

“Review on aspects of air pollution and atopic dermatitis.”**Dipashri Eknath Borse*¹, Santosh Chavhan²**

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ABSTRACT

Air pollution, which reaches an all-new level almost every day, has a negative impact on skin. The toxic pollutants present in both indoor and outdoor air are absorbed into skin, which leads to a number of skin problems. The pollution that affects skin has a combination of smog and particulate matter, which come from car exhaust, metal smelting, smoking, industrial gases. The polluted air makes it hard for the skin to breathe, leaving it irritated, dehydrated, and worsening existing conditions such as redness; *rosacea* and eczema. Atopic dermatitis (AD) is the most common type of eczema.

Keywords: Air pollution, Atopic dermatitis, *rosacea*, eczema

INTRODUCTION

“The skin is a wonderful barrier—that’s its function,” explains Maria Wei, M.D., professor of dermatology at UCSF and co-author of the wildfire study. “It is a barrier against physical entities, gases, liquids, infections, and temperature changes. But it does have its limits, and there are ways for components of pollution to breach that barrier”—especially when the skin barrier is already in a compromised state. This article focuses on aspects of air pollution and atopic dermatitis. Healthy skin helps retain moisture and protects from bacteria, irritants and allergens. Eczema is related to a gene variation that affects the skin's ability to provide this protection. This allows skin to be affected by environmental factors, irritants and allergens.

Aspect of Air Pollution

The city's air condition has been deteriorating in the last few years with the quality reaching at alarming levels in the last few years. The air quality is becoming a health hazard for the people living in the city.

Particulate matter, Carbon Monoxide, Ozone, Nitrogen dioxide and Sulphur dioxide are common pollutants that could cause health hazards to the people. Airborne diseases include any that are caused via transmission through the air.

Aspects of Atopic dermatitis

Skin diseases like acne and eczema, which are on rise, are least perceived as a product of the pollution in the city. One of the challenges in studying eczema is that it's an extremely complicated health condition, and the origin and risk factors vary from person to person. Eczema (or atopic dermatitis, as it is formally known) is believed to be caused by a combination of genetics and environmental factors, both of which can compound to make symptoms worse. Atopic dermatitis (eczema) is a condition that makes skin red and itchy. For instance, someone might be born with an overactive immune system (genetics), which is then triggered by external irritants like cigarette smoke or household cleaners (environment), causing an eczema flare.

Causes:

Air pollutants are chemicals from both indoor and outdoor environments that may bind and penetrate the skin. From there it can possibly reach the deeper skin and enter the bloodstream to negatively affect our health.^[3]

Exposure to pollutants contributes to eczema in several ways:

- Oxidative stress- The pollutants cause damage to the skin and deplete its natural antioxidant mechanisms.
- skin barrier dysfunction
- immune stimulation, and
- Exacerbation of itching and scratching.

A large part of eczema treatment revolves around reducing one's exposure to harmful environmental triggers that may flare eczema, especially in early life. The role that several airborne pollutants may play in the development of eczema has been studied.

Symptoms

Atopic dermatitis (eczema) signs and symptoms vary widely from person to person and include:

- Dry skin
- Itching, which may be severe, especially at night
- Red to brownish-gray patches, especially on the hands, feet,

ankles, wrists, neck, upper chest, eyelids, inside the bend of the elbows and knees, and in infants, the face and scalp

- Small, raised bumps, which may leak fluid and crust over when scratched
- Thickened, cracked, scaly skin

DISCUSSION

Researchers believe these risks may be caused by high levels of volatile organic compounds (VOCs) in the air pollutants when those come in contact with the skin.^[2] Exposure to these chemicals can trigger skin inflammation and cause damage to the skin's natural protective barrier, causing more water to evaporate from the skin, which causes dry skin and ultimately worsens eczema.^[1,2] Recent evidence suggests that a variety of air pollutants, such as environmental tobacco smoke, volatile organic compounds, formaldehyde, toluene, nitrogen dioxide, and particulate matter, act as risk factors for the development or aggravation of AD. These air pollutants probably induce oxidative stress in the skin, leading to skin barrier dysfunction. A lesser-known fact is that they also cause **oxidative damage** to the skin cells. They increase the **free radicals** or toxins in the skin, leading to **allergic**

rashes, itching, blotchy skin, dry skin and increased skin sensitivity. In the deeper skin layers, there is collagen degradation and increased pigment formation resulting in **fine lines, open pores, wrinkles and increased pigmentation.** Chronic inflammation of the skin also causes **rosacea** or redness of the face.

Atopic dermatitis is long lasting (chronic) and tends to flare periodically. It may be accompanied by asthma or hay fever.

Pollution creates a layer of chemicals that leads to inflammation. So, cleansing in the morning and night is a skin-care necessity. Cleanse, double cleanse or even triple cleanse, if need be, especially at night, to remove residue of pollution from the skin.

CONCLUSION

Among the many risk factors for the development of atopic eczema (AE), the influence of air pollution has recently been discussed more often. Exposure to air pollution and smog increases the chances of eczema, acne, and rashes. Pollution also affects the microbiome of skin.

It is very important to identify and control risk factors from the environment in susceptible subjects for successful treatment and prevention. Both indoor

and outdoor air pollution, which is of increasing concern with urbanization, is well-known environmental risk factors for Atopic Dermatitis.

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