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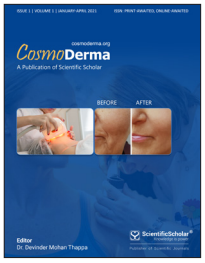

Review Article

Sensitive skin and its management

Iffat Hassan[1], Kewal Krishan[1]

[1]Department of Dermatology, STD and Leprosy, Government Medical College, Srinagar, Jammu and Kashmir, India.

***Corresponding author:**
Dr. Iffat Hassan,
Department of Dermatology, STD and Leprosy, Government Medical College, Srinagar, Jammu and Kashmir, India.

hassaniffat@gmail.com

Received : 14 August 2021
Accepted : 11 September 2021
Published : 09 October 2021

DOI
10.25259/CSDM_42_2021

Quick Response Code:

ABSTRACT

Sensitive skin is a self-diagnosed condition and is usually not accompanied by any obvious physical signs of irritation. Patients with this syndrome usually have unpleasant sensations whenever exposed to any physical, thermal or chemical stimuli that normally cause no provocation on healthy skin. Cosmetics, skin barrier impairment, and climate changes are the main contributing factors for skin hyperactivity. Although diagnosis is challenging due to lack of any specific or preferred diagnostic methods and interventions, recent studies on different clinical aspects of sensitive skin have provided new approaches to the diagnosis, management and interventions targeting the pathophysiology and treatment of sensitive skin syndrome. In general, patients with sensitive skin need an individual approach, keeping in view the various biomedical, neural, and psychosocial factors affecting sensitive skin.

Key words: Sensitive skin, Hypersensitivity, Itch, Definition, Cosmetics

INTRODUCTION

In 2017, the International Forum for the Study of Itch proposed the following definition of Sensitive Skin Syndrome (SSS): "The occurrence of unpleasant sensations (stinging, burning, pain, and pruritus) in response to stimuli that normally should not provoke such sensations."[1] Symptoms (burning, pruritus, tingling, etc.) may or may not be accompanied by signs such as mild erythema, telangiectasias, xerosis, desquamation, or urticaria. The sensitized skin may appear healthy or co-exist with erythema and can occur in all body locations, especially the face.[1] This entity was first described by Maibach in 1987 who named it as Cosmetic Intolerance Syndrome.[2] In 1990, Fisher referred to the condition as "status cosmeticus."[3]

PREDISPOSING FACTORS

There are many endogenous or exogenous factors that can trigger or aggravate the condition. Endogenous factors are inherent potential host factors that may promote skin sensitivity whereas exogenous factors are external triggering factors for sensitive skin [Table 1].[4,5] Some of the more common predisposing factors have been described in detail below:

Age

Studies have shown that patients with younger age tends to have more sensitive skin and, on the other hand, older people are more likely to have sensitive skin due to changes in the integrity of the skin tissue.[2,3]

Table 1: Risk factors contributors to sensitive skin.[4,5]

Endogenous	Exogenous
• Age: Young • Gender: Female • Ethnicity: Whites • Site: Face • Pre-existing skin conditions • Physiological factors	• Use of cosmetics and toiletries • Medications: topical corticosteroids • Environmental factors: sun exposure, light, heat, pollution • Diet: hot beverages, spices, alcohol, coffee • Cosmetic procedure: dermabrasion, laser resurfacing, or facelift • Occupational exposure to chemicals

Gender

Some epidemiological studies have reported that sensitive skin in women varies from 50% to 61% and in men, from 30% to 44%. In women, this can be justified by decreased cutaneous thickness and hormonal factors interfering in cutaneous hydration when compared with men. However, nowadays, this condition has also been described in men due to the increased use of cosmetics.[6-8]

Ethnicity

As there are structural differences among different racial skin that may be associated with the symptoms observed in those with sensitive skin. Thus, reports of erythema are more in whites as compare to blacks and Asians due to the thin skin which is more susceptible to flushing due to barrier damage and increased vascular reactivity.[3,9]

Site

Face is the commonly affected area and mainly the nasolabial fold is involved [Figures 1 and 2]. The contributor factors to this may be the injudicious use of cosmetics in this area along with the presence of thinner skin and greater number of nerve endings on the face. Other area involved are: Volar aspect of forearms, hands, genital region, and scalp.[3,10]

Pre-existing skin conditions

Certain skin disorders such as rosacea and atopic dermatitis (AD) are associated with sensitive skin due to disrupted skin barrier.

Physiological factors

Increased sweat glands, increased epidermal innervations, decreased lipids, and high transepidermal water loss (TEWL) are some of the physiological factors that are inherently associated with the sensitive skin.

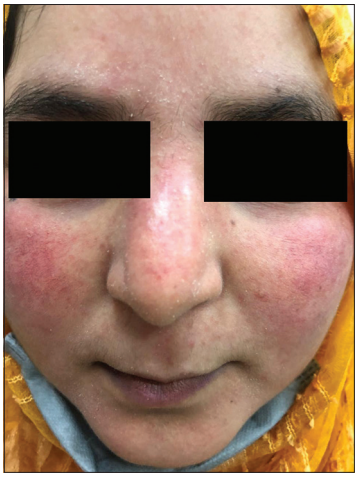

Figure 1: Photosensitivity in a patient having topical steroid damaged/dependent face.

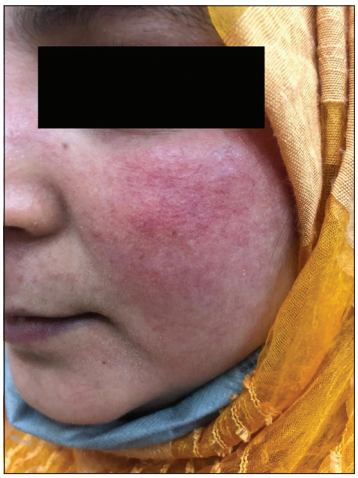

Figure 2: Rosacea like features due to prolonged topical steroid abuse.

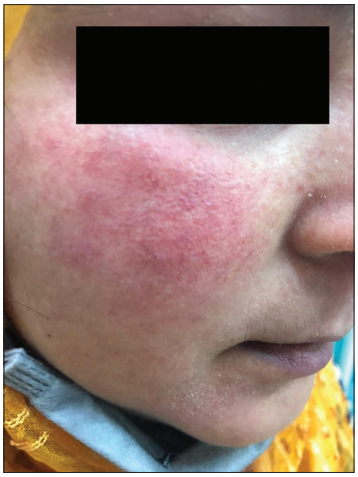

Figure 3: Increases erythema and dryness after using routine household products in the same patient.

Cosmetic products

Products altering cutaneous pH favor sensitive skin. It is usually seen in women, due to irrelevant and overuse of cosmetics [Figure 3]. The presence of possible irritating substances in cosmetics, that is, alpha-hydroxy acids, propylene glycol, alcohol, and fragrances, increases the possibility of symptoms. These irritants can alter the function of the epidermal barrier, allowing the penetration of sensitizing substances which leads to the inflammatory reaction and release of various cytokines.[3]

PATHOPHYSIOLOGY OF SENSITIVE SKIN

Relationship with skin barrier function

There are limited studies regarding sensitive skin and its relation to skin barrier function. The main hypothesis attributed to the occurrence of sensitive skin is the increase in the permeability of the stratum corneum, which leads to greater penetration of substances and water loss. There is an inverse relation between corneal layer thickness and skin permeability. Patients having sensitive skin tend to have thinner stratum corneum with a reduced corneocyte number thereby leading to a higher transcutaneous penetration of water-soluble chemicals. This also facilitates the penetration of substances capable of inducing the release of cytokines, leukotrienes, and prostaglandins thereby leading to the formation of neurotransmitters which, in turn, stimulate the nerve endings.[6,9,11] Individuals with increased TEWL are predisposed to intolerance to products in contact with the skin. Changes in stratum corneum thickness and therefore transcutaneous penetration may explain regional differences in specific areas of sensitive skin. The face is the most common affected site of skin sensitivity, which may be due to the larger number of products used on the face, a thinner barrier in facial skin and a greater density of nerve endings.[12]

Neurosensory hyperactivity

Neurosensory hyperactivity is considered to play a role in sensitive skin. The mechanisms for neural system hyperactivity include nerve fibers; endothelin receptors; burn, itch, heat receptors, and neurotrophin.[13]

Neurogenic inflammation probably results from release of neurotransmitters such as substance P, calcitonin gene

Table 2: Tests for the sensitive skin.

Test	Method	Interpretation
Lactic acid facial sting test[15-17]	Apply 10% aqueous solution of lactic acid over nasolabial fold/cheek at room temperature	Stinging sensation rated by patient at 2.5 and 5 min after application on an ordeal of 4-point scale. 3 or>3 points – patient rated as "stinger" with sensitive skin
Christensen and Kligman test[15]	Application of 10% racemic D–L lactic acid in 1.7-cm Hilltop chamber for 10 min over the malar eminence	Time between initial stinging and maximum stinging is noted and divide stingers into mild, moderate, and severe
Nicotine test[11]	Methyl nicotinate (1.4–13.7%) applied for 15 s over the upper third of forearm	Erythema due to vasodilatation indicates "sensitive skin" in the patient
Histamine test[18]	Intradermal injection of histamine (100 μg in 1 ml of normal saline) on forearm	Reveal intensity of itch sensation using a predetermined scale and duration of itch recorded
Evaporimetry[20] (TEWL measurement)	Application of 20:80 solution over the malar eminence	To elicit burning
Chloroform: Menthol (20:80) test[19]	To assess barrier dysfunction	Water evaporation from barrier
Corneometry[21]	To measure subcutaneous water content by "Capacitance" measuring device operating at low frequency (940–75 MH)	It assesses water content in the epidermis to an approximate depth ranging between 60 and 100 μm
In vivo tests[19]	Patch testing Repeat insult patch test	Performed with raw ingredients or cosmetic products About 10 patches are applied to the same site at 48–72 h intervals for 3–4 week periods. After 2 week rest, and test site re-challenged and graded
LDV and chromameter[22]	Skin color assessment	Measure blood vessel hyperactivity (vasodilation) in these patients

TEWL: Transepidermal water loss, LDV: Laser Doppler velocimetry

related peptide and vasoactive intestinal peptide, which causes vasodilation and mast cell degranulation. The pain sensations, which are the hallmark of the phenomenon, also indicate possible integration and dysfunctions in the central nervous system. Non-specific inflammation may also be associated with the release of interleukins (IL-1, IL-8, prostaglandin E2, prostaglandin F2, and tumor necrosis factor alpha).[14]

DIAGNOSIS

Investigation should involve detailed history taking to identify any triggering factors or cosmetic intolerance as the cause of sensitive skin. Family history, occupational history, use of specific products, etc., need to be noted. Moreover, complete physical examination is important to exclude any signs of inflammation, the presence of predisposing skin conditions such as contact dermatitis and AD. The various testing methods for the evaluation of sensitive skin are mentioned in tabulated form [Table 2].

Sensory reactivity tests provide measure of sensory perception of pain in the absence of visible irritation e.g. sting test with lactic acid, that is, lactic acid facial sting test on nasal labial folds/cheeks is one of the most widely used tests.[15] The patient then rates the stinging sensation at 2.5 and 5 min on a four point scale: [16,17]

1. 0: no stinging or very mild discomfort
2. 1: mild stinging
3. 2: moderate stinging
4. 3: severe stinging.

If the sum of these two ratings is ≥3, the patient is considered a "stinger", which suggests sensitive skin. Other substances can be used, such as capsaicin, ethanol, sorbic acid, and among others.[3,5,16]

Irritation tests are also done to measure the signs of skin irritation after application of irritant substances known as irritants (such as sodium lauryl sulfate), by means of colorimetry or electrical capacitance measurement. However, they require specific devices.[3] Other less commonly used tests are the nicotine test and the histamine test.[11,18]

Epidermal function tests after the application of irritants assess the structural or physiological changes in the skin. The most used parameters are: Measure of TEWL, cutaneous pH, and epidermal thickness.[3,19-21]

Sometimes patch testing may be done to standard allergens, cosmetics, and skin care products routinely used by patients.[19] Laser Doppler velocimetry (LDV) and chromameter can detect blood vessel hyperactivity in these patients.[22]

Recently, dermoscopy and confocal microscopy has also been used by some authors to note the presence of structural alterations in the sensitive skin (demonstrating capillary dilations, epidermis showing thinner than normal thickness).[23]

Table 3: Trigger factors for sensitive skin.

Trigger factors
Unnecessary cosmetics
Alcohol-based substances
Preservatives
Fragnances
Wet air
Variations in temperature- heat, dry air, cold
Air conditioning
Sun exposure
Allergens and irritants, such as lanolin, wool alcohols, wool wax, degras, and adeps lanae

MANAGEMENT OF SENSITIVE SKIN

Avoidance of triggers

The treatment of sensitive skin includes several steps.

In the acute phase, low and medium potency topical corticosteroids can be used for a short period of 3–4 days to relieve symptoms and also topical immunomodulators (pimecrolimus or tacrolimus) can be indicated for a longer period. Use of all cosmetics should be discontinued for a period of 2 weeks at least. After this period, the products are reintroduced one at a time. In a recent literature review and meta-analysis, cosmetics were the main triggering reasons for sensitive skin.[24] There is increase in the possibility of symptoms due to the presence of some irritating substances in their composition. The following trigger factors need to be taken care of in patients having sensitive skin [Table 3]:

Besides this, in predisposed patients and some occupational skin diseases like irritant contact dermatitis, one should protect the skin by wearing gloves, using protective creams, and regular moisturizing the skin.[25]

Role of emollients/moisturizers

Reports suggest that emollients can substantially reduce itching, restore skin barrier function even after the first application in sensitive skin.[26] In conditions like AD, use of emollients is usually recommended to restore and maintain the skin barrier. They play a major role in mild AD and may further decrease the need for topical glucocorticoids in long-term management of AD.[27] In atopic dry skin, mild cleansing agent having hydration ability is suggested and in xerotic skin, cleansing agents containing humectants and/or emollients are recommended, that prevent further dryness. Synthetic soap (syndet) should be used rather than detergent

soaps. Some shower creams and lotions with skin-similar lipids restore skin barrier function, increase skin hydration and become an effective skin moisturizing option for patients with sensitive and dry skin. According to some studies, many menopausal women showed improvement of sensitive skin with the use of moisturizers and emollients.[28]

In rosacea, gentle cleansing with foaming face wash and lipid-free cleansers are recommended.[29] Furthermore, moisturizers are helpful thereby reducing epidermal barrier dysfunction in these patients.[30] Moisturizers with fewer components, without perfume and without substances that can irritate the skin (like urea) are indicated. For sensitive scalp, pH-balanced shampoos containing a mild surfactant, free of potentially irritating additives such as paraben, perfume, and coloring agents are preferred.

Photoprotection

Ultraviolet radiation (UVR) have wide spectrum of adverse effect on the skin and may aggravate symptoms of sensitive skin.[31] UVR increases the release of neuropeptides from nerve endings such as substance P and calcitonin gene-related peptide, inducing vasodilatation, itch or burning pain sensations, and neuroinflammation.[32] UVR also results in angiogenesis and formation of erythema. Hence, there is need of proper sun protection, wearing photoprotective clothing and proper headgear such as a wide brimmed hat. They should apply sunscreens with a sun protection factor of at least 30, which also provide broad-spectrum sun protection.[33] Continuous exposure to heat and light while cooking can increase chances of sensitive skin and pigmentation, hence a sunscreen is recommended in such case also. In patients with rosacea and sensitive skin, zinc oxide based, ferric oxide, and tinted sunscreens are preferred and should be applied 15–20 min before going outdoors on a regular basis.

CONCLUSION

There is no "gold standard" of treatment for sensitive skin as the pathogenesis of sensitive skin is not clearly understood and most probably is of multifactorial origin. Avoidance of possible exacerbating factors, restoration of damaged skin barrier, photoprotection and the use of well-tolerated cosmetics, especially those containing inhibitors of unpleasant sensations, should be considered for patients with sensitive skin. Further studies are needed to better understand the pathophysiology of sensitive skin as well as the inducing factors.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflict of interest.

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How to cite this article: Hassan I, Krishan K. Sensitive skin and its management. CosmoDerma 2021;1:53.