

Questionnaire Study of the Prevalence of Allergic Contact Dermatitis from Cosmetics in Israel

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Background: The prevalence of cosmetics-related contact dermatitis is rising, owing mainly to the wider use of cosmetics by the public and the routine diagnostic use of patch tests.

Objective: To determine the prevalence of cosmetics allergy in Israel.

Methods: A questionnaire was distributed to a random sample of 360 female customers of pharmacies and beauty salons in two areas of the country. Items included general health profile, family history of atopy, occurrence of rash due to patch-test-proven cosmetics allergy, anatomic sites of the rash, subjective aspects regarding the rash, and cosmetics consumption habits.

Results: Patient age ranged from 15 to 89 years. Eleven subjects (3.1%) had patch-test-proven cosmetics allergic contact dermatitis. There was a correlation between proven cosmetics allergy and subjective sensitivity to facial cream ($p = .03$).

Conclusions: The 3.1% prevalence rate of cosmetics contact allergic dermatitis in a randomly selected population in Israel is similar to values reported in the literature (about 2%). The higher-than-expected rate of subjective sensitivity to facial cream among patients with proven cosmetics allergy may be explained by the wide use of facial cream, facial skin susceptibility to insult, and the relatively long duration of contact of facial cream (a leave-on product) with the skin.

ALTHOUGH COSMETIC PRODUCTS are generally safe, adverse dermatologic effects are not impossible. It is difficult to estimate trends in the prevalence of allergic contact dermatitis from cosmetics because of the rise in cosmetics consumption on the one hand¹ and the continuous improvements in premarket testing techniques on the other. Furthermore, the routine use of patch tests for the diagnosis of cosmetics allergy is increasing. Accordingly, the rates of cosmetics-induced contact dermatitis reported in the literature vary widely among studies. Their comparison should take into account, in addition to the above factors, the sample source (namely, the general population or patients attending contact dermatitis clinics).

In studies conducted among subjects with known contact dermatitis, Adams and Maibach² reported a 5.4% rate of cosmetics allergy (713 of 13,216 patients); de Groot,³ in a smaller study, reported a 4.2% rate (75 of 1,781 patients). In another study, de Groot and colleagues⁴

questioned 1,609 individuals about reactions to cosmetics and toiletries. Although 12.2% claimed to have had dermatologic side effects from cosmetics, none of those who were patch-tested proved to be allergic. de Groot and another group of colleagues⁵ also interviewed 982 clients of beauticians; 254 (25.9%) claimed to have experienced adverse effects from cosmetics. Of the 150 who were patch-tested, only 2% had a clinically positive result, and most of the reactions were of an irritative nature. A relatively high rate of allergic dermatitis from cosmetics (28.6%) was reported in a Danish population, but no patch tests were performed.⁶ In a retrospective study⁷ of 819 patch-tested patients from Belgium, 36.3% had allergic contact dermatitis from one or more cosmetic ingredients. In a recent retrospective study of 10,061 patch-tested patients performed in the United States, 23.8% of females and 17.8% of males had at least one allergic patch-test reaction associated with a cosmetic source.⁸

Specifically, the worldwide reported prevalence of allergy to fragrances in general rose to 8.4% from 4.1% in the 1980s, and rose to 13.3% from 9.9% in the 1990s.^{9–14} The only exception is a study from the United Kingdom in which the rate of fragrance allergy remained constant at approximately 8% throughout a 16-year period (1980 to 1996).¹⁵

A recent study from Israel found that 32.8% of patients with clinically suspected contact dermatitis from cosmetics had a positive response on patch testing with one or more

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allergens in the cosmetic series.¹⁶ The present study is the first to examine the prevalence of cosmetics-induced allergic contact dermatitis among the general Israeli population. This study also sought to identify anamnestic, anatomic, or cosmetic product-related factors that may contribute to an allergic response.

Patients and Methods

Study Population

We performed a health interview survey of a random sample of 360 female subjects who used pharmacies and beauty salons in two geographic regions (coastal and mountain) in Israel. Patients were patch-tested according to the European Standard patch test series (Chemotechnique Diagnostics, Malmö, Sweden). Each test substance was placed in a Haye's test chamber (Haye's Service BV, Alphen aan den Rijn, the Netherlands) and applied with Micropor surgical tape (3M Health Care, St. Paul, MN) to the upper back. The strips were removed on day 2, and readings were taken on day 2 and day 3, according to the criteria of the International Contact Dermatitis Research Group.

Questionnaire and Definitions

The participants were interviewed in person at pharmacies and beauty salons by one of the authors (A.T.). The questionnaire design is outlined in Table 1. Items included general health profile, family history of atopy, occurrence of rash due to patch-test-proven allergy to cosmetics, anatomic sites of the rash (if any), subjective aspects regarding the rash (if any), and cosmetics consumption habits.

Statistical Analysis

Data were stored with *Excel 97* software with Hebrew language support (Microsoft Corporation, Redmond, WA) and analyzed with *SPSS* software (SPSS Inc., Chicago, IL). Continuous variables (eg, subject age, duration of rash) were recorded as mean $\pm$ standard deviation. Categorical variables, (eg, presence or absence of specific sensitivities) were described by frequency distributions. The *t*-test for independent samples was used to detect differences in the means of continuous variables between subjects with and without cosmetics allergy. The chi-square test (exact, two-sided *p* value, when calculable) was used to detect

Table 1. Questionnaire Design

Age
Medical history
Medicaments
Atopic background
Familial atopy
Former rash (yes/no)
Location of rash
Duration of rash
Examined by a physician (yes/no)
Physician specialty
Diagnosis
Treatment
Diagnostic tests (performed/not performed)
Kind of tests (patch, prick, or both)
Test result
Subjective sensitivity
Cosmetic consumption habits (fragrance-free, without alcohol, etc.)
Cosmetic products selection (cosmetician recommendation, brand name, price, advertisements, etc.)

differences in categorical variables by sensitivity to cosmetics. All tests were considered significant at $p < .05$.

Results

The ages of the participants ranged from 15 to 89 years (mean, 46.6 ± 1.6 years). Eleven (3.1%) of the 360 women who were surveyed reported a rash attributable to patch-test-proven allergic contact dermatitis from cosmetics. The mean age of this subgroup was 52.6 ± 2.3 years, and the mean duration of the rash was 100.6 ± 24.0 days. There were no statistically significant differences between the allergic and nonallergic subjects in age, atopic background, family history of atopy, anatomic site of rash, or cosmetics consumption habits. Background diseases and use of medications did not significantly influence the results.

The only variable found to differ significantly between the groups was subjective sensitivity. Specifically, prior to patch testing, more subjects who were later found to have allergy to cosmetics assumed they had a subjective sensitivity to facial cream ($p = .038$).

Discussion

Allergy to cosmetics is on the rise, probably owing to the ubiquitous use of cosmetics in modern society and the

growing market for cosmetics use.¹⁷ Although there was an increasing trend of reactions to fragrance mix I (FM I) in North America from the late 1980s to the middle 1990s, the North American Contact Dermatitis Group's data from 2003 to 2004 shows reactions to FM I to be declining in North America.¹⁸ This may be due to a real decrease in fragrance allergy. Alternatively, changes in the formulations of fragrances used in cosmetics could make FM I less ideal than previously for patch testing, yielding false-negative results. Nevertheless, there are very few reports on the prevalence of rash due to cosmetics allergy in the general population. In only one study were subjects who reported an assumed cosmetics-related rash patch-tested; 2% had positive results.⁵ In our study, a similar percentage (3.1%) was documented. Naturally, reports from patch-test clinics report a higher rate. The true prevalence is probably still higher because not all patients consult a physician.¹⁹

Another interesting finding of our study is the significantly higher-than-expected rate of subjects with proven allergy to cosmetics who had a subjective sensitivity to facial cream. This might be explained by the popularity of the product and its wide use. Alternatively, facial skin is considered one of the areas most susceptible to allergic assault. Furthermore, facial cream is a leave-on product, so the duration of contact with the skin is relatively long. We also suspect that the preservative and emulsifying agents in facial cream could accumulate on the skin and reach a sensitizing level.²⁰

Improved cooperation between dermatologists and companies that manufacture skin care products is necessary to lower the risk of cosmetic allergy.

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References

1. European Cosmetic Toiletry and Perfumery Association (COLIPA). COLIPA market statistics, 1982-1997. Available at: <http://www.colipa.eu> (accessed 2003).
2. Adams R, Maibach HI. A five year study of cosmetic reactions. *J Am Acad Dermatol* 1985;13:1062-9.
3. de Groot A. Contact allergy to cosmetics: causative ingredients. *Contact Dermatitis* 1987;17:26-34.
4. de Groot A, De Nater J, Van der Lende T, Rijcken B. Adverse effects of cosmetics and toiletries. A retrospective study in the general population. *Int J Cosmet Sci* 1987;9:255-9.
5. de Groot AC, Beverdam EG, Ayong CT, et al. The role of contact allergy in the spectrum of adverse effects caused by cosmetics and toiletries. *Contact Dermatitis* 1988;19:195-201.
6. Johansen JD, Andersen TF, Thomsen LK, et al. Rash related to use of scented products. A questionnaire study in the Danish population. Is the problem increasing? *Contact Dermatitis* 2000;42:222-6.
7. Kohl I, Blondeel A, Song M. Allergic contact dermatitis from cosmetics. *Dermatology* 2002;204:334-7.
8. Warshaw EM, Buchholz HJ, Belsito DV, et al. Allergic patch test reactions associated with cosmetics: retrospective analysis of cross-sectional data from the North American Contact Dermatitis Group, 2001-2004. *J Am Acad Dermatol* 2009;60:23-38.
9. Johansen J, Menné T, Christophersen J, et al. Changes in the pattern of sensitization to common contact allergens in Denmark between 1985-1986 and 1997-1998, with a special view to the effect of preventive strategies. *Br J Dermatol* 2000;144:490-5.
10. Lim JT, Goh CL, Ng SK, et al. Changing trends in the epidemiology of contact dermatitis in Singapore. *Contact Dermatitis* 1992;26:321-6.
11. Lunder T, Kansky A. Increase in contact allergy to fragrances: patch test results 1989-1998. *Contact Dermatitis* 2000;43:107-9.
12. Larsen WG. Detection of allergic dermatitis to fragrances. *Acta Derm Venereol Suppl (Stockh)* 1987;134:83-6.
13. Marks JG, Belsito DV, DeLeo VA, et al. North American Contact Dermatitis Group patch test results 1996-1998. *Arch Dermatol* 2000;136:272-3.
14. Marks JG, Belsito DV, DeLeo VA, et al. North American Contact Dermatitis Group test results for the detection of delayed-type hypersensitivity to topical allergens. *J Am Acad Dermatol* 1998;38:911-8.
15. Buckley DA, Wakelin SH, Seed PT, et al. The frequency of fragrance allergy in a patch test population over a 17 year period. *Br J Dermatol* 2000;142:279-83.
16. Trattner A, Farchi Y, David M. Cosmetics patch test: first report from Israel. *Contact Dermatitis* 2002;47:180-1.
17. Scheinman PL. Prevalence of fragrance allergy. *Dermatology* 2002;205:98-102.
18. Warshaw EM, Belsito DV, DeLeo VA, et al. North American Contact Dermatitis Group patch-test results, 2003-2004 study period. *Dermatitis* 2008;19:129-36.
19. Wolf R, Wolf D, Tuzun B, Tuzun Y. Contact dermatitis to cosmetics. *Clin Dermatol* 2001;19:502-15.
20. Doooms-Goossens A. Cosmetics as causes of allergic contact dermatitis. *Cutis* 1993;52:316-20.