

## Impact of UV Rays in Causing Skin Cancer in India

\*Dr. Urmil Mahalawat

### ABSTRACT

An increase in the cases of skin cancer in India has always been a topic of concern among the population. To stop and prevent this from happening it's important that we know what is skin cancer, how it's spread and how to prevent it. More than that what are the areas of concern in India leading skin cancer. Some local regional factors also affect the ratio of skin cancer in India. However necessary precautions can be taken to prevent it.

**KEY WORDS:** Skin cancer, uv radiation, sunlight, arsenic, genetic predisposition, carcinoma, melanoma, skin exposure, sunscreen, melanin, day-light, tanning

### INTRODUCTION

Skin cancer is the most common form of cancer. It occurs when there is an irregular growth of skin cells most often develops on skin exposed to the sun. But this common form of cancer can also occur on areas of our skin not ordinarily exposed to sunlight. There are three major types of skin cancer:

1. Basal cell carcinoma,
2. Squamous cell carcinoma
3. Melanoma.

Skin cancer develops primarily on areas of sun-exposed skin, including the scalp, face, lips, ears, neck, chest, arms and hands, and on the legs in women. But it can also form on areas that rarely see the light of day like palms, beneath fingernails or toenails, and genital area.

Skin cancer affects people of all skin tones, including those with darker complexions. When melanoma occurs in people with dark skin tones, it's more likely to occur in areas not normally exposed to the sun, such as the palms of the hands and soles of the feet.

### CAUSES OF SKIN CANCER

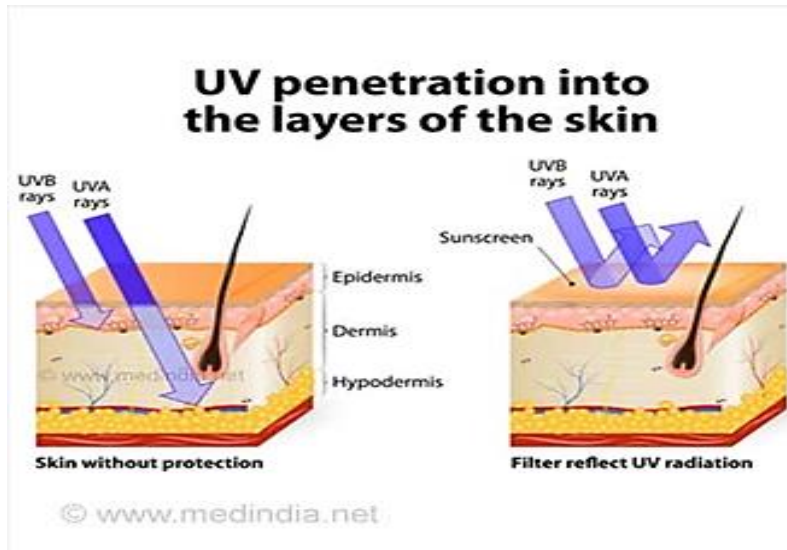
- **Fair skin** - Anyone, regardless of skin color, can get skin cancer. However, having less pigment (melanin) in a person's skin provides less protection from damaging UV radiation. If a person have blond or red hair and light-colored eyes, and freckle or sunburn easily, they're much more likely to develop skin cancer than in a person with darker skin.

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- **A history of sunburns** - Having had one or more blistering sunburns as a child or teenager increases a person's risk of developing skin cancer as an adult. Sunburns in adulthood also are a risk factor.
- **Excessive sun exposure** - Anyone who spends considerable time in the sun may develop skin cancer, especially if the skin isn't protected by sunscreen or clothing. Tanning, including exposure to tanning lamps and beds, also puts humans at risk. A tan is a skin's injury response to excessive UV radiation.



- **Sunny or high-altitude climates** - People who live in sunny, warm climates are exposed to more sunlight than are people who live in colder climates. Living at higher elevations, where the sunlight is strongest, also exposes to more radiation.
- **Moles** - People who have many moles or abnormal moles called dysplastic nevi are at increased risk of skin cancer. These abnormal moles which look irregular and are generally larger than normal moles are more likely than others to become cancerous. If a person has a history of abnormal moles, they should watch them regularly for changes.
- **Precancerous skin lesions** - Having skin lesions known as actinic keratoses can increase a person's risk of developing skin cancer. These precancerous skin growths typically appear as rough, scaly patches that range in color from brown to dark pink. They're most common on the face, head and hands of fair-skinned people whose skin has been sun damaged.
- **A family history of skin cancer** - If one of a person's parents or a sibling has had skin cancer, they may have an increased risk of the disease.

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- **A personal history of skin cancer** - If anyone developed skin cancer once, they're at risk of developing it again.
- **A weakened immune system** - People with weakened immune systems have a greater risk of developing skin cancer. This includes people living with HIV/AIDS and those taking immunosuppressant drugs after an organ transplant.
- **Exposure to radiation** - People who received radiation treatment for skin conditions such as eczema and acne may have an increased risk of skin cancer, particularly basal cell carcinoma.
- **Exposure to certain substances** - Exposure to certain substances, such as arsenic, may increase your risk of skin cancer.

### SKIN CANCER IN INDIA

The skin cancer incidence in India is low in proportion (0.5--4.8 among females and 0.04--6.2 among males) to all other cancers in comparison with regions of the world (8.1--79.6 in females and 5.1--79.1 in males).

Most cases of skin cancer arise in areas of direct exposure to the sun. Non-exposed areas are occasionally affected, remarkably more often in the heavily pigmented skin. When the genitalia are affected, typically patients in this part of the world are very late in seeking medical attention. Sunlight and arsenic exposure are the usual culprits in the causation of skin cancer. Kangri cancer is, of course, a well-known pattern of skin cancer that develops on or over rash which is created after sun or heat exposure. It is typically seen to occur on the lower extremities and the abdominal wall following the use or exposure of kangri, an indigenous fire pot tucked in between the thighs to generate warmth during the winter months. This cancer is seen exclusively among the impoverished people of the Kashmir valley, and was reported as early as in 1879. These tumors have an aggressive biological behavior with a substantial risk of loco-regional metastasis in 20-50% cases.

### UV Radiation

UV radiation is part of the natural energy produced by the sun. On the electromagnetic spectrum, UV light has shorter wavelengths than visible light, so our eyes can't see UV, but our skin can feel it. Tanning beds also emit UV radiation.

Two types of UV light are proven to contribute to the risk for skin cancer:

Ultraviolet A (UVA) has a longer wavelength. It is associated with skin aging.

Ultraviolet B (UVB) has a shorter wavelength. It is associated with skin burning.

While UVA and UVB rays differ in how they affect the skin, they both do harm. Unprotected exposure to UVA and UVB damages the DNA in skin cells, producing genetic defects, or mutations, that can lead to skin cancer and premature aging. UV rays can also cause eye damage, including cataracts and eyelid cancers.

UV radiation is a proven human carcinogen, causing basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). These types of cancers often appear on sun-exposed areas of skin. Fortunately, when discovered and treated early, these common skin cancers are usually curable.

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UV exposure that leads to sunburn has proven to play a strong role in developing melanoma, a dangerous type of skin cancer. Research shows that the UV rays that damage skin can also alter a gene that suppresses tumors, raising the risk of sun-damaged skin cells developing into skin cancer. The ozone layer is an absorber of UV radiation and the World Health Organization explained, "As the ozone layer gets thinner, the protective filter activity of the atmosphere is progressively reduced"

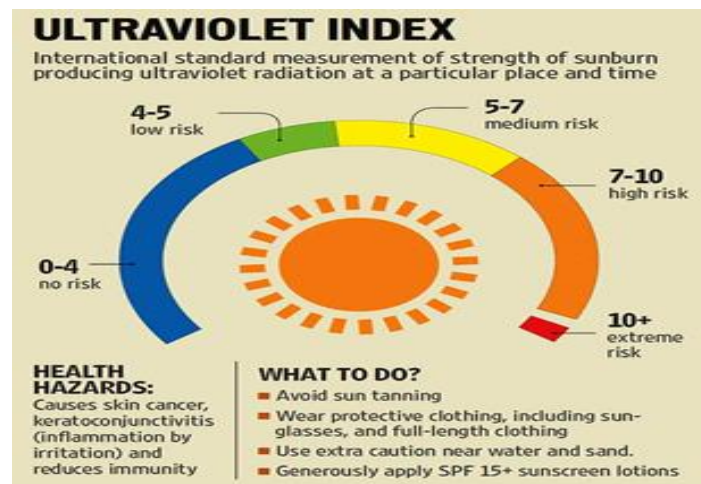
The previous studies have shown that genetic factors that make people more vulnerable to cancers caused by arsenic exposures played an important role in such cancers. People in the Eastern region, along the Ganga and parts of North India are prone to arsenic exposure. Meanwhile, exposure to ultraviolet B radiation is directly linked to skin cancers. The skin types prevalent in the Northeast, along with high UV radiation in that area, can explain the higher incidence of skin cancers.

The increased melanoma incidence in Delhi does not seem to have any reasonable explanation. It is suspected that the high incidence in Delhi is simply a result of referral bias that is more people with the disease have access to cancer hospitals and get admitted.

It is also suggested that men possibly have a higher incidence of skin cancer because they are more likely to have increased outdoor occupational activity and hence higher UV light exposure.

The ultraviolet index, or UV index, is an international standard measurement of the strength of the sunburn-producing ultraviolet (UV) radiation at a particular place and time. It is primarily used in daily and hourly forecasts aimed at the general public. The UV index is designed as an open-ended linear scale, directly proportional to the intensity of UV radiation, and adjusting for wavelength based on what causes human skin to sunburn. The purpose of the UV index is to help people effectively protect themselves from UV radiation.

Maximum value 16.73 of UVI is observed at Bhopal during monsoon season whereas minimum value 2.18 is noted at Srinagar in winter. Seasonal decadal trend are found to vary from -0.19 to +0.15.



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## PREVENTION

- **Avoid the sun during the middle of the day** - In India , the sun's rays are strongest between about 10 a.m. and 4 p.m. Schedule outdoor activities for other times of the day, even in winter or when the sky is cloudy.

Humans absorb UV radiation year-round, and clouds offer little protection from damaging rays. Avoiding the sun at its strongest helps avoid the sunburns and suntans that cause skin damage and increases risk of developing skin cancer. Sun exposure accumulated over time also may cause skin cancer.

- **Wear sunscreen year-round** - Sunscreens don't filter out all harmful UV radiation, especially the radiation that can lead to melanoma. But they play a major role in an overall sun protection program.

Use a broad-spectrum sunscreen with an SPF of at least 30, even on cloudy days. Apply sunscreen generously, and reapply every two hours — or more often while swimming or perspiring. Use a generous amount of sunscreen on all exposed skin, including lips, the tips of ears, and the backs of hands and neck.

- **Wear protective clothing** - Sunscreens don't provide complete protection from UV rays. Cover skin with dark, tightly woven clothing that covers arms and legs, and a broad-brimmed hat, which provides more protection than a baseball cap or visor does.

Use of photoprotective clothing.

- **Avoid tanning beds** - Lights used in tanning beds emit UV rays and can increase risk of skin cancer.

- **Be aware of sun-sensitizing medications** - Some common prescription and over-the-counter drugs, including antibiotics, can make our skin more sensitive to sunlight.

- **Check skin regularly and report changes to doctor** - Examine skin often for new skin growths or changes in existing moles, freckles, bumps and birthmarks.

Check for any abnormal growth on body every month and consult a doctor if any abnormality found

## CONCLUSION

In conclusion, UV exposure have made some segments of India's population vulnerable to different forms of skin cancer along with arsenic exposure and genetic factors playing a tiny role alongside it. Areas with direct sunlight and long day duration have also played a major role in causing skin cancer

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in India. Some local regional factors like Kangri have also contributed to the exposing the local population to skin cancer. But all this can be wisely avoided by preventing simple things as mentioned above.

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