

## Characteristics of Allergic Contact Dermatitis Patients at The Dermato-Venereology Polyclinic of Prof I.G.N.G Ngoerah Hospital Denpasar

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### ABSTRACT

**Introduction:** Allergic contact dermatitis (ACD) is caused by a delayed-type hypersensitivity reaction to allergic contact. Allergic contact dermatitis can be caused by several factors including genetics, age, gender, occupation, and other comorbidities such as irritant contact dermatitis (ICD), atopic dermatitis, and chronic urticaria. **Objectives:** To evaluate the profile and prevalence of allergic contact dermatitis in the Dermato-Venereology Polyclinic of Sanglah Public General Hospital Denpasar during the period of January 2019 - December 2021. **Methods:** This is a descriptive study. The data were obtained from outpatients' medical records in the Dermato-Venereology Polyclinic of Sanglah Public General Hospital Denpasar during the period of January 2019 - December 2021. **Results:** There were 128 patients with female (112 patients) and male (86 patients) gender. The most common age group was 26-45 years, with 77 patients (39%), followed by the 46-65-year age group with 59 patients (30%). Most of the DKA were in the acute phase, 131 patients (66%). The most common cause of DKA was traditional oil which was found in 69 patients (35%), followed by detergent in 67 patients (34%). The most common location of DKA predilection was on the hands, in 69 patients (35%), followed by the body in 65 patients (33%), and feet in 54 patients (27%). **Conclusion:** In this study, ACD most often occurs in females at the age of 26-45 years old. Most patients had acute ACD. The most common allergen found was traditional oil. The most common predilection was hand.

**Keywords:** allergic contact dermatitis; characteristic; patients

### INTRODUCTION

Allergic contact dermatitis (ACD) is caused by a delayed-type hypersensitivity reaction to a contact allergen. The incidence of ACD is not clearly defined, but is thought to be increasing. A recent study found that all forms of contact dermatitis, including irritant contact dermatitis (ICD) and ACD, had a prevalence of 4.17% in the US.[1] North American Contact Dermatitis Group (NACDG) reports from 2009-2010 and 2011-2012, show that the prevalence of ACD has increased from 46.3% to 48.0%. The prevalence of ACD patients treated at RSUP Dr. Mohammad Hoesin Palembang, in 2008 reached 13.42%.[2]

Allergic contact dermatitis can be caused by several factors including genetics, age, gender, occupation, and other comorbidities such as irritant contact dermatitis (ICD), atopic dermatitis, and chronic urticaria.[2] ACD is the second most common type of contact dermatitis after irritant contact dermatitis (ICD), and can present with signs and symptoms similar to atopic dermatitis. The most common symptom is pruritus, accompanied by burning and stinging.

ACD generally presents acutely with erythematous, indurated papules and plaques, vesiculation, edema and bulla formation in severe cases. Chronic ACD can present with scaling, lichenification, and fissuring. ACD typically presents with a clear distribution, depending on exposure, usually involving the hands, face, or eyelids. However, irregular or diffuse distribution may occur due to secondary allergen transfer or systemic allergen sensitization.[1].

ACD is a classic type IV hypersensitivity reaction that requires two phases: sensitization and elicitation. In the sensitization phase, the allergen is captured by antigen-presenting cells (APCs), which migrate to the draining lymphoid tissue. Activation of naive T cells then occurs, leading to the differentiation of memory T cells specific for that allergen. In the elicitation phase, reexposure to the allergen or cross-reacting allergens results in activation of memory T cells. Cytotoxic T cells (Tc) 1 are activated and cause characteristic inflammation and adaptive immune responses resulting in dermatitis. The main sign of ACD inflammation is a T cytotoxic (Tc) 1 or Th1 response.

However, Th2, Th17, and Th22 responses appear to play a role in ACD, sometimes depending on the allergen. For example, nickel was found to be a potent inducer of Th1, Th17, and Th22 innate immune pathways, while fragrances and rubber promoted Th2 activity with little involvement of Th1 and Th17.[3]

This study aims to determine the profile and prevalence of allergic contact dermatitis patients at the Dermato-venereology Polyclinic of Prof I.G.N.G Ngoerah Hospital, Denpasar for the period January 2019 - December 2021.

#### METHODS

This research was conducted with a retrospective cross-sectional design using medical records of patients who came to the Polyclinic in the period January 2019 - December 2021 where the diagnosis was made from the history and physical examination.

Data taken in this study included gender, age, diagnosis of acute or chronic ACD, causative allergen and predilection.

#### RESULTS

There were 128 patients with female (112 patients) and male (86 patients) gender. The basic characteristics of the research subjects are presented in Table 1. The most common age group was 26-45 years, 77 patients (39%), followed by the 46-65-year age group with 59 patients (30%). Most of DKA were in the acute phase, 131 patients (66%). The most common cause of DKA was traditional oil which was found in 69 patients (35%), followed by detergent in 67 patients (34%). The most common location of DKA predilection was on the hands, in 69 patients (35%), followed by the body in 65 patients (33%), and feet in 54 patients (27%).

**TABLE 1:** Basic characteristics of research subject.

	Total	Percentage (%)
<b>Sex</b>		
Male	86	44
Female	112	56
<b>Age (years)</b>		
0-12	14	7
13-25	32	16
26-45	77	39
46-65	59	30
>65	16	8
<b>Duration</b>		
Acute	131	66
Chronic	67	34
<b>Allergen</b>		
Traditional oil	69	35
Jewellery	24	12
Detergent	67	34
Body lotion	28	14
Cosmetic	10	5
<b>Predilection</b>		
Hands	69	35
Feet	54	27
Trunk	65	33
Face	10	5

#### DISCUSSION

Based on the results of research conducted on ACD patients at the dermatovenereology polyclinic at Prof. I.G.N.G Ngoerah Hospital Denpasar in the period January 2019 - December 2021, significant differences were found between female and male patients. There were 112 female patients (56%) and 86 male patients (44%). A study at a clinic in Surabaya showed that more women experienced ACD than men.[5] Experimental studies have been conducted to investigate skin differences between the sexes, but the results are controversial.

One study found that women's skin thickness was thinner at all ages compared to men, due to lower collagen content, while studies on the stratum corneum (SC) – the skin's most important barrier layer – did not show a clear relationship between SC thickness and gender. One study analyzed stripping bands in both sexes and showed a significantly different SC protein composition between the sexes and another study showed a significantly thicker cellular epidermis in men compared with women, but the consequences of these findings in terms of skin permeability remain unclear. [6]

From the research, ACD patients were more often aged 26-45 years as many as 77 patients (39%). Another study at Farhat Hached University Hospital showed the average age of patients with ACD was  $38.9 \pm 10.8$  years.[7] In general, it remains unclear why it is common to observe a higher prevalence of contact dermatitis in the age groups between 30 and 34 years and 45 and 49 years. The time required to develop sensitization to one or more allergens as well as repeated exposure have been suggested as possible explanations. It is important to consider that both groups identified represent a large portion of the workforce, a characteristic described previously for this condition.[8]

The majority of patients were acute ACD, as many as 131 patients (66%). In ACD skin lesions, there are several different clinical phases, such as the erythematous phase with well-defined skin erythema or edema; and the madidans phase characterized by erosion and moistening. In the next stage, crusts appear, followed by the final stage, squamous, when the horny layer repairs itself. Acute ACD develops after 24-48 hours. Skin lesions are initially asymmetrical and limited to the contact area, but often spread/spread later. In cases of severe reactions, there is swelling and blistering. Of the common symptoms of ACD, itching is very visible. The main clinical differences between irritant contact dermatitis and allergic contact dermatitis are the more rapid onset of irritant contact dermatitis and the tendency of allergic contact dermatitis to spread. Usually broad reactions are usually symmetric, although primary reactions are not.[9]

The most common predilection for ACD was in the hands, which was found in 69 patients (35%). ACD typically presents with a clear distribution, depending on exposure, usually involving the hands, face, or eyelids. However, irregular or diffuse distribution may occur due to secondary allergen transfer or systemic allergen sensitization.[1] Research conducted at clinics in Surabaya also showed that the most common predilection was in the upper extremities.[5] This is also related to the cause of dermatitis where the first contact is on the hands.

From the research results, the most common causative agent for ACD was traditional oil, which was found in 69 patients (35%), followed by detergent in 67 patients (34%). Common allergen sources include nickel and other metals; personal care products (e.g., shampoo, cleanser, moisturizer, deodorant, and sunscreen); cosmetics, nail polish, and hair dye; topical medications (over-the-counter and prescription); plants (most commonly, poison ivy, oak, and sumac); rubber materials (e.g., gloves, shoes, elastic in clothing); and plastic and glue. The use of traditional oils is widely discovered due to the unknown content in traditional oils and the frequency of use compared to other ingredients.[10]

## CONCLUSION

From the results of this study, it can be concluded that ACD is more common in women aged 26-45 years. The majority of patients with ACD are acute. The most common causative agent is traditional oil. Most common predilection for hands.

## REFERENCES

- [1] Dermatitis in Patients with Atopic Dermatitis. *Am J Clin Dermatol*. 2018 Jun 1;19(3):293.
- [2] Anggraini DM, Sutedja E, Achadiyani A. Etiology of Allergic Contact Dermatitis based on Patch Test. *Althea Med J*. 2017 Dec 19;4(4):541-5.
- [3] Dhingra N, Shemer A, Correa Da Rosa J, Rozenblit M, Fuentes-Duculan J, Gittler JK, et al. Molecular profiling of contact dermatitis skin identifies allergen-dependent differences in immune response. *J Allergy Clin Immunol*. 2014;134(2):362-72.
- [4] Martin SF, Rustemeyer T, Thyssen JP. Recent advances in understanding and managing contact dermatitis. *F1000Research*. 2018;7.
- [5] Purworizky DA, Harijati E, Kartikawati LR. The Description Of Allergic Contact Dermatitis At Gotong Royong I Primary Clinic Surabaya. *J WIDYA Med Jr*. 2019 Aug 5;1(3):146-52.
- [6] Mauro M, Bovenzi M, Filon FL. Occupational contact dermatitis in a gender perspective: North East Italian data 1996-2016. *Med Lav*. 2021;112(1):34.
- [7] Kalboussi H, Kacem I, Aroui H, El Maalel O, Maoua M, Brahem A, et al. Impact of Allergic Contact Dermatitis on the Quality of Life and Work Productivity. *Dermatol Res Pract*. 2019;2019.
- [8] Sedó-Mejía G, Soto-Rodríguez A, Pino-García C, Sanabria-Castro A, Monge-Ortega OP. Contact dermatitis: Clinical practice findings from a single tertiary referral hospital, a 4-Year retrospective study. *World Allergy Organ J*. 2020 Jul 1;13(7).
- [9] Novak-Bilić G, Vučić M, Japundžić I, Meštrović-štefekov J, Stanić-Duktaj S, Lugović-Mihić L. IRRITANT AND ALLERGIC CONTACT DERMATITIS - SKIN LESION CHARACTERISTICS. *Acta Clin Croat*. 2018;57(4):713.
- [10] Adler BL, Deleo VA. Allergic Contact Dermatitis. *JAMA Dermatology*. 2021 Mar 1;157(3):364-364.