การแพ้เครื่องสำอางในกลุ่มผู้ป่วยที่มีผื่นผิวหนังอักเสบที่ใบหน้าและลำตัว: การศึกษาย้อนหลัง 5 ปี

พู่กลิ่น ตรีสุโกศล พ.บ., ไพลิน พวงเพชร พ.บ., ประณีต สัจจเจริญพงษ์ พ.บ.
สถาบันโรคผิวหนัง กรมการแพทย์ กระทรวงสาธารณสุข แขวงทุ่งพญาไท เขตราชเทวี กรุงเทพฯ 10400

Abstract: Contact Allergy from Cosmetics Among Patients with Eczema on Face and Trunk: A 5-years Retrospective Descriptive Study

Poohglin Tresukosol, M.D., Pailin Puangpet, M.D., Praneet Sajjacharoenpong, M.D.
The Institute of Dermatology, Department of Medical Sciences, Ministry of Public Health, Thung Phayathai Subdistrict, Ratchathewi, Bangkok, 10400
(E-mail: baybamster@gmail.com)
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Background: Adverse reaction to cosmetic products is underestimated as some patients seek no treatments. Allergic contact dermatitis (ACD) and irritant contact dermatitis (ICD) to cosmetic products, in which diagnoses can be done by patch testing, are common. Objective: to identify the type of cosmetic products and common causative allergens. Method: A retrospective study of medical records of the patients during 2015–2019 at The Institute of Dermatology, Bangkok, Thailand was conducted. Result: The total number of 425 medical records were analyzed, 39 of which were male, and 386 were female, with a ratio of M:F of 1:9.89. All patients had lesions on the face and trunk. They were all investigated by patch testing with a standard and cosmetic set of allergens and their cosmetic products. Diagnoses of allergic contact dermatitis was found in 398 cases; irritant contact dermatitis in 26 cases and others in 14 cases. One patient may have more than one diagnosis. The most common types of cosmetic products which induce ACD include cleansers, whitening, other products (not classified or patients' own products), moisturizers, and deodorants. The most common cause of allergen is Kathon CG in the standard set and gallate mix in the cosmetic set. Conclusion: Adverse reaction to cosmetic products is common. Patients' history and investigation help in diagnosis, management, and prevention of recurrence.

Keywords: Allergic contact dermatitis (ACD), Irritant contact dermatitis (ICD), Cosmetic products, Adverse reaction

บทคัดย่อ

ภูมิหลัง: การเกิดผลข้างเคียงจากเครื่องสำอาง ยังได้รับการประเมินต่ำกว่าความเป็นจริง เนื่องจากผู้ป่วยบางรายไม่พบแพทย์เพื่อรับการรักษา ผื่นผิวหนังอักเสบจากการสัมผัส (ACD) และผื่นผิวหนังอักเสบจากการระคายเคือง (ICD) ที่เกิดจากเครื่องสำอาง สามารถวินิจฉัยได้โดยการทำทดสอบแพทช์เทส (patch test) วัตถุประสงค์: เพื่อศึกษาถึงประเภทของผลิตภัณฑ์ และสารก่อภูมิแพ้ที่เป็นสาเหตุของการผื่นผิวหนังอักเสบที่เกิดจากเครื่องสำอาง วิธีการ: การศึกษาย้อนหลังจากเวชระเบียนผู้ป่วย สถาบันโรคผิวหนัง กรุงเทพฯ ระหว่างปี 2015-2019 ผล: เวชระเบียนทั้งหมด 425 แฟ้ม เป็นผู้ป่วยเพศชาย 39 ราย เพศหญิง 386 ราย สัดส่วนเพศชาย:หญิง = 1:9.89 ผู้ป่วยทั้งหมดมีรอยโรคที่ใบหน้าและลำตัว และได้รับการทำทดสอบแพทช์เทสกับสารทดสอบชุดมาตรฐานและสารทดสอบในกลุ่มเครื่องสำอาง พบว่า มีผื่นผิวหนังอักเสบจากการสัมผัส 398 ราย ผื่นผิวหนังอักเสบจากการระคายเคือง 26 ราย และโรคอื่น ๆ 14 ราย ผู้ป่วย 1 รายอาจได้รับการวินิจฉัยมากกว่า 1 โรค ผลิตภัณฑ์ที่เป็นสาเหตุของผื่นผิวหนังอักเสบจากการสัมผัสที่พบบ่อย คือ ผลิตภัณฑ์ทำความสะอาด ผลิตภัณฑ์ที่ทำให้ผิวขาว และอื่น ๆ ที่ระบุไม่ได้ และเป็นผลิตภัณฑ์ของผู้ป่วย สารก่อภูมิแพ้ที่เป็นสาเหตุที่พบบ่อยในชุดทดสอบมาตรฐานคือ Kathon CG ในชุดที่เป็นเครื่องสำอาง คือ Gallate mix สรุป: การเกิดผลข้างเคียงจากเครื่องสำอางยังพบได้ การซักประวัติ และการตรวจเพิ่มเติมจะช่วยในการวินิจฉัย รักษา และป้องกันการกลับเป็นซ้ำ

คำสำคัญ: ผื่นผิวหนังอักเสบจากการสัมผัส ผื่นผิวหนังอักเสบจากการระคายเคือง เครื่องสำอาง ผลข้างเคียง

Cosmetic products are commonly used in the daily life of both women and men. These products may contain allergens which induce the reaction on the skin. The average of 12 cosmetic products used daily by women and 7 by men were mentioned.[1] Allergic contact dermatitis (ACD) is one of the common adverse reactions from these products. The other form includes irritant contact dermatitis (ICD). The incidence varies depending on each study. The most common causes of allergic contact dermatitis are fragrances and preservatives.[2] Moisturizer is considered safe among cosmetic products. A study by Zirwas and co. reported 68% of fragrances as the most common cause of ACD from moisturizers.[3] Fragrance mix I can detect about 70 to 80% of fragrance allergy cases.[2] False positive from fragrance mix I can be detected by 17.7% according to sensitization to the emulsifier.[1] The study by Boonchai W showed that fragrances and preservatives are the most common cosmetic-related allergens in Thailand from 1999 to 2008.[4] From that study, it was found that the only allergen which showed a significant increase in the incidence of cosmetic allergy is ammoniated amalgam.[2] The sensitization is high in the age group of 36–50 years (p = .04). The second most important marker to detect fragrance allergy is fragrance mix II.[1]

Preservatives added to cosmetic is used for preventing biological degradation of the products. The most widely used preservative in cosmetic is paraben, which is effective over a wide pH range, without any sensitizing capacity.[1] A study of 1,000 cosmetic and skin care products in Thailand showed the three most common preservatives are found; paraben, methylchloroisothiazolinone (MCI)/ methylisothiazolinone (MI), and MI alone respectively.[5] None of the investigated products are free from preservatives. Fast IM reported the prevalence of contact allergy to formaldehyde of 1 to 1.5% in a 10-year study.[6] ontact allergy in children is common but underdiagnosed. A study by Simonsen AB and co. showed statistically significant increase in fragrance and isothiazolinone contact allergy among Danish children.[7]

Objectives

The objective of our study is to identify the type of cosmetic products which is the cause of the adverse reaction and common causative allergens in cosmetic products during 2015–2019 at The Institute of Dermatology, Bangkok, Thailand.

Materials and Methods

A retrospective descriptive study was conducted. Medical records of patients who had dermatitis on the face and trunk investigated by patch testing from 2015-2019 were included for the analysis. The study was approved by The Human Research Ethics Committee, The Institute of Dermatology. The inclusion criteria included the patients who had the diagnosis of dermatitis, allergic and irritant contact dermatitis with the lesion were found on at least at the face and trunk. All patients were investigated by patch test with standard, cosmetic set of allergens (European international set) and patients' own products. The patch test result at 48 and 96 hours was recorded according to The International Contact Dermatitis Researches group (ICDRG) criteria. The medical records with other definite diagnoses i.e., discoid lupus erythematosus, cutaneous infection from bacteria, virus and fungus were all excluded.

Demographic data of sex, occupations, atopic history, history of cosmetic product using, type of the lesion, site of involvement, detail of cosmetic products, and patch test result were collected in data record forms. The cosmetic products were grouped as anti-aging, base/ base cream, cleansers, deodorants, hair dye, lipstick, moisturizers, nail products, perfumes, powder cake, remedies, sunscreens, whitening and others. The data were analyzed in Excel spreadsheet.

Results

Total number of 425 medical records between 2015–2019 fit in with the inclusion criteria. Among these, 39 cases were male, 386 were female, with the ratio of M:F of 1:9.89. There was an increasing trend in female patients. Most of the patients were employees, followed by housewives, office workers, and students. History of allergic rhinitis was found to be the first common atopic background, followed by atopic dermatitis and asthma, respectively. Urticaria was found in only one case. All patients had the lesion on the face and some on the other sides of the trunk, extremities in which are related to the history of cosmetic product usage. (Figure 1) The

most common diagnosis was ACD. The common clinical presentations were eczema, hyperpigmentation, and acne. No clinical manifestation of irritation was found in the study. (Figure 2) Stinging was a common symptom reported by the patients. (Figure 2) No record of pain and burning sensation was found. The most common top three sites of involvement were face, hands and trunk. In our study, there was no record of involvement only at the cheek. The face seems to be the increasing site of involvement by year. The patch test result with cosmetic set of allergens were shown in Figure 3. The most common causative cosmetic products which induced skin reaction were cleanser, whitening, other products (not classified or patients' own products), moisturizers and deodorants. (Figure 4) The other categories were perfumes, hair dyes, sunscreens, powder cake, anti-aging products, lipstick, remedies, base creams, and nail products.

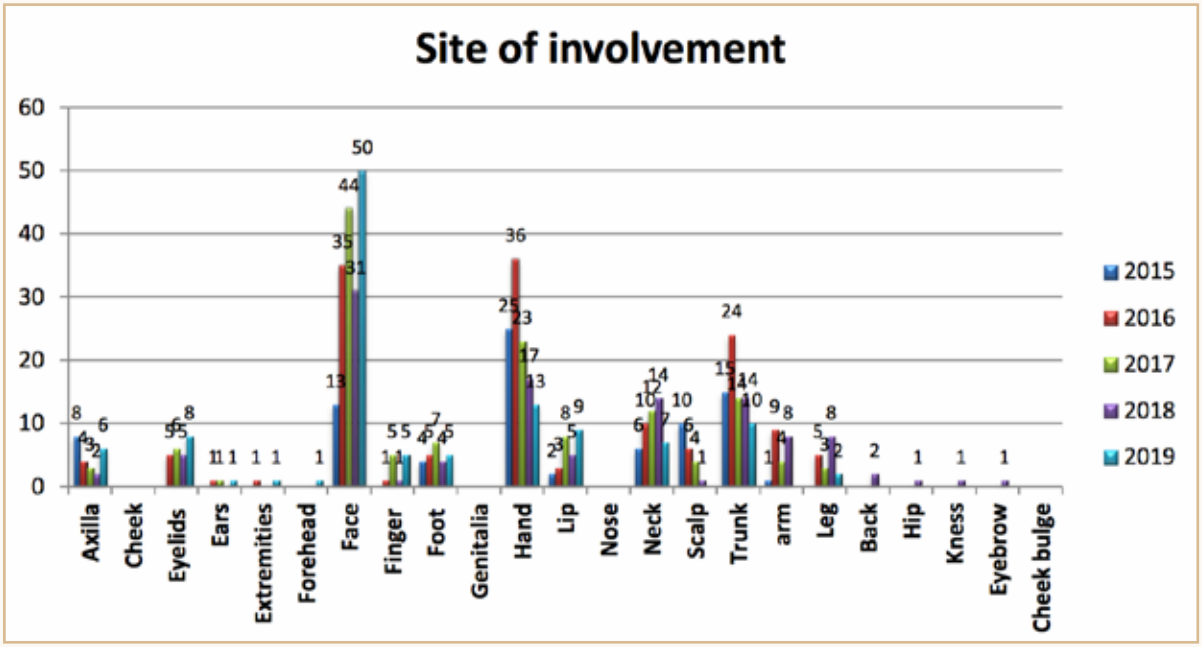

Figure 1: Number of Involvements from 2015-2019 by Sites of Involvement. (Note: Number of Involvements are recorded per each detections on the patients, as the patients can have more than one sites)

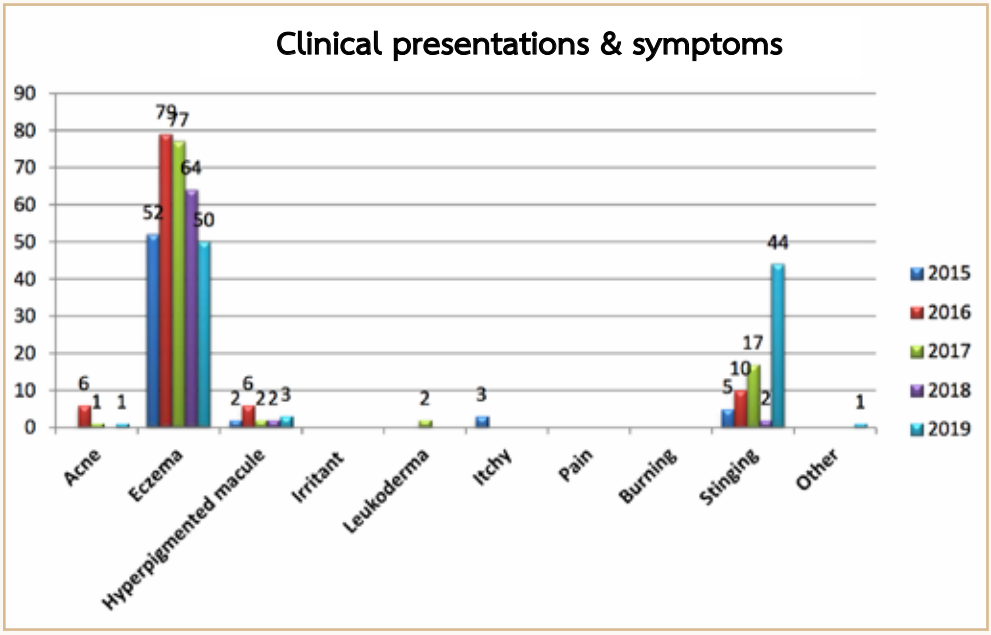

Figure 2: The number of clinical presentations & symptoms from 2015-2019 reported by the patients, by type of symptoms.

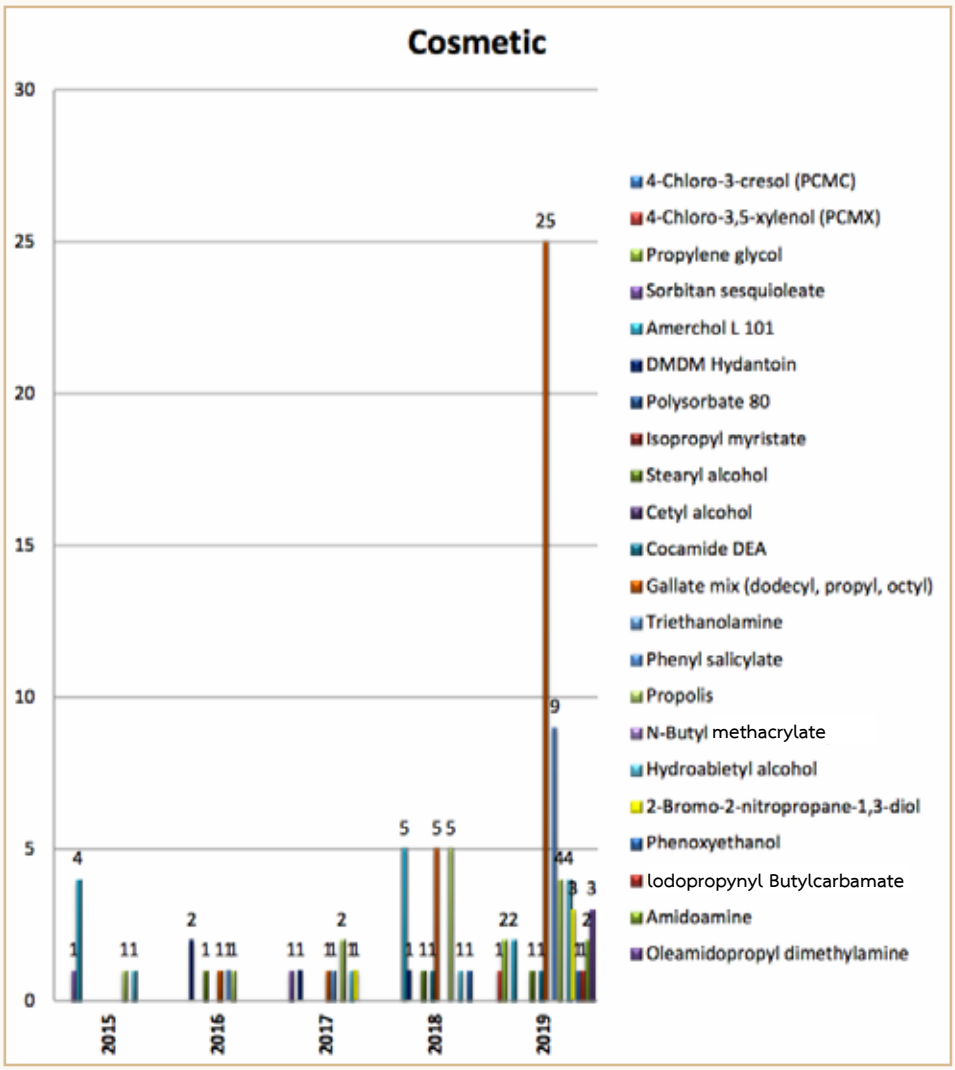

Figure 3: The number of positive patch test results with cosmetic set of allergens from 2015-2019, by type of allergens.

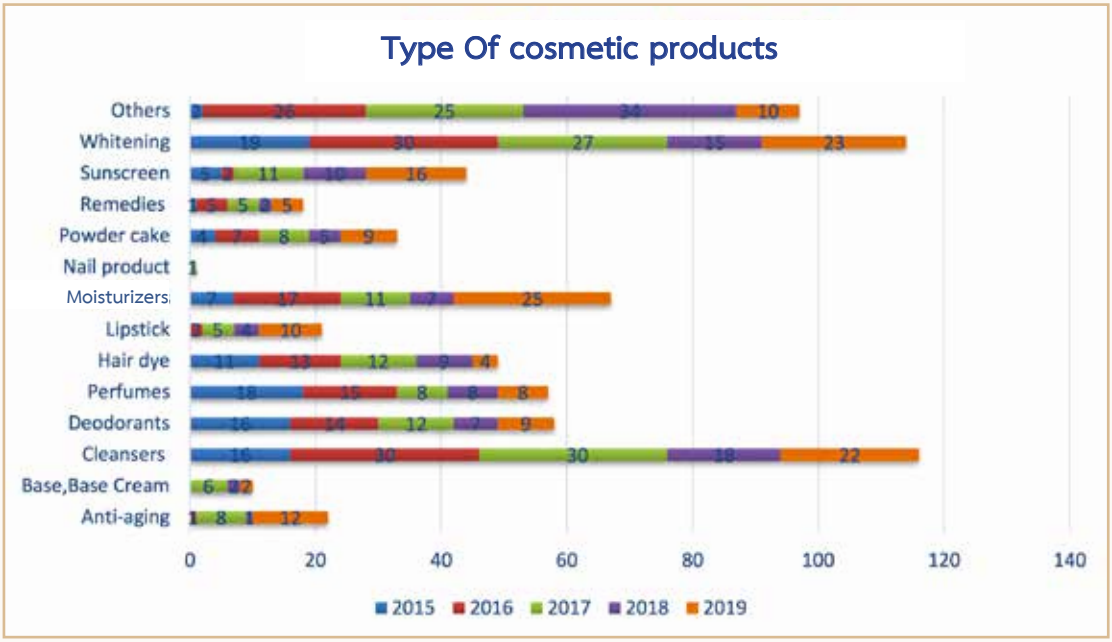

Figure 4: Type of cosmetic products defined as the cause.

Discussion

Cosmetic products are used daily to improve people's appearance, personal hygiene, thus, they shouldn't be harmful to the body and skin.[8] The most common adverse effect from cosmetic is irritant dermatitis.[9] Cosmetic-induced ACD is still common in practice and increasing.[2] The increasing use of cosmetics carries the risk of ACD.[9] The route of allergen contact to the skin is by direct application of the cosmetics. Other possibilities are by air-borne contact, transfer by fingers or hand, allergen-contaminated surface, used by friends or partners and photo-induced ACD. The clinical of allergic reaction includes ACD (delayed type hypersensitivity) and contact urticarial (immediate type reaction) may develop.[2] The diagnosis is made by history taking, physical examination and investigation. The investigations include patch testing, open or semi-open test and repeat open application test (ROAT). The most common causative allergens of cosmetic ACD are fragrances and preservatives. Cinnamal, sorbic and benzoic acid are the examples of allergens which can induce non-immunologic contact urticaria (NICU).[2]

The incidence of adverse reaction due to cosmetic products is underestimated as most of the patients with mild symptoms do not consult with physicians.[1] The most common types of cosmetic products which induced ACD are hygiene products, moisturizers, make-up, hair products and nail products. Causative allergens are preservatives and fragrances.[9] A report from Korea by Cheong SH. et al. demonstrates that only 20% of 74 constituents are included in the cosmetic set of allergens and are identified in the cosmetics market. Some of these such as fragrance, vehicle, surfactant is missing.[10] Irritation is the most adverse reaction, which is reported from about 2% of the customers, while ACD is less than 10%. The most frequently reported allergens are still fragrances and preservatives. The types of product are skin care products, hair products, make up and nail polish, respectively. Skin care products show the highest positive patch test result. A study of cosmetic preservative labelling on the Thai market by Bunyavaree M. and Co. shows that 80.3% of cosmetic products in Thailand are international brands, in which 87.6% contain non-formaldehyde-releasing preservatives (non-FRPs), 4.2% formaldehyde-releasing preservatives (FRPs), and 8.2% with both. Diazolidinyl urea is also commonly found in leave-on products sold in Thailand.[5] In our study, the most common diagnosis is ACD which is different from 10% of ACD found in the study of Cheong SH. Among these, the investigation by patch testing helps with the diagnosis of ACD from provisional diagnosis of ICD in 29 cases, 8 being dyshidrosis and 17 being other issues. The remaining are not related to allergic or irritant to cosmetic products. The most common clinical presentation is eczema, in which the reported symptom of itch is only in 3 cases. Stinging

reported on 44 cases was the most common symptom. This might explain that itchy sensation may not be intense enough compared to stinging and thus underrecognized by most patients. We have found that cleanser is the most common cosmetic products which induce the allergic reaction, followed by whitening products and patients' own products. The most common cause of ACD is preservative and diazolidinyl urea is the most common allergen inducing allergic reaction in the standard set and gallate mix in the cosmetic set. According to Bunyavaree M. and co's study, paraben is most frequently found in six categories of cosmetic and skin care products. In addition, MCI and MI are most commonly observed in body cleanser and hair care product.[5] Diazolidinyl urea, commonly found preservative in leave-on products sold in Thailand, can be the source for sensitization.

The types of cosmetic products in our study were classified to be anti-aging, base creams, cleansers, deodorants, perfumes, hair dyes, lipsticks, moisturizers, nail products, powder cake, remedies, sunscreens, whitening and patients' own products. Cleanser is the most common type of cosmetic product which induced ACD—about 16.4%, followed by whitening product 16.1% and patient's own product 13.7%. Cleansers is the commonly used daily cosmetic product; thus, it may explain why it is the most common type among cosmetic group.

Whitening products have been increasingly used. This type of product is found to be the second most common product in our study which is reported to be the cuase. The ingredients of the product may include vitamin A and its derivatives, vitamin C, vitamin E, and sunscreens. Further investigation and data monitoring may be needed to observe the possible common causative allergen in the near future.

The NACDG data from 2013-2014 reported a 7% positive patch test to formaldehyde, which represents the ninth most common allergen for ACD. Quaternium-15 showed the highest incidence among the group of formaldehyde releaser which is the same to our study. Kathon CG was found to be the most common positive allergen in the standard set of patch testing during our study period (data from The Institute of Dermatology). The most common type of cosmetic products which is related to positive patch test reaction in our study is cleansing products. Further investigation with the detail of the ingredient in these group of cosmetic products may need to be explored to reduce the incidence of ACD.

Benzophenone-3 was found in lipsticks, make-up, creams, and lotions as UVR absorber. ACD to this allergen was found in 0.5-0.7%, related to some patients who used these groups of products.[11] In our study, Benzophenone was not included in the cosmetic set of allergens, this might explain why there was no case of ACD to this allergen among the patients who developed the lesion on face and trunk. Compared to a study from Thailand by Boonchi W and co. during 1999 to 2008, in which the causative allergens from cosmetic were fragrances and preservatives, we found that the most common causative allergen is gallate mix in which still be the preservative in cosmetic product. Further studies with more numbers of patients may be needed to identify that the trend of causative allergen from cosmetic is changing or not.

The most common top three sites of involvement were face, hands, and trunk. This might explain as the face was the major site for the application of the cosmetic. Site involvement at the cheek was not reportedly found in this study. Further in-depth study is recommended to determine whether there is a direct cause-effect relationship between the cosmetic agents and the application at the cheek area. Hands, trunk and the other sites of the body might develop the clinical due to the transfer of the allergens by hands. The axilla represents the site which develops the lesion from deodorants group.

Conclusion

Adverse reaction from cosmetic products is still underestimated, under-recognized and under-investigated. The common allergens in each group of the cosmetic products may need to be considered among patients who reported the signs and symptoms on the skin after usage. Patients' history, product details, the way of application, duration of use, and physical examination help for the diagnosis and management. Investigation with patch testing is necessary to identify the potential causative allergens and prevent recurrences. Consideration about the possibility of ACD among cosmetic adverse reaction during practice, which refers to patch testing, may be needed during the development of the cosmetic ingredients in cosmetic products.

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