



UNIVERSITI TEKNOLOGI MARA

**PATCH TESTING IN SUSPECTED FACE ALLERGIC CONTACT DERMATITIS TO
COSMETICS IN A TERTIARY HOSPITAL: A PREVALENCE STUDY ON CAUSATIVE
COSMETIC ALLERGENS**

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TITLE PAGE

Title

Patch Testing in Suspected Face Allergic Contact Dermatitis to Cosmetics in a Tertiary Hospital: A Prevalence Study on Causative Cosmetic Allergens

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ABSTRACT

Background/Objective: Cosmetic contact dermatitis (CD) has been an increasing concern as many new products are introduced. The face is the most exposed to cosmetics which results in face dermatitis. We aimed to determine the prevalence of positive reactions to cosmetic allergens from standard and cosmetic patch test series among suspected face allergic contact dermatitis to cosmetic patients who attended HUiTM Dermatology Clinic.

Methods: A cross-sectional study was performed between June to December 2022 involving 49 patients aged between 18-30 years old. All patients underwent standard and cosmetic series patch testing. The results were according to the International Contact Dermatitis Research Group (ICDRG) protocol.

Results: Our study cohort compressed 93.8% patch test positivity rate either to standard, cosmetic or both series. There was a high prevalence (n=49, 85.4%) of positivity to cosmetic series alone. The most prevalent clinical presentation among suspected face CD was erythema (n=49, 25.2%) which cheek being the most frequently affected site (n=45, 40.5%). Facial and hair care products (n=45, 22.6% and 20.1%) respectively were the most suspected product causing allergic CD. Cosmetic patch test positivity was highest with preservative allergens (68%) predominantly to thimerosal (n=41, 8.1%) followed by sodium metabisulfite (n=41, 4.5%). Antioxidant allergens that probable cause CD were gallate mix (n=41, 7.2%) and dodecyl gallate (n=41, 5.4%). The most positive standard allergens were nickel(II) sulfate hexahydrate (n=32, 15.1%), textile dye mix (n=32, 15.1%), caine mix III and fragrance mix (n=32, 6.32%) respectively.

Conclusion: The most cosmetic related allergens identified were from preservative (68%), fragrance (45%), emulsifier (11%) and antioxidant (7%) groups. National multicentre registry data is required to support national cosmetic product legislation and to enhance public education.

Keywords: Cosmetic allergic contact, face dermatitis, patch test.

MAIN TEXT

INTRODUCTION

The cosmetics industry has expanded over the years with more new cosmetic-related allergens identified. In 2013, Malaysian spent about US\$407 million on cosmetics annually (1). The Federal Food, Drug, and Cosmetic Act (FD&C Act) defines cosmetics as substances that are rubbed, poured, sprinkled, sprayed, injected into, or otherwise applied to the human body for washing, beautifying, boosting attractiveness, or modifying the look (2). Available products include skin moisturisers, perfumes, lipsticks, fingernail polishes, eye and face makeup preparations, shampoos, hair colours, toothpaste, and deodorants (3).

Cosmetics contributed to 8-15% of suspected allergic contact dermatitis (ACD) patients. A cosmetic or cosmetic ingredient sensitizes 1-5.4% of the population (2). The face is the most prevalent location where cosmetic allergic contact dermatitis occurs (3, 4, 5). A recent survey among Malaysians on adverse cosmetic reactions indicated that over fifty percent involved the face (4). Facial dermatitis may affect the forehead, chin, cheek, eyes, eyelids, lips, nose or diffuse face (6, 7). Because patients self-diagnose, self-medicate, and self-treat by quitting suspected agents without seeking an expert opinion, the true global prevalence of cosmetic allergic contact dermatitis is likely higher than stated (4, 5, 8).

Antioxidants, preservatives, emulsifiers, fragrances and colouring agents are the four groups of cosmetic compounds that may cause allergic (9, 10). The clinical manifestations include itchiness, redness, burning, hyperpigmentation, hypopigmentation, swelling and pain (11). The potential clinical morphology presentations comprise a broad spectrum of the cutaneous reaction including erythema, scaling, hyperpigmentation, hypopigmentation, papules, plaques, pustules, contact urticaria, lichenoid eruptions and acneiform eruptions (4, 12).

The standard series and cosmetic series can detect more than 80% of the allergens responsible for dermatitis (13). The most common positive allergens and products used vary by country, time, and population (7, 14, 15, 16, 17). The agents include lipstick, hair dye, face cream, perfume and

shampoo as the most frequent culprits (2, 12, 18). According to published data, the most common allergens in Asian countries were abitol, gallate mix, thimerosal, and amerchol L 101. In contrast, methylchloroisothiazolinone /methylisothiazolinone (MCI/MI) and paraphenylenediamine (PPD) were the most common in European countries (16, 17). This study was to determine the prevalence of positive reactions to cosmetic allergens from standard and cosmetic patch test series in the dermatology referral centre in Selangor, in tandem with our clinical obligation to society.

METHODS

Study population

This cross-sectional study was conducted in the outpatient Dermatology Clinic, Hospital UiTM Puncak Alam between June to December 2022 with approval from the UiTM Research Ethics Committee (REC/06/2022 (PG/FB/13)). The study objective was to determine the prevalence of positive reactions to cosmetic allergens from both patch test series; standard and cosmetic. We also aimed to analyse the clinical presenting features of allergic face contact dermatitis by cosmetics, which include the skin symptoms, skin signs, dermatitis distributions and suspected causative agents.

In a study done among cosmetic users with rash and proven patch testing, 3.1% of 360 subjects had cosmetic contact dermatitis. Our study sample size was calculated using Open Epi including dropped out rate of 20% was 54 subjects (19). The subjects were recruited via convenience sampling. Patch tests were successfully performed on 48 consented patients over 18 years old, suspected or indicative of allergic face CD to cosmetic products.

Patients who were pregnant or lactating, had disseminated lesions, had solely endogenous face eczema, had an active face infection in the previous two weeks or had severe allergies were excluded. Patients with active endogenous eczema were atopic eczema (involvement of typical sites of atopic eczema, triggered by environmental factors, food, scratching, physical stress), erythroderma or seborrheic eczema (seborrheic area).