners has been documented as high as 30.1%[11] and the incidence rate of 5.8 per 10 000 persons-year for recognised cases of OHE among Danish cleaners has been reported.[12] The implications of OHE can have broad-reaching effects, affecting the individuals in the cleaning profession and society at large. These include low quality of life, disability, sick leave and lost productivity.[11]

In Denmark and many other Western countries, any suspected case of OHE should be reported to the relevant authorities,[13–15] which in Denmark are presented by the Danish Working Environment Authority (WEA) and the Labour Market Insurance (AES).[13] Notification of suspected OHE is mostly done by physicians (general practitioners and dermatologists), who are obligated to report suspected cases. Rarely, workers (patients) do report themselves directly to the WEA and AES. The reporting of any potential case of OHE to the authorities is essential for several reasons. First, it may lead to the identification of occupational risk factors in certain occupations. Second, it leads to the opportunity to take necessary measures to protect workers' health and safety (prevention).[8] Third, it ensures that affected workers receive proper medical attention and treatment and offers the opportunity of economic compensation, in cases where the disease has led to long-term or serious disability.[13] However, many workers, including cleaners, are not aware of these legal requirements and physicians may tend to forget to report. The aim of this study was to explore to what extent self-reported hand eczema (HE), induced or worsened by a cleaner's occupational activities, is reported as a potential case of occupational disease in Danish professional cleaners and if not reported, to identify reasons for this and assess the degree of medical treatment received.

2 | MATERIALS AND METHODS

2.1 | Design

The present investigation was a questionnaire-based study conducted in a cross-sectional manner, utilising data from the Hand Eczema In Cleaners trial.[16,17] This trial focused on hospital cleaners employed at three hospitals in the Zealand Region, which took place between 14 November and 5 December 2022.[16,17] The hospitals were chosen because they were located in the same region, where standardised hygiene protocols were uniformly implemented. This consistency ensured comparable levels of exposure and risk of developing HE. The selection of these three hospitals was strategic, aimed at maintaining a consistent study environment and reducing variability in exposure and risk factors associated with HE. At baseline, data collection commenced at the onset of the trial.[16,17] Eligibility criteria for participation included being professional cleaners aged at least 18 years old, proficient in the Danish language, and providing written informed consent.[16,17] Exclusion criteria encompassed insufficient Danish abilities, pregnancy, presence of skin conditions other than HE on the hands, and current use of systemic or topical immunomodulatory therapy, thereby precluding participation.[16,17]

2.2 | Ethics

Participation in the current study was voluntary, and approval for this study was granted by the Regional Ethics Committee for the Zealand Region (journal number: EMN-2022-04317).[16,17]

2.3 | Baseline interview and questionnaire

All of the cleaners were asked to complete a questionnaire during the baseline interview.[16,17] Cleaners were informed that the research team was available to help with any queries they had regarding the questionnaire in order to ensure clarity.[17] The study group was ready to offer a comprehensive definition of HE according to accepted standards[8] for those cleaners unfamiliar with the term.[17] None of the cleaners, however, requested or obtained this information.[17]

The present study focused on 17 specific questions selected from a comprehensive questionnaire. These covered: demographic information (3 questions), HE-related outcomes (11 questions), and atopic comorbidities including atopic dermatitis (AD), asthma and hay fever or other symptoms of nasal allergy (3 questions)[17] (Table S1).

In the current study, self-reported HE was defined based on question D1 from the Nordic Occupational Skin Questionnaire-2002 (NOSQ-2002) (Have you ever had HE?).[18] The options were: (1) 'Yes' and (2) 'No'[18] (Table S1). Furthermore, the onset time of HE was determined by using question D6 from NOSQ-2002 (When did you first get HE?).[18] The options were: (1) 'Below 6 years of age', (2) 'Between 6 and 14 years of age', (3) 'Between 15 and 18 years of age' and (4) 'Above 18 years old'.[18] Doctor visits due to HE and atopic comorbidities were explored by using other questions from NOSQ-2002 (Questions D10, A2, A4 and S5b) (Table S1).[18] Respondents with self-reported HE were asked if 'they believed that their occupation caused or exacerbated their HE'.[19] The options were: (1) 'Yes', (2) 'No' and (3) 'I don't know'.[19] In addition, the participants were asked whether they experienced any improvement in their self-reported HE, when they were away from normal work (question F4 from NOSQ-2002).[18] The options were: (1) 'Yes, sometimes/usually', (2) 'No' and (3) 'Don't know'.[18] In the present study, OHE was

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defined as 'self-reported HE developed during adulthood, which cleaners perceived being caused or exacerbated by their occupation, and which demonstrated improvement during periods away from work'.[19]

All participants with self-reported HE were asked if the disease had been reported either by themselves, or a physician as an occupational disease to WEA and AES. The answer options were: (1) 'Yes', (2) 'No' and (3) 'I don't know'. Participants with unreported cases were provided with different reasons for not reporting and asked to mark those of relevance (Table S1).[19] The participants were also given space to list any additional reasons they had that were not listed before.[19] The answer options were previously developed and used in a previous study investigating the same topic.[19,20]

Questions regarding previous medical care for HE included the use of moisturisers, topical corticosteroids, topical calcineurin inhibitors, phototherapy (UV), antibiotics, potassium permanganate solution, antihistamines, methotrexate, azathioprine and acitretin/alitretinoin (including their respective brand names) when self-reported HE was at its worst.[21] These questions were developed and employed in a prior study.[21] The participants were given space to list any additional treatments they had that were not on the list.[21] Self-rated severity of self-reported HE at its worst was measured on a scale from 0 (no eczema) to 10 (severe) (Patient Global Assessment = PGA), using question D12 from NOSQ-2002[18] (Table S1). PGA 1–4 was defined as mild HE and 5–10 as moderate-to-severe HE, according to a previous study.[21]

2.4 | Statistical analysis

The statistical analysis was performed using SAS Statistics version 9.4. Descriptive statistics in the form of means, standard deviations, interquartile range, and frequency counts with corresponding percentages were reported and were compared across groups (those with mild HE vs. those with moderate-to-severe) using the difference proportions along with exact 95% confidence intervals (CIs). Exact method was used due to the small sizes, as the normal approximation may not be suitable when there is inadequate data to accurately estimate the distribution.

3 | RESULTS

3.1 | Study population

About 224 of 234 (96%) invited professional cleaners participated in the study.[17] Among the participants, 24 (10.7%) were male and 200 (89.3%) were female.[17] Their mean age was 49.7 (years) ± 12.7 (standard deviation).[17] The participants reported the following comorbidities: 15 (6.7%) had a history of AD, 35 (15.6%) had asthma, and 105 (46.9%) had a history of hay fever or other symptoms of nasal allergy.[17] Looking at the duration of exposure, 20 (8.9%) had worked as a professional cleaner for <1 year, 65 (29.0%) between 1 and 5 years, and the majority ($n = 139$, 62.1%) for 5 years or more[17] (Table 1). Among the cleaners, 12.1% ($n = 27$) had previously received information on the prevention of HE at their workplace, while 28.1% ($n = 63$) were uncertain about whether they had received any or not, and the majority (59.8%, $n = 134$) reported that they had not received any information on prevention before (Table 1). Forty-nine (22%) of the study population reported having had HE (Table 1).

3.2 | Characteristics of HE

Of those with self-reported HE ($n = 49$), 41(83.7%) reported adult-onset (above 18 years), 4 (8.2%) onset between 15 and 18 years, 3 (6.1%) onset between 6 and 14 years, and 1 (2.0%) onset below 6 years of age (Table 2).

3.3 | Reporting of HE

18.3% ($n = 41$) of the study population self-reported developing HE during adulthood, which they perceived to be induced or aggravated by their occupation and noted improvement during periods away from work (OHE). However, only 4/41 (9.7%) of those cases with OHE were reported to WEA and AES (Table 3).

3.4 | Reasons for not reporting

Based on the cleaner's perception, the most frequent reasons for not reporting their disease as occupational were: 'I thought it would eventually get better', (40.5% [$n = 15$]), 'I did not know that my HE was occupational', (32.4% [$n = 12$]), 'I would probably not gain anything from it anyway' and 'I was worried that my HE would lead to problems with my employer' (both reported by 27.0% [$n = 10$]) and 'my doctor did not tell me it was possible to report it as an occupational disease' (18.9% [$n = 7$]). Other reasons are listed in Figure 1.

3.5 | Prevention and treatment of OHE

Among cleaners who believed their HE to be triggered or worsened by their occupational duties, but not officially documented as such ($n = 37$), 16.2% ($n = 6$) had previously received information on the prevention of the disease at their workplace, while 40.5% ($n = 15$) could not remember having received any, and 43.2% ($n = 16$) reported not previously having received any information on prevention at their workplace. The majority (75.7%, $n = 28/37$) had consulted a physician at some point due to HE, and 70.3% (26/37) had received treatment (Table 4). Among cleaners, who self-reported HE, believed to be triggered or worsened by their occupational duties, but not officially documented as such, the majority 27/37 (73%) had moderate-to-severe OHE, and 10/37 (27%) had mild OHE (Table 4). No significant difference between treatments and disease severity was found (the difference [95% CIs] was −14.1% [−50.0% to 19.1%]) (Table 2).

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TABLE 1 Characteristics of the 224 cleaners included in the study.

Variable		Total (*N* = 224)	Have you ever had hand eczema? Yes (*N* = 49)	No (*N* = 175)
Sex	Male	24 (10.7%)	3 (6.1%)	21 (12.0%)
	Female	200 (89.3%)	46 (93.9%)	154 (88.0%)
Age (years)	Range	18–72	19–67	18–72
	Mean ± SD	50 ± 13	49 ± 12	50 ± 13
	Median (IQR)	53 (45–59)	52 (42–58)	53 (45–60)
Number of years working as a cleaner	<1 year	20 (8.9%)	6 (12.2%)	14 (8.0%)
	1–5 years	65 (29.0%)	12 (24.5%)	53 (30.3%)
	≥5 years	139 (62.1%)	31 (63.3%)	108 (61.7%)
Previously receiving information on the prevention of hand eczema at the workplace	Yes	27 (12.1%)	10 (20.4%)	17 (9.7%)
	No	134 (59.8%)	21 (42.9%)	113 (64.6%)
	Don't know	63 (28.1%)	18 (36.7%)	45 (25.7%)
Atopic dermatitis	Yes	15 (6.7%)	9 (18.4%)	6 (3.4%)
	No	167 (74.6%)	24 (49.0%)	143 (81.7%)
	Don't know	42 (18.8%)	16 (32.7%)	26 (14.9%)
Asthma (physician—diagnosed)	Yes	35 (15.6%)	12 (24.5%)	23 (13.1%)
	No	189 (84.4%)	37 (75.5%)	152 (86.9%)
Hay fever or other nasal allergy	Yes	105 (46.9%)	27 (55.1%)	78 (44.6%)
	No	107 (47.8%)	16 (32.7%)	91 (52.0%)
	Don't know	12 (5.4%)	6 (12.2%)	6 (3.4%)
Wet work exposure	Never	7 (3.1%)	0 (0.0%)	7 (4.0%)
	Less than 30 min	54 (24.1%)	12 (24.5%)	42 (24.0%)
	Between 30 min and 1 h	43 (19.2%)	8 (16.3%)	35 (20.0%)
	Between 1 and 2 h	29 (12.9%)	9 (18.4%)	20 (11.4%)
	Between 2 and 3 h	27 (12.1%)	5 (10.2%)	22 (12.6%)
	Between 3 and 5 h	42 (18.8%)	9 (18.4%)	33 (18.9%)
	More than 5 h daily	22 (9.8%)	6 (12.2%)	16 (9.1%)

Abbreviations: IQR, interquartile range; SD, standard deviation.

TABLE 2 Characteristics of hand eczema in individuals who self-reported the condition.

'When did you first get eczema in your hands'?	*N* (%)
Onset below 6 years of age	1/49 (2.0%)
Between 6 and 14 years of age	3/49 (6.1%)
Between 15 and 18 years of age	4/49 (8.2%)
Above 18 years of age	41/49 (83.7%)

TABLE 3 Reporting of hand eczema as an occupational disease in individuals who developed hand eczema during adulthood.

'Has your hand eczema been reported either by yourself, or a physician as an occupational disease to the authorities'?	*N* (%)
Yes	4/41 (9.7%)
No	37/41 (90.3%)

The reported treatments included hand moisturiser (used by 56.8% [21/37]), topical corticosteroid (used by 43.2% [16/37]), phototherapy treatment (used by 24.3% [9/37]) and topical calcineurin inhibitors as well as systemic treatment (defined as using methotrexate, azathioprine or acitretin/alitretinoin) used by 2.7% (1/37) (Figure 2).

4 | DISCUSSION

The main finding of this study is that only 9.7% of the cases of self-reported HE, believed to be triggered or worsened by the cleaners' occupational duties, were reported as an occupational disease to WEA and AES. This is despite the fact that among the participants

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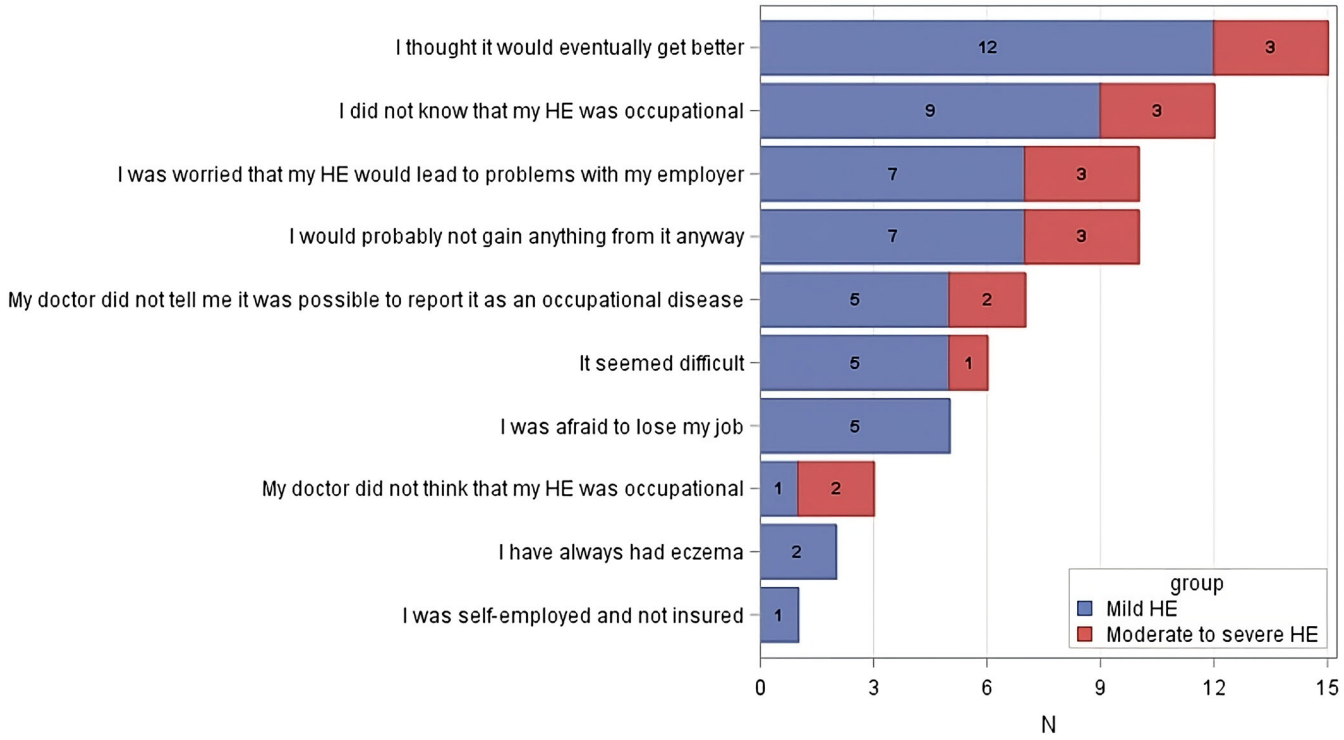

FIGURE 1 Reasons for not reporting hand eczema (HE) as an occupational disease based on the cleaners' perception ($n = 37$). The participants were allowed to mark as many reasons as possible if they were relevant to not reporting HE as an occupational disease. Fifteen participants marked one answer option, 10 participants marked two answer options, 9 participants marked three answer options, one participant marked four answer options and one participant marked five answer options. The list of the reasons was previously developed and used in another study.[8] 73% (27/37) of the cleaners had moderate-to-severe HE and 27% (10/37) had mild HE. Other reasons stated in open-ended items included: 'I don't know why I did not report it as an occupational disease' ($n = 1$), "I did not think about it ($n = 1$), 'I had only hand eczema during the winter' ($n = 1$), 'my workplace did everything they could for me to avoid my hand eczema at the workplace' ($n = 1$) and one person wrote only 'occupational-related'.

TABLE 4 Previously treatment of hand eczema among those with occupational hand eczema who did not report the disease as occupational to the authorities.

Variable		Total ($N = 37$)	The severity of hand eczema		Difference (95% confidence interval [CI])
			Mild ($n = 10$)	Moderate-to-severe ($N = 27$)	
Previously receiving information on the prevention of hand eczema at the workplace	No, *n* (%)	16 (43.2%)	5 (50.0%)	11 (40.7%)	9.3% (−26.4% to 44.5%)
	Yes, *n* (%)	6 (16.2%)	1 (10.0%)	5 (18.5%)	−8.5% (−31.4% to 27.6%)
	Do not recall, *n* (%)	15 (40.5%)	4 (40.0%)	11 (40.7%)	−0.7% (−35.1% to 35.5%)
Previously seen by a physician as an adult for hand eczema?	Yes, *n* (%)	28 (75.7%)	7 (70.0%)	21 (77.8)	−7.8%
	No, *n* (%)	9 (24.3%)	3 (30.0%)	6 (22.2)	(−44.5% to 22.0%)
Previously receiving treatment for hand eczema?	Yes, *n* (%)	26 (70.3%)	6 (60.0%)	20 (74.1%)	−14.1%
	No, *n* (%)	11 (29.7%)	4 (40.0%)	7 (25.9%)	(−50.0% to 19.1%)

Note: Difference refers to the estimated disparity between two groups, with the 95% CI indicating the range within which the true difference is expected to lie with 95% certainty.

with unreported OHE, 73% of the cleaners assessed their disease as moderate-to-severe. Furthermore, 3 out of 10 had never received any treatment and approximately one out of four had never been seen by a physician for their HE. These findings indicate that self-reported HE, believed to be triggered or worsened by the cleaners' occupational duties, is underreported as an occupational disease.

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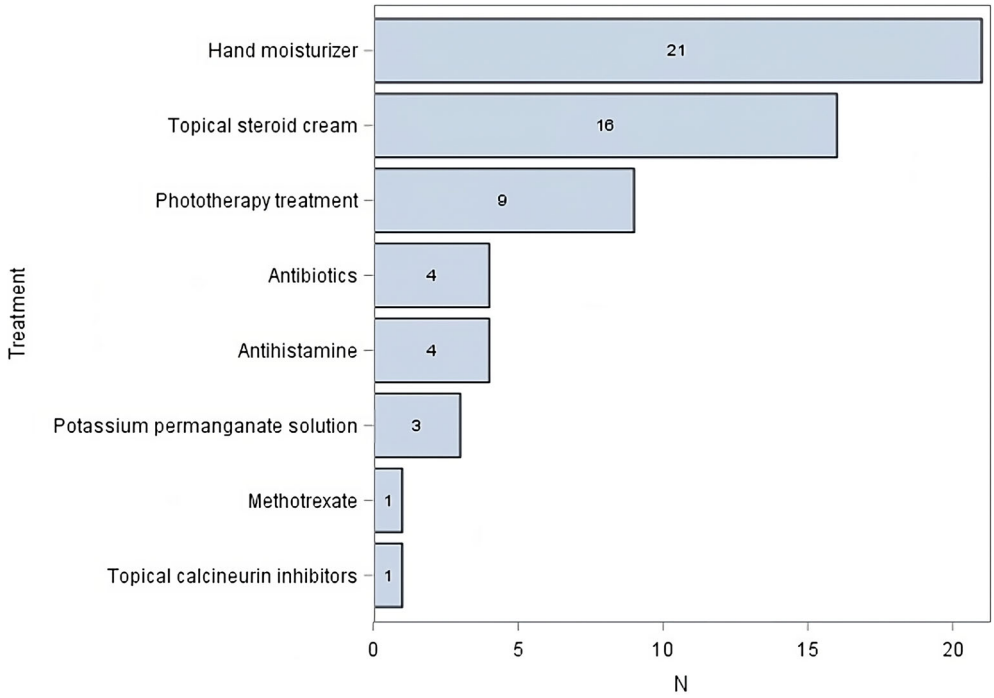

FIGURE 2 Treatments for hand eczema (HE) among those who did not report the disease as occupational ($n = 37$). The participants were allowed to mark more than one treatment, if they had used several treatments for their HE. Twenty-one participants marked only one treatment, six participants marked two treatments, two participants marked three treatments, one participant marked four treatments, two participants marked five treatments and one participant marked six treatments. Other treatments: three participants marked 'other treatments'. However, they could not remember the names of the other treatments received.

4.1 | Exploring underreporting and its associated factors

Underreporting of occupational diseases (including skin diseases) is a worldwide challenge that is reported in many countries.[14,19,22–31] This can be caused by factors related to psycho-social practices (among workers and healthcare providers), workplace culture and finally the organisational and systemic structures in general.[32]

Discussing psycho-social practices among workers, the most common reasons for not reporting based on the perception of the cleaners were the cleaners believing that their self-reported HE, would get better (lack of perceived seriousness), that they would not gain anything from reporting it anyway, and that they not being aware of the association between their self-reported HE and their occupation (awareness). Incidentally, these all are also the prevailing rationale behind decisions to not report self-reported HE as an occupational disease among Danish hairdressers.[19] Low levels of knowledge regarding HE in cleaners and the general society and diverse disease perceptions among patients with OHE have previously been reported.[33–35] Both are important since they influence the worker's behaviour toward seeking medical help as well as coping strategies. An interesting observation in our study was the absence of participant requests for clarification on HE. This phenomenon could be attributed to participant's confidence in their understanding of the disease. Nevertheless, it is plausible that insufficient prior knowledge of HE, coupled with first encountering awareness of the disease during the interview, may have contributed to the underreporting of the disease.

With regard to psycho-social practices among healthcare workers, this encompasses situations where physicians failed to inform the cleaners about reporting HE as an occupational disease. In a global context, several factors contribute to the underreporting of OSDs. These include the extended length of time required for the notification process, insufficient implementation of workplace safety and health laws, insufficient compensation structures, limitations, and hesitations, authorities imposing fines on employers, and lack of protocols.[22]

Some cleaners in our study believed that it was difficult to report their self-reported HE, and it was complicated by worries about getting into problems with their employer and losing their job if they reported their HE to the authorities. These findings parallel those documented in prior studies, underscoring the significance of the employer-worker relationship and apprehension about job insecurity as notable factors contributing to underreporting.[22,36]

4.2 | Reporting of HE by physicians

Despite the cleaners providing different reasons for why their self-reported HE, believed to be triggered or worsened by their occupational duties, was not reported as an occupational disease, it is important to notice that 75.7% ($n = 28/37$) of the cleaners were previously seen by a physician at some point. As physicians in Denmark are legally bound to report even suspected cases, it is important to discuss the physician's neglect of their obligation. Some physicians may not be aware of the obligation to report any suspected occupational-related case to the health authorities.[37–39] In Denmark, failure to adhere to this obligation carries consequences in the form of penalties for the physicians with a fine of around 667 euro the first time and around 1333 euro in case of recurrence.[40] In addition, Danish workers with HE typically begin their assessment process with a visit to their general practitioner, who is the first physician obligated to report the case as an occupational disease, if suspicion arises. However, certain general practitioners may encounter time limitations when engaging

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with the reporting system or having difficulties identifying occupational diseases.[41] In addition, it has been reported that only a minority of general physicians are dedicating time to inquire about workplace exposure during patient consultations, ranging from 5% to 45%.[42] Currently, Danish general practitioners lack a standardised template or checklist for the identification of potential risk factors for HE with occupational origin, which could be used during history taking. This absence may also contribute to the underreporting of HE with occupational origin by family doctors. In addition, general practitioners in Denmark only referred the workers (patients) to consult a dermatologist or an occupational physician if there was a need for contribution to identify the exposure status at the workplace or when an enhanced treatment strategy is deemed necessary. Thus, the procedures are exclusively based on the assessment of the general practitioner, rather than following a standardised protocol. Furthermore, the involvement of occupational physicians as part of the legal and compensation system is only limited to situations where their expertise is deemed necessary, ensuring their input in cases where specific occupational health insights are required.[13]

4.3 | Strategies for advancing the reporting of HE

At the worker's level, education and awareness about HE significantly influence the cleaner's knowledge and disease perception toward HE. This would eventually also have an impact on the timely reporting of HE. Hairdressers are currently the only group of high-risk workers in Denmark, who receive OHE-related education nationwide through vocational Danish hairdressing schools; this has been so since 2011.[43] Despite education being shown to reduce the risk of OHE in hairdressers,[43] no similar educational program has yet been provided to professional cleaners in Denmark.

At the manager's level, it is important to recognise that fostering an open communication line between cleaners and management can facilitate the reporting process. The creation of this necessitates the creation of a secure working environment with the responsibility vested in the managerial role. The manager should not be perceived as an intimidating figure by the cleaners, but rather as an approachable individual with whom they feel comfortable sharing their concerns. In addition, the manager should emphasise the aim of reporting HE with occupational origin and the positive outcomes associated with reporting for cleaners. The institutional manager should also initiate implementations of preventive strategies to improve and minimise hazard exposure in the workplace. By ensuring this, the employment status might remain unaffected, and in the majority of instances, the cleaners may sustain their employment within the same workplace.

At the physician's level, the efforts to enhance the reporting of HE should focus on education and resource provision. Integrating more training modules on occupational dermatology into medical education programmes for general practitioners as well as dermatologists could contribute to recognising and reporting OHE effectively. In addition, developing and implementing standardised tools, such as templates or checklists, to recognise possible cases of HE with occupational origin, could streamline the reporting process by general practitioners. The German 'Dermatologist's report F6050' could serve as a model for identifying early work-related skin problems, possible causal relationships between these and the workplace, and notification of these.[44] By using this 'checklist' including questions about hazardous exposures such as wet work, protection measures (e.g., gloves), and morphology of skin lesions, the physicians can systematically document necessary information related to possible OHE cases. Such standardised tools not only facilitate consistent identification of OHE, but also streamline the reporting process. In Germany, dermatologists are responsible for more than 85% of notifications and reporting of OHE.[22,45] However, this responsibility seems mainly to be held by general practitioners in Denmark, who therefore could benefit from such tools. Regarding dermatologists as well as occupational physicians, utilising established diagnostic methods like the Mathias Criteria, which are known to both professions, could be a possible solution for avoiding under-diagnosis and ultimately underreporting of OHE.[22,46] By employing shared diagnostic standards, there is a likelihood of enhancing accuracy and completeness in identifying work-related health conditions.

Further, the establishment of a systematic referral process holds promise as a mechanism to enhance the early diagnosis and reporting of OHE. Implementing a system where patients presenting with HE, initially assessed by their general practitioner, are automatically referred to either a dermatologist or an occupational physician could serve as a strategic approach to redistribute the responsibilities of reporting OHE across multiple professionals. Further, introducing a financial incentive to the physicians who promptly report cases, might also result in a significant reduction in underreporting in Denmark as in Germany.[47]

At the political level, it may be worthwhile to explore the possibility of granting authorisation to managers responsible for high-risk workers like cleaners, enabling them to perform targeted risk assessments, especially addressing the potential occurrence of OHE among their staff. Performing a baseline assessment such as visual checks of the skin at the beginning of employment and later an annual skin assessment performed by individuals with occupational or dermatological expertise, could serve to monitor any changes or developments in the skin health. Ultimately, this would contribute to an increased incidence of reported cases with OHE. The Skin Surveillance Health Questionnaire and Clinical Assessment of Occupational Skin Disease Questionnaire developed and recommended by the National Health Service in the United Kingdom could act as a prototype when discussing the assessment of the skin.[48]

4.4 | Treatment

Nearly one-third of the cleaners whose self-reported HE was not reported had not received any treatment at all for their HE. An explanation could be the stigmatisation associated with acknowledging OHE. Some cleaners associate skin problems with the notion of workplace 'culture' and perceive skin changes to be a natural 'part of the

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job', and therefore neglect the disease and don't seek treatment. Only slightly over half of the cleaners reported the use of hand moisturiser, fewer than 50% used topical corticosteroid cream, and fewer than 3% used topical calcineurin inhibitors as treatment for their OHE. This is a matter of concern since these are the cornerstones of the treatment of OHE depending on the severity. The significance of reporting OHE extends beyond merely addressing compensation to workers. It facilitates access to specialised and relevant diagnostics, and more efficient treatment, contributing to better outcomes.

5 | STRENGTHS AND LIMITATIONS

To the best of our knowledge, this study is the first to investigate the underreporting of self-reported HE, perceived to be triggered or worsened by the cleaners' occupational duties, as an occupational disease to the authorities. The study includes a substantial number of cleaners from different hospitals and the response rate of the survey was high. However, it is crucial to approach the interpretation of our data with caution due to different common limitations of cross-sectional questionnaire-based studies including selection, recall, and healthy worker bias. HE and severity of HE were self-assessed, and not based on an experienced physician's evaluation. In our study, OHE was defined as HE that emerged during adulthood, perceived to be caused or exacerbated by occupational activities, and in which an improvement was observed during periods away from work. This is grounded in the recognition of cleaners as a high-risk group, facing a substantially elevated likelihood of experiencing OHE in comparison to the broader general population. While this definition proves to be more pragmatic for larger-scale epidemiological investigations, its implementation in real-world scenarios requires the initial collection of occupational history and subsequent diagnostic tests to ascertain its accuracy and relevance. The reporting of HE as an occupational disease relied on inquiries directed at professional cleaners rather than official healthcare records. However, given the fact that workers with suspected OHE are consistently engaged in the reporting process, it is highly unlikely that they would forget whether their condition was reported or not. The language skills of the participants were assessed through an individual conversation and questionnaire reading. However, this evaluation was not conducted using a validated tool officially endorsed by authorities for language assessment. Compliance and adherence to treatment may also be a limitation to the reliability of our conclusions. Finally, participants in our study were not obligated to provide details regarding their ethnic background. Considering that, a significant proportion of cleaners in Denmark have an immigrant background,[49] this would eventually have an impact on our results.

In conclusion, underreporting of self-reported HE, perceived to be induced or worsened by cleaner's occupational activities, as an occupational disease to the authorities, is a significant problem, that limits the compensation the workers are entitled to and reduces knowledge of the true prevalence of OHE. Underreporting may have a negative impact on treatment, access to diagnostics, and the development and implementation of preventative programmes for cleaners.

AUTHOR CONTRIBUTIONS

Farnam Barati Sedeh: Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; software; formal analysis; project administration; data curation. **Anna Glenn Ullum:** Investigation. **Karl Bang Christiensen:** Formal analysis; software; supervision; writing – review and editing. **Thórunn Elísabet Michaelsdóttir:** Writing – original draft; writing – review and editing; software; formal analysis. **Ole Steen Mortensen:** Conceptualization; investigation; funding acquisition; writing – original draft; writing – review and editing; supervision. **Gregor Borut Jemec:** Investigation; methodology. **Kristina Sophie Ibler:** Conceptualization; investigation; funding acquisition; writing – original draft; writing – review and editing; supervision; validation.

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CONFLICT OF INTEREST STATEMENT

Dr. Sedeh reported receiving grants from Pfizer. Dr. Jemec reported receiving grants from AbbVie, LEO Foundation, Afyx, InflaRx, Janssen-Cilag, Novartis, UCB, CSL Behring, Regeneron, Sanofi, Boehringer Ingelheim, Union Therapeutics and Toosonix and personal fees from Coloplast, Chemocentryx, LEO Pharma, Incyte, Kymera and VielaBio. Dr. Ibler has been part of advisory boards and received personal fees from Astra Zeneca, Leo Pharma, Sanofi Genzyme and Eli Lilly. Dr. Sedeh, Jemec, and Ibler declare that none of the mentioned conflicts of interest influenced the content of this manuscript. The rest of the authors do not have any conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

Applicable.

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