

Dermatoses Due to Cleaning and Cosmetic Products



Healthcare

Keywords: dermatis, cosmetics, cleaning products.

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Abstract

Dermal exposure to hazardous agents can result in a variety of skin diseases including dermatoses. Cosmetics and household cleaning products often contain potential allergens and irritants. The aim of the study was to determine the frequency of dermatoses due to cosmetics and cleaning products in Elbasani district. This is a prospective study including 864 ambulatory patients with dermatoses presented to the Dermatology Clinic of primary health care service in the district of Elbasan from January 2012 to December 2014. Data on sociodemographic characteristics, variables related to lifestyle and to the temporal factor, the type of contact dermatitis, location and etiological factors were gathered through a structured questionnaire concerning their use of cosmetics and skin care products and household washing and cleaning products. Of 864 patients included in the study. The mean age of patients was 42.3 ± 14.2 years old (range 23 – 61), with majority of them 657 (79%) of them living in urban area $p < 0.05$. There were significantly more females 726 (84%) than males 138 (16%) participating. The female/male ratio was 5.2:1. In total 562 (65%) patients reported adverse reactions. Dermatoses to cosmetics or skin care products 311 (36%) reported while 251 (29%) reported reactions to household washing and cleaning products. The most frequently reported locations of dermatitis were face (40%), hands (35%), arms (16%), lower limbs (9%). In the patch test evaluation, 354 (63%) out of total patients with dermatoses had positive tests. It is important to include exposure to such products in the patient's case history and to discuss this aspect in the preventive information given to eczema patients.

Introduction

Dermal exposure to hazardous agents can result in a variety of skin diseases including dermatoses. Cosmetics and household cleaning products often contain potential allergens and irritants. Cosmetics are substances applied to the skin (makeup and moisturizer), hair (conditioners), or nails (polish and lacquer) designed to enhance appearance (1,2). Cosmetics do not produce any sort of biological effect. They contain additives which augment their odor (perfumes), physical form (emulsifiers), color (pigments), and inhibit their degradation (preservatives) as well as variety of inert materials. They also may contain a variety of exotic botanical substances for which the manufacturer may ascribe some vague benefit. Detergents are used by almost every household in the developed and developing world. The resultant eczema, predominantly localized to the hands following irritation, is very distressing and incapacitating. Females working with detergents at home and in occupations involving exposure to such detergents bear the brunt (3). In spite of advertising claims of relative mildness of a particular detergent powder, most of these patients are likely to be atopic who have defective barrier function and thus are more prone for skin irritation (4). Anionic surfactants, an active ingredient of detergents make the water more effective when cleaning, but act by increasing the permeability of the horny layer of the skin and with little or no inflammatory change leads to severe scaling without much erythema, disrupting the stratum corneum barrier function and finally end up in dermatitis (5,6). Dermal absorption is the transport of a chemical from the outer surface of the skin both into the skin and into the body. Studies show that absorption of chemicals through the skin can occur without being noticed by the worker, and in some cases, may represent the most significant exposure pathway. Many commonly used chemicals in the household could potentially result in systemic toxicity if they penetrate through the skin (i.e. washing and cleaning products, organic solvents). These chemicals enter the blood stream and cause health problems away from the site of entry. The rate of dermal absorption depends largely on the outer layer of the skin called the *stratum corneum* (SC). The SC serves an important barrier function by keeping molecules from passing into and out of the skin, thus protecting the lower layers of skin. The extent of absorption is dependent on the skin integrity, location of exposure (thickness and water content of stratum corneum; skin temperature), physical and chemical properties of the hazardous substance, concentration of a chemical on the skin surface, duration of exposure, the surface area of skin exposed to a hazardous substance (7,8). The present study was performed to determine the frequency of dermatoses due to cosmetics and cleaning products in Elbasani district.

Materials and Methods

This is a prospective study including 864 ambulatory patients with dermatoses presented to the Dermatology Clinic of primary health care service in the district of Elbasan from January 2012 to December 2014. Data on sociodemographic characteristics, variables related to lifestyle and to the temporal factor, the type of contact dermatitis, location and etiological factors were gathered through a structured questionnaire concerning their use of cosmetics and skin care products and household washing and cleaning products. Patients reported suspected current or previous adverse reactions to such products (5). At the time of patch testing, the responsible dermatologist completed the questionnaire, inserting information about the location of the dermatitis and any history of atopy. At the time of patch testing, 61% of those reporting adverse reactions to cosmetics had active dermatitis. Patch testing: The standard selection of allergens used is the European Standard Battery, which consists of the commonest allergens.

Results

Of 864 patients included in the study. The mean age of patients was 42.3 ± 14.2 years old (range 23 – 61), with majority of them 657 (79%) of them living in urban area $p < 0.05$. There were significantly more females 726 (84%) than males 138 (16%) participating. The female/male ratio was 5.2: 1. In total 562 (65%) patients reported adverse reactions. Dermatoses to cosmetics or skin care products 311 (36%) reported while 251 (29%) reported reactions to household washing and cleaning products (fig. 1). Significantly more males had adverse reactions due to cosmetics 47 (34%) than cleaning products 15 (11%), $p < 0.05$. Significant differences were also found in age distribution between the two groups, showing a shift towards older persons in the cosmetic group. The mean age of patients with dermatoses due to cosmetic group was 38 years while in patients with dermatoses from cleaning products was 32 years, $p < 0.01$.

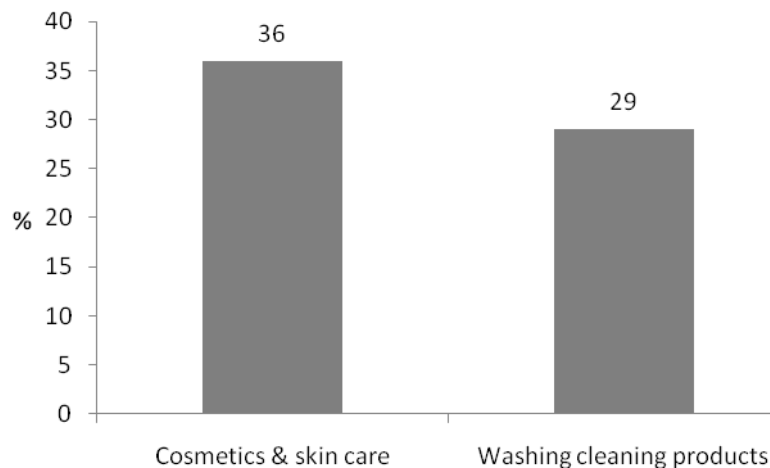


Figure 1 Frequency of dermatoses due to cosmetics and cleaning products

Patients with present or previous atopic dermatitis reported significantly more adverse reactions (36.5% vs 24.2%). The most frequently reported locations of dermatitis were face (40%), hands (35%), arms (16%), lower limbs (9%). In the face, the areas affected were forehead, eyelids, retroauricular folds, cheeks, perioral region and neck. Dermatitis in the face and neck region was significantly more often due to cosmetics while in hands and arms more often due to cleaning products. There were no differences regarding other body locations. The products reported to be suspected of causing skin problems are listed in table 1.

Table 1. Frequency of dermatoses according to products

Product	Females (n=264)	Males (n=47)	Total (n=311)
Cosmetic & skin care (n=311)			
Eye make-up	46.7	0	39.6
Soaps	31.7	30.8	31.6
Deodorants	26.1	46.4	29.2
Moisturizers and cleansers	31.3	12	28.4
Hair care products	21.7	21.9	21.7
(e.g. shampoos/balsams)		0	0.0
Perfumes/aftershave	19.3	25.5	20.2
Facial	19.3	1.6	16.6
Sunscreens	11	2.6	9.7
Lipstick	6.9	0	5.9
Hair dyes	5.2	1.6	4.7
Intimate hygiene products	4.2	0	3.6
Hair permanents	3.9	0	3.3
Hair removal products	2.7	0.5	2.4
Shaving products	0.5	8.9	1.8
Nail varnish	2.2	0.5	1.9
Toothpaste	1.5	0	1.3
Washing & cleaning (n=251)	(n=236)	(n=15)	(n=251)
Bleaching with hypochlorite	24.3	1.2	23.6
Wall/floor/tile cleaners	26.7	1.4	25.9
Ammonia cleaners	11.2		10.5
Hand dishwashing	37.8	0.8	35.9
Automatic dishwasher detergents	2.1		2.0
Laundry detergents	2.9		2.7
Fabric conditioners	3.8		3.6
Spray detergents	2.7		2.5
Hard surface cleaning products	14.2	2	14.9

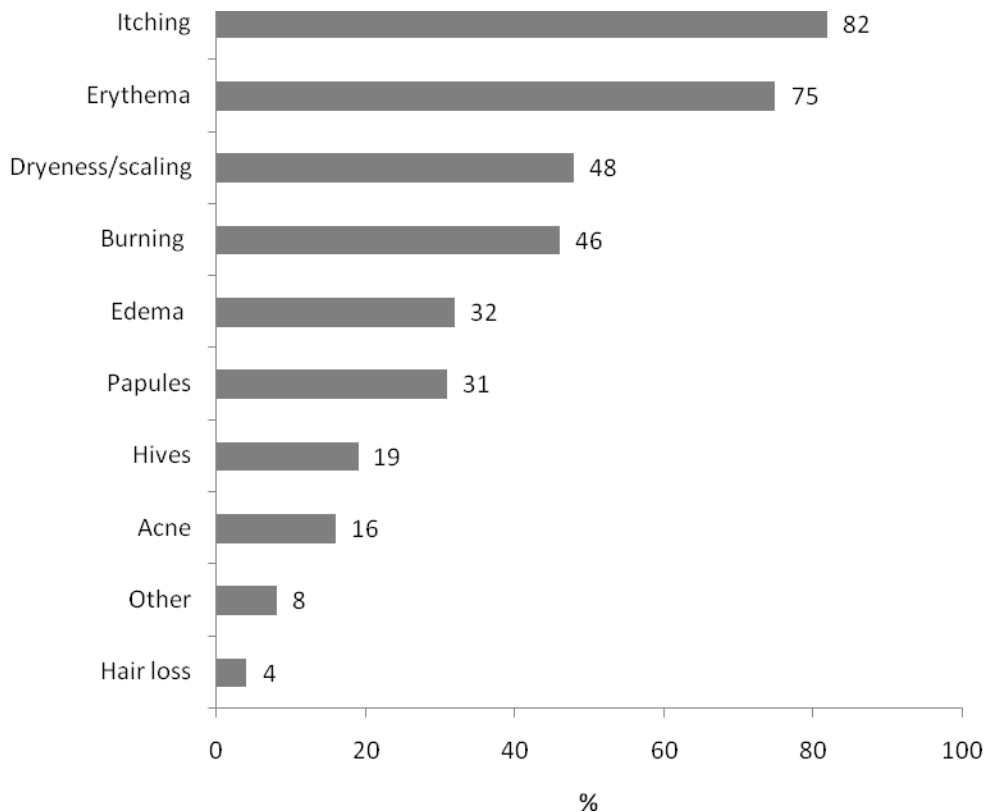


Figure 2. Signs and symptoms

In the patch test evaluation, 354 (63%) out of total patients with dermatoses had positive tests. There were significantly more positive patch tests among females. The most frequent allergen for the cosmetic series was Cocamidopropylbetaine 1% in water while for the cleaning products were methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) and limonene (9-11).

Discussion

The present study demonstrates that in a large number of patients with dermatitis the cause are cosmetics or skin care products and washing and cleaning products. Adverse reactions were significantly associated with sex (females), atopic dermatitis, increased number of positive patch tests, and dermatitis on face and neck, thus confirming previous reports (12,13). There were also differences in the reported use of cosmetics and skin care products. Our results do indicate that adverse reactions to cosmetics and cleaning products can be an important aetiological and/or complicating factor in cases of suspected contact dermatitis. Allergic Contact Dermatitis is a delayed type of induced sensitivity (allergy) resulting from cutaneous contact with a specific allergen to which the patient has developed a specific sensitivity. This allergic reaction causes inflammation of the skin manifested by varying degrees of erythema, edema, and vesiculation. Detergents are used by almost every household in the developed and developing world. The resultant eczema, predominantly localized to the hands following irritation, is very distressing and incapacitating. Females working with detergents at home and in occupations involving exposure to such detergents bear the brunt (14,15). In spite of advertising claims of relative mildness of a particular detergent powder, most of these patients are likely to be atopic who have defective barrier function and thus are more prone for skin irritation (16-18). Among those reporting

adversereactions we found significantly more positive testreactions. This can in part be explained by the higherage and the preponderance of women in this group, ascontact dermatitis and contact allergy are morecommon among women, and are more common withincreasing age (19,20). In this context it is importantto note that men also have high frequencies of positivepatch tests to fragrances and that the gender differencenoted is dependent on these substances. Symptoms of hand dermatitis may have long-term consequences for employment,economics, and quality of life (21,22). The use of gloves could reduce the risk of exposure to household detergents. In conclusion, patients referred for standard patchtesting because of eczema report a high incidence ofadverse effects to cosmetics or skin care and washing and cleaning products). This suggests that adverse reactionsto such products can constitute a more seriousaetiological and/or complicating factor for a currentdermatitis than is commonly recognized. It is thereforeimportant to include exposure to such products in thepatient’s case history and to discuss this aspect inthe preventive information given to eczema patients.

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