

Ten-year trends in occupational skin diseases in Singapore, 2009 to 2018: Experience of a tertiary referral center

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This 10-year retrospective study aims to provide updated information on occupational skin diseases (OSDs) in Singapore.

METHODS

Retrospective analysis was done on all patients with suspected OSDs who underwent patch testing at the National Skin Center, Singapore between January 1, 2009 and December 31, 2018. Patients were patch tested with a modified European baseline series following the protocol of the International Contact Dermatitis Research Group (ICDRG).¹ Additional series were tested when deemed relevant by the attending dermatologist.

RESULTS

In the study period, 526 patients were patch tested. Of these, 264 were diagnosed with OSDs. Irritant contact dermatitis (ICD) accounted for 55.3% of cases, followed by allergic contact dermatitis (ACD) in 43.1% and contact urticaria (CU) in 1.5% (Table 1). The three most common irritants were wet work/detergent, oil/grease, and occlusion, whereas the three most common allergens were chromate, resins, and rubber chemicals (Table 2). Atopy was seen in 34.8% of patients with OSDs (Supplementary Table 2). OSDs most frequently presented as eczema (87.1%) (Supplementary Table 3). Involvement of the hands was seen in 79.9% of patients (Supplementary Table 4). Latency data between commencement of occupation and onset of OSD was available for 257 of the 264 cases. Median latency was 475 days for ICD (n = 142), 323 days for ACD (n = 111), and 117 days for CU (n = 4).

DISCUSSION

The incidence of OSDs at our center has declined from 262.5 cases/year (1984-1985),² 93.8 cases/year (1989-1998),³ 62.5 cases/year (2003-2004),⁴ to 26.4 cases/year (2009-2018). There are several reasons for this. The majority of patients with OSD worked in goods-producing industries like metal/engineering and construction. In 1984, these industries accounted for 38.8% of gross domestic product; this declined to 27.7% in 2018.⁵ Tighter legislation may also have contributed to the reduction in OSDs. First announced in 2005 in Singapore, the Workplace Safety and Health Act introduced the requirement to report occupational diseases. It was initially enforced at factories in 2006 and gradually extended to all workplaces by 2011.

Allergy to rubber chemicals is seen in a large number of industries, reflecting the use of rubber products such as gloves to protect the hands. ICD from wet work/detergents is commonplace, seen in the majority of patients in the beauty/wellness, food/catering, health/pharmaceutical, cleaning, laundry, and transport industries.

Patients with OSDs had a higher prevalence of atopy compared to the general population (13.1%).⁶ This corroborates with studies that suggest an association between atopy, ICD,⁷ and ACD.⁸ The skin barrier disruption in atopic dermatitis results in a twofold increase in percutaneous penetration of contact irritants⁹ and allergens.¹⁰ The high incidence of hand involvement underscores the importance of adequate hand protection in preventing OSDs. The median latency for CU was much shorter than for ICD and ACD. We postulate the rapid onset of symptoms following occupational exposure lends to earlier recognition of CU by patients.

We hope that understanding the nature of OSD in Singapore as well as the sectors where it is prevalent will enable policy makers, employers, and clinicians to better care for patients with OSDs.

TABLE 1 Industry sectors and relative contribution to occupational skin diseases (OSDs)

Industry sector	Irritant contact dermatitis	Allergic contact dermatitis	Contact urticaria	Total
Metal/engineering	67	31	0	98
Building/construction	5	41	0	46
Health/pharmaceutical	28	6	0	34
Food/catering	21	4	4	29
Beauty/wellness	7	20	0	27
Cleaning/laundry	9	3	0	12
Others	4	5	0	9
Military/defense/conscript	4	0	0	4
Transport	1	2	0	3
Electrical/electronic	0	2	0	2
Total	146	114	4	264

TABLE 2 Frequency of irritants and allergens in patients with occupational skin diseases (OSDs)

Irritants	Number of patients positive	Percentage of patients positive (n = 146) (%)
Wet work/detergents	58	39.7
Oil/grease	23	15.8
Occlusion	19	13.0
Solvents	14	9.6
Coolants/soluble oil	12	8.2
Cement	5	3.4
Acids and alkalis	4	2.7
Others	13	8.9
Allergens	Number of patients positive	Percentage of patients positive (n = 114) (%)
Chromates	39	34.2
Resins	23	20.2
Rubber chemicals	14	12.3
Fragrances	11	9.6
Metals	8	7.0
Colophonium	8	7.0
Food	5	4.4
p-Phenylenediamine	4	3.5
Others	14	12.3

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare related to the work described in the manuscript.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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Supplementary Table 1: Top irritant and allergen in 5 most affected industry sectors and percentage of patients affected

Industry	Top Irritant	Percentage of Patients	Top Allergen	Percentage of patients
Metal/engineering	Oil/grease	25.4%	Resins	54.8%
Building/construction	Cement	40.0%	Chromates	82.9%
Health/pharmaceutical	Wet work/detergents	82.1%	Rubber Chemicals	50.0%
Food/catering	Wet work/detergents	90.5%	Food	62.5%
Beauty/Wellness	Wet work/detergents	57.1%	Fragrances	50.0%

Supplementary Table 2: Prevalence of Atopy in Patients with OSD

			Atopy History		Total
			Yes	No	
Diagnosis	Allergic Contact dermatitis		25	89	114
	Irritant Contact dermatitis		64	82	146
	Contact urticaria		3	1	4
Total			92	172	264

Supplementary Table 3: Clinical presentation of OSD

Presentation	Percentage of Patients
Eczema	87.1%
Pigmentary Changes	5.7%
Unknown	0.8%
Folliculitis	0.4%
Others	7.2%

Supplementary Table 4: Body regions involved in OSD

Region of involvement	Percentage of Patients
Hands	79.9%
Rest of Upper Limbs	42.8%
Feet	15.5%
Rest of Lower Limbs	17.8%
Face	4.9%
Rest of Head and Neck	9.8%
Trunk	11.4%
Axillae	0.8%
Groin	0.0%

