

# Effects of Ultraviolet Rays on the Eyes in a Tertiary Referral Hospital in Tamil Nadu

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## Abstract

**Introduction:** Ultraviolet (UV) radiation from the sun can trigger the onset of various ophthalmic problems.

**Aim:** To assess the pattern of eye diseases caused by UV rays at Government Vellore Medical College and Hospital.

**Materials and Methods:** Retrospective study was conducted from February 2017 to May 2017 around 673 patients who came with ocular defects due to sunlight were considered for study. We recorded the data based on the type of presentation of disease. The data were analyzed statistically by simple proportion.

**Results:** Of the 673 patients examined most common age group is 40-50 years, more predominant in males. The most common disease being cataract. The patients were managed appropriately.

**Conclusion:** Our study shows a male preponderance and the most common age group being 40-50 years. The most common disease found is cataract. Hence, there is an urgent need for reinforcement of the protective wear during exposure to sunlight thereby preventing the ill effects.

**Key words:** Cataract, Conjunctivitis, Sunlight, Ultraviolet Radiation

## INTRODUCTION

Hot weather, strong sun, sun bath, swimming pools, air conditioning, and dry atmosphere are all factors that can adversely affect the eye and cause vision problems. Summer is the time when we look forward to either for a holiday or a weekend getaway. Ultraviolet (UV) radiation from the sun can trigger the onset of a range of eye diseases.

Summer is the time of optimism where the days are longer, and flowers are at their best. Most of the time is spent outdoors. This is the time of the year where we recharge our batteries and our bodies get prepared for the colder months.

UV radiation sits adjacent to the blue end of the visible portion of the electromagnetic spectrum constituting

400-100 nm wavelengths. The sun is the natural source of UV energy.

It is hypothesized that UV rays from the sun can invite formation of free radicals which cause protein modification and peroxidation. As far as the eye is concerned the cornea and the lens are the most important tissues absorbing UV radiation. Below 300 nm (UV-B) it is the cornea that absorbs most radiation, the lens absorbs UV-A of <370 nm. "UV-A light-excited kynurenines oxidize ascorbate and modify lens proteins through the formation of advanced glycation end products: Implications for human lens aging and cataract formation."<sup>1</sup>

## MATERIALS AND METHODS

Our study was done in a ophthalmology Outpatient Department (OPD) of a tertiary hospital in South India. Of the 5,559 patients who attended ophthalmic OPD at Government Vellore Medical College from February 2017 to May 2017. 673 patients were affected due to sunlight. The patients who already had eye diseases such as glaucoma and operated eyes were excluded from the

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**Month of Submission :** 05-2017

**Month of Peer Review :** 06-2017

**Month of Acceptance :** 07-2017

**Month of Publishing :** 07-2017

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study. A thorough ophthalmic examination was done which included visual acuity measurement by Snellen chart, slit-lamp examination to evaluate anterior segment problems and fundus examination by indirect ophthalmoscopy and slit lamp by microscope. Intraocular pressure was measured in all patients except with cornea involvement. The data collected included age, sex, and type of ocular disease. The data were finally analyzed statistically by simple proportion.

## RESULT AND DISCUSSION

In our study, of 673 patients, 60% of the patient belonged to the age group of 40-50 years. 71% of them were males and 29% were females. UV radiation from the sun can trigger the onset of cataracts. It is a common misconception that the cataracts are solely age related. This is not so. Sunlight acts as an additional factor in hastening the process of cataract formation.

In our study, most of the patients in 40-50 years were affected (Table 1).

In our study, mostly males were affected. This may be attributed to their work outdoor and exposure to sunlight henceforth (Table 2).

In our study, cataract formed the major bulk of the causes. The conjunctiva was affected next either due to allergy or a degenerative disease because of the UV exposure. This was followed by corneal involvement like keratitis. The lids were affected due to lack of hygiene resulting in chalazion or sty. Dry eye was commonly noticed in some of the patients, more so in patients with exposure to air conditioner vents (Table 3).

Sunlight reflected from the surface of water, or other reflective medium can cause conjunctivitis and keratitis. Conjunctivitis as otherwise called "Red eye" is associated with redness, watery discharge, and running nose.

Keratitis may involve a wide variety of infections and inflammation. It should be treated at the earliest to prevent corneal scarring thereby resulting in permanent blindness.

The conjunctiva is easily damaged by UV, which activates a complex series of oxidative reactions and distinct pathways of cell death.<sup>2</sup> There is strong epidemiological evidence to support an association between chronic UV exposure and the formation of a pterygium.<sup>3,4</sup> This wing-shaped thickening of the conjunctiva and cornea is particularly seen in people who live in sunny climates and those who work outdoors.<sup>5</sup> The prevalence of pterygia occurring on the nasal conjunctiva has been explained by peripheral

**Table 1: Age distribution**

Age group (years)	Number of patients (%)
20-30	15 (2.2)
30-40	35 (5.2)
40-50	403 (60)
50-60	120 (17)
60-70	100 (14)

**Table 2: Sex distribution**

Sex	Number of patients (%)
Male	478 (71)
Female	195 (29)

**Table 3: Pattern of ocular disease**

Type of disease	Number of patients (%)
Cataract	373 (55)
Infective conjunctivitis	49 (7)
Allergic conjunctivitis	102 (15)
Keratitis	16 (3)
Dry eyes	10 (2)
Pterygium	83 (12)
Chalazion/stye	40 (6)

light focusing onto the medial anterior chamber beneath the limbal corneal stem cells.

Actively dividing stem cells are likely to have a lower damage threshold than non-mitotic corneal epithelial cells.

The aggravating factor for infections of the conjunctiva and cornea is lack of hygiene. In hot summer, bugs of all sorts multiply fast so it is essential to instruct the patients to maintain cleanliness and particularly washed hands frequently.

Looking directly at the sun, the solar rays can cause permanent loss of sight at any age. Patient must be advised to wear proper quality sunglasses. The better lens colors are brown, gray, or green and preferably avoid very dark and very light lens.

Continuous exposure air conditioning vents will cause drying out of the surface of the eye. To keep the eyes clear, sparkling and healthy it is essential to keep the surface naturally irrigated. Blinking of the eye consciously rapidly a few times helps in regulating the natural moisturizing effect.

Even in chlorinated swimming pools, blinking is better as chlorine is an irritant that affects the eyes, and excessive exposure can cause conjunctivitis or keratitis. The use of swimming goggles is another measure of avoiding exposure to chlorinated water.

Dust particles and pollen are a hazard in summer months and can provoke or accelerate an allergy which has detrimental effect on the eyes. Close-fitting wraparound sunglasses keep out the dust and pollen thereby providing a physical protection to the eyes. Prompt treatment with qualified ophthalmologists and controlling the dryness with medications and avoiding exposure to dust will go a long way in the management of allergic conjunctivitis.

## CONCLUSION

Based on our study, the most common age group affected was 40-50 years and males because of their greater exposure to sunlight. A few useful tips to prevent eye diseases due to sunlight:

1. Cold compress to the closed eyes.
2. Frequent use of lubricating eye drops prescribed by ophthalmologists.
3. Use of sunglasses outdoors.
4. Avoid direct splashing of water into open eyes.
5. Avoid contact lens and eye makeup if eyes are feeling sore.

According to a national sun safety survey conducted by the American Academy of Ophthalmology, only about half of people who wear sunglasses say they check the UV rating before buying. The good news is that you can easily protect yourself. To be eye smart in the sun, the American Academy of Ophthalmology recommends the following:

Wear sunglasses labeled “100% UV protection”: The use only glasses that block both UV-A and UV-B rays and that are labeled either UV 400 or 100% UV protection.

- Choose wraparound styles so that the sun’s rays cannot enter from the side.

- If you wear UV-blocking contact lenses, you will still need sunglasses.

Wear a hat along with your sunglasses; broad-brimmed hats are best.

Remember the kids: Its best to keep children out of direct sunlight during the middle of the day. Make sure they wear sunglasses and hats whenever they are in the sun.

Know that clouds do not block UV light: The sun’s rays can pass through haze and clouds. Sun damage to the eyes can occur any time of year, not just in summer.

Be extra careful in UV-intense conditions: Sunlight is strongest mid-day to early afternoon, at higher altitudes, and when reflected off of water, ice, or snow.

By embracing these simple tips you and your family can enjoy the summer sun safely while protecting your vision.<sup>6</sup>

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**How to cite this article:** Sharmila N, Pramila B. Effects of Ultraviolet Rays on the Eyes in a Tertiary Referral Hospital in Tamil Nadu. *Int J Sci Stud* 2017;5(4):137-139.

**Source of Support:** Nil, **Conflict of Interest:** None declared.