

## UNDERSTANDING ECZEMA: SYMPTOMS AND STRATEGIES FOR PREVENTION

Shruti Khare\*, Swatantra K. S. Kushwaha, Saket Gautam and Rajat Saxena

Krishna Institute of Pharmacy and Sciences, Kanpur.



\*Corresponding Author: Prof. Shruti Khare

Krishna Institute of Pharmacy and Sciences, Kanpur.

Article Received on 05/06/2024

Article Revised on 25/06/2024

Article Accepted on 15/07/2024

## ABSTRACT

Eczema, also known as dermatitis (With 'derma' referring to skin and 'titis' indicating inflammation), is a prevalent inflammatory skin condition characterized by dryness and can affect individuals of any age, from infancy to old age. The terms eczema and dermatitis are often used interchangeably. A key characteristic of eczema is dry skin, which tends to be itchy, leading to scratching and subsequently triggering the itch-scratch cycle. This cycle provokes an inflammatory response, resulting in eczema flare-ups. Atopic eczema is the most common and typically the most persistent type of eczema. In the UK, it impacts 1–2% of adults and 15–20% of school-aged children, accounting for 30% of dermatology consultations in general practice and 10–20% of all dermatologist referrals. Many children with atopic eczema experience improvement as they age, although they often continue to have dry and sensitive skin. Some children may carry eczema into adulthood, or it can reappear later in life, especially after the age of 60 due to changes in the skin associated with aging. The natural progression of atopic eczema is unpredictable.

**KEYWORDS:** Eczema, Dermatitis, Atopic, Sensitive skin, Dermatologist, dryness.

## INTRODUCTION

Atopic dermatitis (AD) is a chronic, relapsing condition affecting a growing number of individuals. Typically beginning in early childhood, AD can be the first phase of the atopic march, often followed by allergic rhinitis and asthma. AD is a genetically complex disease influenced by interactions between multiple genes and environmental factors. Genetic linkage and association studies have identified several candidate genes related to epidermal barrier function and the immune system. Factors such as stress, bacterial or viral infections, exposure to airborne or food allergens, and hygiene practices can exacerbate AD symptoms. Although a generalized Th2-skewed immune response is strongly associated with AD, the disease itself is characterized by biphasic inflammation, starting with a Th2 phase and progressing to chronic lesions with Th0/Th1 cells. Regulatory T cells and the innate immune system in the skin are also altered in AD. Key treatment objectives include reducing inflammation and infection, maintaining and restoring the skin barrier, and managing exacerbating factors. Future strategies for AD aim to control skin inflammation proactively to prevent sensitization and to develop personalized management plans based on genetic and pathophysiological insights.<sup>[1]</sup>

Atopic dermatitis (AD), also known as eczema in some regions, is distinguished as the most common, itchy, and

relapsing inflammatory skin disease among chronic inflammatory skin conditions.<sup>[2]</sup>

Its rising prevalence is well-documented, posing a significant public health issue, particularly in industrialized nations. Significant progress has been made in understanding the genetic background and pathophysiology of AD. Recent research in genetics, epidemiology, and immunology has provided critical insights, transforming our understanding of the disease mechanisms, its natural history, and future strategies for managing it within the context of the atopic march.

The World Allergy Organization (WAO) has recently updated the terminology for atopy and atopic diseases, defining atopy specifically as IgE-sensitization, meaning atopic diseases with IgE-mediated mechanisms. Therefore, the term atopy should be used only when there are documented specific IgE antibodies in the serum or a positive skin prick test. This requires distinguishing the non-IgE-associated form (previously known as intrinsic or atopic dermatitis) from the IgE-associated form (previously known as extrinsic). While some researchers advocate for the classification of two distinct forms, atopic dermatitis versus AD, it is suggested that the non-IgE-associated form may actually be a transitional stage of the IgE-associated form, particularly in infancy.<sup>[3]</sup>

Atopic dermatitis affects around 230 million people globally, with a lifetime prevalence exceeding 15%, particularly in wealthier nations. It often occurs in individuals with an 'atopic tendency,' frequently coexisting with hay fever, asthma, and food allergies. While people of all races can develop atopic dermatitis, some are more prone to it, and genetic studies highlight significant variability in the condition's prevalence among different populations.<sup>[4]</sup>

Atopic dermatitis typically begins in infancy, affecting up to 20% of children, with about 80% of these cases developing before the age of six. Although it can diminish during late childhood and adolescence, its prevalence among young adults up to 26 years old remains between 5% and 15%. The condition can affect individuals of all ages.<sup>[5]</sup>

#### **Eczema and Atopic dermatitis how much different?**

Eczema is a broad term for skin conditions that cause rash-like symptoms, with atopic dermatitis being the most common type. Eczema often causes intense itching, and scratching can lead to red, inflamed (Swollen) skin.<sup>[6]</sup>

Eczema is most prevalent in infants but also affects children and adults. Infants with moderate to severe eczema are at a higher risk of developing a peanut allergy. Consequently, guidelines from the National Institutes of Allergy and Infectious Diseases recommend introducing small amounts of peanut-based foods to children as early as 4 to 6 months old to potentially prevent this allergy. It is essential to consult with your family doctor before introducing peanuts.<sup>[7]</sup>

Atopic dermatitis is a chronic skin condition resulting from an allergic reaction and is the most prevalent form of eczema. The term "atopic" refers to an inherited predisposition to develop dermatitis, asthma, and hay fever, while "dermatitis" means red, itchy skin. Atopic dermatitis typically begins in infancy and continues into childhood.

The condition experiences periods of worsening (known as flare-ups), followed by periods of healing when there may be no visible signs of atopic dermatitis (known as remission). Remission can last for weeks, months, or even years. Some children outgrow atopic dermatitis, while others continue to experience it into adulthood, though flare-ups tend to be less severe in adults.<sup>[8]</sup>

Eczema encompasses a variety of reaction patterns with different causes, with atopic dermatitis being the most common cause in children. Other types of eczematous dermatitis include allergic contact dermatitis, irritant contact dermatitis, seborrheic dermatitis, nummular eczema, dyshidrotic eczema, asteatotic eczema, and lichen simplex chronicus. Eczematous reactions are classified as acute, subacute, or chronic based on their historical and physical characteristics.<sup>[9]</sup>

#### **Types of eczema**

Eczema is a chronic condition that can lead to dry, itchy, scaly, and painful skin lesions or blisters. Often referred to as atopic dermatitis, which is the most prevalent form of eczema according to the American Academy of Dermatology Association (AAD), eczema actually encompasses a group of seven distinct types of inflammatory skin conditions.

##### **1. Atopic dermatitis**

It is the most common type of eczema. It typically begins in early childhood, between the ages of 2 months and 5 years, and often becomes milder or resolves by adulthood. However, symptoms can flare up again or even appear for the first time later in life. In atopic dermatitis, symptoms typically appear on your arms or in the creases of your elbows or knees. Children may develop symptoms on their scalp and cheeks. It's important not to scratch any bumps, rashes, or lesions, as this may lead to infection.<sup>[10]</sup>

**Causes:** The exact cause of atopic dermatitis remains unknown. However, it occurs when the skin's natural barrier is compromised, making it less effective at protecting against irritants and allergens. The condition is likely due to a combination of factors, including genetics, dry skin, immune system issues, and triggers like irritants, stress, and dry skin.<sup>[11]</sup>

##### **2. Contact dermatitis**

Contact dermatitis results from a reaction to substances you touch. There are two types:

**1. Allergic contact dermatitis:** This is an immune system reaction to an irritant, like latex or metal.<sup>[12]</sup>

**2. Irritant contact dermatitis:** This starts when a chemical or other substance directly damages your skin. Symptoms of contact dermatitis may take up to 48 hours to appear after coming into contact with a trigger. The symptoms also include itchy skin that turns red, pink, or magenta. In darker skin tones, this can appear as brown, purple, or gray, skin that burns or stings, hives, fluid-filled blisters, thick, leathery skin.

**Causes:** Contact dermatitis happens when you touch a substance that irritates your skin or causes an allergic reaction. The most common irritants include: detergent, bleach, latex, soaps and perfumes etc.<sup>[13]</sup>

##### **3. Dyshidrotic eczema**

Dyshidrotic eczema, also known as pompholyx, causes small blisters to form on your hands and feet. Symptoms of dyshidrotic eczema may last between 2–3 weeks at a time. You may experience fluid-filled blisters that could itch, hurt, crack, and flake. These may appear on your fingers, toes, palms and soles of the feet.

**Causes:** Dyshidrotic eczema can be caused by allergies, damp hands and feet, exposure to substances such as

nickel, cobalt, or chromium salt and smoking tobacco product.<sup>[13,14]</sup>

#### 4. Seborrheic dermatitis

Seborrheic dermatitis is sometimes referred to as scalp eczema because it typically affects your scalp. Seborrheic dermatitis in infants is commonly called cradle cap, and it does not reappear later. In teens and adults, however, seborrheic dermatitis will most likely be an ongoing skin issue. Seborrheic dermatitis may cause scaly, oily patches of skin that produce dandruff-like flakes. These patches often appear where there are more sebaceous glands on the body, such as the scalp, hairline, upper back and nose. In people with darker skin tones, these patches may be darker than their skin, but in people with lighter skin tones, the patches may be lighter.<sup>[15]</sup>

**Causes:** Seborrheic dermatitis may be due to a combination of environmental and genetic factors. First, a trigger like stress or illness sets off an inflammatory reaction in the skin. This sends the oil-producing glands in the body into overdrive, which allows too much *Malassezia* yeast to grow. This is an organism that lives on the skin's surface. When yeast grows too rapidly, the immune system reacts and causes a series of skin changes. This leads to the development of the patches of skin common with seborrheic dermatitis.<sup>[16]</sup>

#### 5. Neurodermatitis

Neurodermatitis, also referred to as lichen simplex chronicus, is a type of eczema that usually causes 1–2 eczema patches to develop. It involves intense itching that worsens the more you scratch. Neurodermatitis causes thick, scaly, and sometimes very itchy patches to form on your arms, legs, back of your neck. It's important not to scratch the skin patches. This may worsen your symptoms and lead to bleeding and infection.<sup>[17]</sup>

Table summarizing different types of eczemas.<sup>[24]</sup>

Endogenous	Exogenous	Combined
Seborrheic dermatitis	Irritant dermatitis	Pompholyx
Nummular eczema	Allergic dermatitis	Atopic dermatitis
Lichen simplex Chronicus	Photo dermatitis	
Asteatotic Eczema	Radiation dermatitis	
Pityriasis Alba	Infectious dermatitis	

#### Pharmacological management of eczema

Knowing the type of eczema and its triggers is the best way to start treatment and control so as not to impede normal life, and attempts to try different methods may require several months or years, however, even in response to treatment may show signs and symptoms.<sup>[25]</sup> If normal hydration and other self-care steps are not enough, your doctor may recommend one of the following treatments and medicines:

- Creams that control itching and inflammation.
- Infection control medications (e.g. antibiotic ointments).

**Causes:** The underlying cause of neurodermatitis isn't yet known. However, the condition usually starts with an itch, and the rash develops the more you scratch it, according to the AAD.<sup>[18]</sup>

#### 6. Nummular eczema

Nummular eczema, also known as discoid eczema, causes round, coin-shaped spots to form on your skin. It looks different than other types of eczema and could be very itchy. Symptoms of nummular eczema may last up to several years without treatment. The first sign of nummular eczema is usually a group of small bumps on the skin. These may appear red or pink on lighter skin tones and dark brown on darker skin tones.<sup>[19]</sup> These small bumps then usually grow coin-shaped skin lesions that may be itchy, flaky, or cracked.<sup>[20]</sup>

**Causes:** The exact cause of nummular eczema is not known. However, it may result from having very dry skin.<sup>[21]</sup>

#### 7. Stasis dermatitis

Stasis dermatitis is more common in people who have poor circulation, according to the AAD. It happens when fluid leaks out of weakened veins into your skin. This fluid may cause swelling, redness in lighter skin tones, brown, purple, gray, or ashen color in darker skin tones. Symptoms include stasis dermatitis are most likely to affect your legs and ankles. For example, the lower part of your legs may swell, especially during the day when you've been walking. Your legs may also ache or feel heavy.<sup>[22]</sup>

**Causes:** Stasis dermatitis happens in people who have blood flow problems in their lower legs. If the valves that normally push blood up through your legs toward your heart malfunction, blood can pool in your legs.<sup>[23]</sup>

- Oral antipruritic drugs. Skin care:
- Avoid the following causes of eczema:

**Some skin irritants (Such as: Some types of soap, some fabrics, creams)**

**Psychological stress:** Substances to which the patient is allergic (e.g. Some foods, animals, pollen). Avoid extreme heat and extreme cold. Ensure continuous moisturizing with suitable and fragrance-free creams. Avoid itching as much as possible and know its causes.<sup>[26]</sup>

**Cause:** The exact cause of eczema is unknown, but doctors believe it is a combination of genetic and environmental factors.

People with eczema may have an imbalance in the gene responsible for the formation of a protein that contributes to the building of a protective layer of the skin. When it does not form enough, the skin moisture fades and bacteria enter, so the skin of the infected is very dry and more susceptible to infection.

Eczema is a non-communicable disease and cannot be transmitted from one person to another.

**Risk factors:** Personal or family history of eczema, or any type of allergies (Hay fever or asthma).<sup>[27]</sup>

Milk does not cause eczema at any age but may affect its severity from some types of formula and additives or preservatives.

**Most vulnerable groups:** Eczema affects all age groups and often appears in children, and those who recover from childhood are more likely to develop it in the future.<sup>[28]</sup>

**Eczema treatment:** Eczema treatment aims to ease and prevent itching, which can lead to infection.<sup>[29]</sup>

#### Medications

- Your doctor may also prescribe creams and ointments with corticosteroids to ease inflammation. If the area becomes infected, you'll probably need antibiotics.<sup>[30]</sup>
- Other options include tar treatments (chemicals that reduce itching), phototherapy (using ultraviolet light), and the drug cyclosporine.
- The FDA has approved two medications called topical immunomodulators (TIMs) for mild to moderate eczema.<sup>[31]</sup>
- Elidel cream and Protopic ointment work by changing your immune system response to prevent flare-ups. They can reduce inflammation and itching.<sup>[32]</sup>

#### How is eczema treated?

Eczema cannot be cured, but it can be managed effectively. During flare-ups, your doctor might prescribe steroid creams, which are commonly used for treatment.

- **Skin protection:** Apply a moisturizer or emollient at least twice daily, even when your eczema is not flaring up. Opt for thick moisturizers or ointments.<sup>[33]</sup>
- **Wet dressings:** These can help to cool, protect, and rehydrate your skin.
- **Treating Flare-Ups:** Use prescribed ointments or creams. You may need occasional courses of steroid creams.

- **Steroid strength:** Your doctor will suggest weaker steroids for sensitive areas like the face, underarms, and groin, and stronger steroids for other areas.<sup>[34]</sup>
- **Proper usage:** Follow your doctor's instructions carefully when using creams. Side effects from steroid creams are rare in both children and adults when used as directed.
- **Itch control:** Use antihistamines, a cold compress, and avoid scratching. Your doctor might also recommend using steroid creams to manage itching, but less frequently than during flare-ups.<sup>[35]</sup>
- **Infection control:** If an infection occurs, your doctor may prescribe antibiotics to treat it.

#### CONCLUSION

In conclusion, while eczema is a chronic condition without a cure, it can be effectively managed through proper treatment and care. Diagnosis typically involves a thorough examination by a healthcare provider, who will assess the symptoms and possibly perform tests to rule out other conditions. Treatment strategies focus on alleviating symptoms and preventing flare-ups through the use of moisturizers, prescribed steroid creams, and other medications as needed. Adhering to your doctor's recommendations and maintaining a consistent skincare routine are crucial for controlling eczema. With diligent care, individuals with eczema can lead comfortable, healthy lives.

#### Conflict of interest

There is no conflict of interest throughout the review process.

#### REFERENCES

1. Robertson C, Dalton M, Peat JK, et al. Asthma and other atopic diseases in Australian children. Australian arm of the International Study of Asthma and Allergy in Childhood. *Med J Aust*, 1998; 168: 434–8.
2. Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's textbook of dermatology*. 7th ed. London: Blackwell Science 2004, Ch 17. Hanifin JM, Cooper KD, Vo VC, et al. Guidelines of care for atopic dermatitis. *J Am Acad Dermatol*, 2004; 50: 391–404.
3. McGowan R, Tucker P, Joseph D, et al. Short term growth and bone turnover in children undergoing occlusive steroid ('wetwrap') dressings for treatment of atopic eczema. *J Dermatolog Treat*, 2003; 14: 148–52.
4. Sule O, Shankar S, Willcocks L, Day J, Brown N, Burrows NP. Intermittent or prolonged use of fusidic acid is associated with carriage of fusidic acid-resistant *Staphylococcus aureus* in patients with eczema. *Br J Dermatol*, 2004; 151(Suppl 68): 6.
5. Blicharz L, Czuwara J, Samochocki Z, Goldust M, Chrostowska S, Olszewska M, et al. Hand eczema-A growing dermatological concern during the COVID-19 pandemic and possible treatments. *Dermatol Ther*, 2020; e13545. [CrossRef]



6. Giacalone S, Bortoluzzi P, Nazzaro G. The fear of COVID-19 infection is the main cause of the new diagnoses of hand eczema: Report from the frontline in Milan. *Dermatol Ther*, 2020; 33: e13630. [CrossRef]
7. Guertler A, Moellhoff N, Schenck TL, Hagen CS, Kendziora B, Giunta RE, et al. Onset of occupational hand eczema among healthcare workers during the SARS-CoV-2 pandemic: Comparing a single surgical site with a COVID-19 intensive care unit. *Contact Dermatitis*, 2020; 83: 108–14. [CrossRef]
8. Lan J, Song Z, Miao X, Li H, Li Y, Dong L, et al. Skin damage among health care workers managing coronavirus disease-2019. *J Am Acad Dermatol*, 2020; 82: 1215–6. [CrossRef]
9. Kiely LF, Moloney E, O'Sullivan G, Eustace JA, Gallagher J, Bourke JF. Irritant contact dermatitis in healthcare workers as a result of the COVID-19 pandemic: a cross-sectional study. *Clin Exp Dermatol*, 2020; 23 [Epub ahead of print], doi: 10.1111/ced.14397.
10. Yan Y, Chen H, Chen L, Cheng B, Diao P, Dong L, et al. Consensus of Chinese experts on protection of skin and mucous membrane barrier for health-care workers fighting against coronavirus disease 2019. *Dermatol Ther*, 2020; 33: e13310. [CrossRef]
11. Agner T, Andersen KE, Brandao FM, Bruynzeel DP, Bruze M, Frosch P, et al; EECDRG. Hand eczema severity and quality of life: a crosssectional, multicentre study of hand eczema patients. *Contact Dermatitis*, 2008; 59: 43–7. [CrossRef]
12. Patrino C, Fabbrocini G, Stingeni L, Napolitano M. The role of occupational dermatology in the COVID-19 outbreak. *Contact Dermatitis*, 2020; 83: 174–5. [CrossRef]
13. Greveling K, Kunkeler ACM. Hand eczema pandemic caused by severe acute respiratory syndrome coronavirus 2 hygiene measures: the set-up of a hand eczema helpline for hospital personnel. *J Eur Acad Dermatol Venereol*, 2020; 34: e556–7. [CrossRef]
14. Hamming I, Timens W, Bulthuis ML, Lely AT, Navis G, van Goor H. Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. *J Pathol*, 2004; 203: 631–7. [CrossRef]
15. Balato A, Ayala F, Bruze M, Crepy MN, Gonçalo M, Johansen J, et al. European Task Force on Contact Dermatitis statement on coronavirus disease-19 (COVID-19) outbreak and the risk of adverse cutaneous reactions. *J Eur Acad Dermatol Venereol*, 2020; 34: e353–4. [CrossRef]
16. Smith DR, Adachi Y, Mihashi M, Kawano S, Ishitake T. Hand dermatitis risk factors among clinical nurses in Japan. *Clin Nurs Res*, 2006; 15: 197–208. [CrossRef]
17. van der Meer EW, Boot CR, van der Gulden JW, Jungbauer FH, Coenraads PJ, Anema JR. Hand eczema among healthcare professionals in the Netherlands: prevalence, absenteeism, and presenteeism. *Contact Dermatitis*, 2013; 69: 164–71. [CrossRef]
18. Stutz N, Becker D, Jappe U, John SM, Ladwig A, Spornraft-Ragaller P, et al. Nurses' perceptions of the benefits and adverse effects of hand disinfection: alcohol-based hand rubs vs. hygienic handwashing: a multicentre questionnaire study with additional patch testing by the German Contact Dermatitis Research Group. *Br J Dermatol*, 2009; 160: 565–72. [CrossRef]
19. Agner T, Elsner P. Hand eczema: epidemiology, prognosis and prevention. *J Eur Acad Dermatol Venereol*, 2020; 34, 1: 4–12. [CrossRef]
20. Dalgard F, Svensson A, Holm J, Sundby J. Self-reported skin morbidity in Oslo. Associations with sociodemographic factors among adults in a cross-sectional study. *Br J Dermatol*, 2004; 151: 452–7. [CrossRef]
21. Hamnerius N, Svedman C, Bergendorff O, Björk J, Bruze M, Pontén A. Wet work exposure and hand eczema among healthcare workers: a cross-sectional study. *Br J Dermatol*, 2018; 178: 452–61. [CrossRef]
22. Boyle RJ, Leonardi-Bee J, Bath-Hextall FJ, Tang MLK. Probiotics for the treatment or prevention of eczema. *J Allergy Clin Immunol*, 2009; 123: 266–7.
23. Lee J, Seto D, Bielory L. Meta-analysis of clinical trials of probiotics for prevention and treatment of pediatric atopic dermatitis. *J Allergy Clin Immunol*, 2008; 121: 116–21.
24. Folster-Holst R, Muller F, Schnopp N, Abeck D, Kreisemaier I, Lenz T, et al. Prospective, randomized controlled trial on *Lactobacillus rhamnosus* in infants with moderate to severe atopic dermatitis. *Br J Dermatol*, 2006; 155: 1256–61.
25. Deeks JJ, Higgins JPT, Altman DG, editors. Analysing and presenting results. In: Higgins JPT, Green S, editors. *Cochrane handbook for systematic reviews of interventions* 4.2.6 section 8. Available at: <http://www.cochrane.org/resources/handbook/hbook.htm>. Accessed October, 2006; 6.
26. Chu AW, Wong MM, Rayner DG, Guyatt GH, Martinez JP, Ceccacci R, Zhao IX, McMullen E, Srivastava A, Wang J, Wen A. Systemic treatments for atopic dermatitis (eczema): systematic review and network meta-analysis of randomized trials. *Journal of Allergy and Clinical Immunology*, 2023; 1, 152(6): 1470–92.
27. Cipriani F, Dondi A, Ricci G. Recent advances in epidemiology and prevention of atopic eczema. *Pediatric Allergy and Immunology*, 2014; 25(7): 630–8.
28. Diepgen TL, Andersen KE, Chosidow O, Coenraads PJ, Elsner P, English J, Fartasch M, Gimenez-Arnau A, Nixon R, Sasseville D, Agner T. Guidelines for diagnosis, prevention and treatment of hand eczema.

- JDDG: Journal der Deutschen Dermatologischen Gesellschaft, 2015; 13(1): e1-22.
29. Szari S, Quinn JA. Supporting a healthy microbiome for the primary prevention of eczema. *Clinical Reviews in Allergy & Immunology*, 2019; 57(2): 286-93.
  30. Chu DK, Koplin JJ, Ahmed T, Islam N, Chang CL, Lowe AJ. How to prevent atopic dermatitis (eczema) in 2024: theory and evidence. *The Journal of Allergy and Clinical Immunology: In Practice*, 2024; 2.
  31. Viljanen M, Savilahti E, Haahtela T, Juntunen-Backman K, Korpela R, Poussa T, et al. Probiotics in the treatment of atopic eczema/dermatitis syndrome in infants: a double-blind placebo-controlled trial. *Allergy*, 2005; 60: 494-500.
  32. Kirjavainen PV, Salminen SJ, Isolauri E. Probiotic bacteria in the management of atopic disease: underscoring the importance of viability. *J Pediatr Gastroenterol Nutr*, 2003; 36: 223-7.