

# Pattern of Keratoconus - A Hospital Based Study

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## ABSTRACT

**Aim:** To study the pattern of keratoconus including age, sex, and risk factors such as eye rubbing, UV exposure.

**Material And Methods:** Retrospective hospital based study including 437 diagnosed patients of keratoconus in the year 2022.

**Results:** In our study the prevalence of keratoconus was 0.5%. The mean age of keratoconus patients in our study was 25.67 years. Males (54.7%) were affected more than females (45%). Maximum number of cases were from Srinagar followed by Pulwama and Budgam districts. Most of the patients gave itching and eye rubbing as a symptom and were associated with VKC.

**Conclusion:** We believe that the prevalence of keratoconus in Kashmir is way beyond which is diagnosed. This is because of the lack of proper investigative tools. The number is just the tip of iceberg which we got in our hospital. Moreover, eye rubbing, VKC and UV exposure has been the most important risk factor.

**Keywords:** Keratoconus, Corneal Topography, Prevalence, Distribution.

## INTRODUCTION

Keratoconus is a bilateral, progressive, non-inflammatory corneal disorder, leading to thinning & protrusion of cornea, which assumes a conical shape.<sup>(1)</sup> Keratoconus was first described by Nottingham in 1854.<sup>(2)</sup> This results in irregular astigmatism, visual impairment.<sup>(3,4)</sup> Keratoconus occurs at around puberty, progresses and continues till third or fourth decade.<sup>(5,6)</sup> The exact cause of keratoconus is uncertain, but it

has been associated with detrimental enzymatic activity within cornea.

The disease is multifactorial with genetics and certain environmental risk factors, the most recognized environmental factor is eye rubbing.<sup>(5-13)</sup> The repeated mechanical pressure on cornea causes structural modification of collagen.<sup>(14)</sup> Keratoconus is associated with certain systemic condition like Down's syndrome, Ehlers-Danlos syndrome, and connective tissue disorder.<sup>(15)</sup> Vernal conjunctivitis, computer vision syndrome results in ocular surface irritation and could be associated with keratoconus.<sup>(16,17)</sup> Though frequently symmetric between eyes in same patient, cases of unilateral keratoconus have been reported.<sup>(18,19)</sup>

Various corneal signs are seen in keratoconus which include:

- Oil droplet reflex
- Charleaux's sign
- Scissoring reflex on retinoscopy
- Rizzuti's sign
- Vogt striae
- Munson's sign
- Fleischer ring
- Hydrops in advanced keratoconus.

Corneal pachymetry, tomography and topography are the principal diagnostic tools to establish diagnosis of keratoconus.<sup>(20)</sup> Keratoconus has significant impact on quality of life and treatment modalities to halt its progression (such as corneal collagen cross linking) or to improve vision by contact lenses, intracorneal ring implantation or keratoplasty have shown

good results but are not free of risk and financial burden.<sup>(21-23)</sup>

**MATERIAL AND METHODS**

It is a retrospective hospital based study done from Jan 2022 to Dec 2022 at tertiary care hospital in Srinagar (J@K).

**Inclusion criteria:**

Diagnosed cases of keratoconus, confirmed by clinical evaluation & on topography (Sirius topo-tomographer Italy) of any age group in the year 2022.

**Exclusion Criteria**

- Ocular Trauma.
- Any other ocular pathology like corneal ulcer, glaucoma etc.
- Any previous refractive surgery.

**RESULTS**

Out of total 87,461 patients who visited hospital during this period, 437 were diagnosed with keratoconus (0.5%). Among 437 patients, 239 (54.7%) were males and 198 (45.3%) were females.

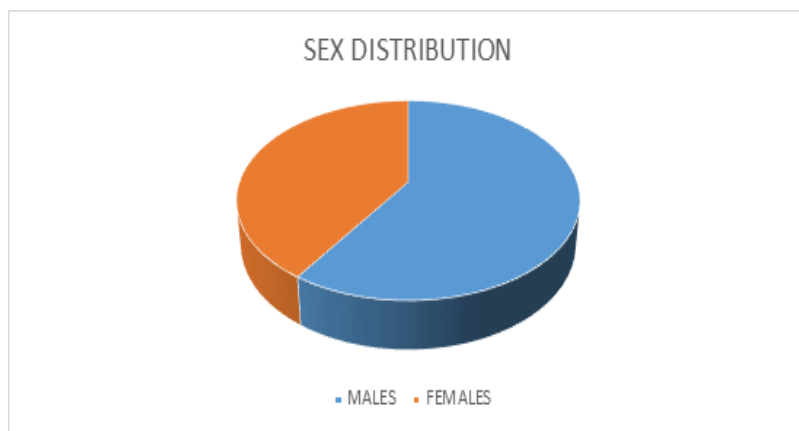


Figure 1. Age range was from 7 to 80 years, with a mean age of 25.65 years ± 12.24 years (Mean ±SD).

**Table 1: Age distribution of the patients.**

Age Group	No. of Patients	Percentage (%)
0 – 10	6	1.4
10-20	133	30.4
20-30	202	46.2
30-40	57	13.1
40-50	9	2.1
50-60	8	1.8
60-70	15	3.4
70-80	7	

Thus majority (76.6%) of patients were between 10 to 30 years of age.

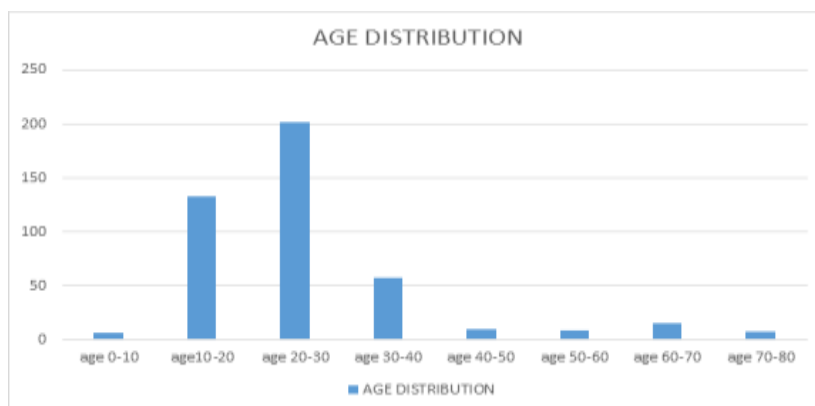
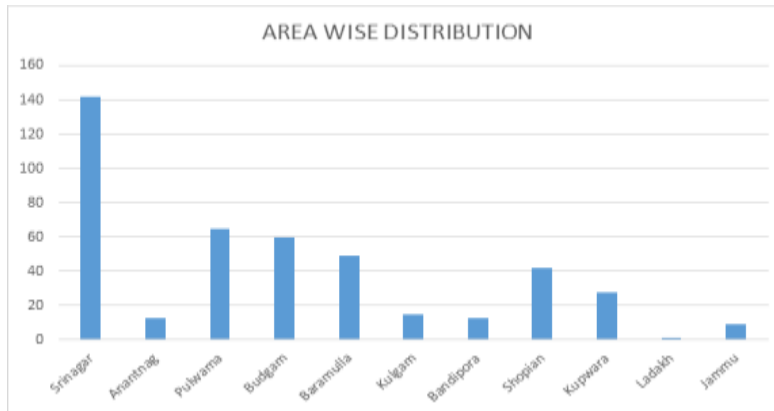


Figure 2.

**Table 2: Area wise distribution of patients.**

AREA	NUMBER OF PATIENTS	PERCENTAGE (%)
Srinagar	142	32.5
Anantnag	13	3
Pulwama	65	14.9
Budgam	60	13.7
Baramulla	49	11.2
Kulgam	15	3.4
Bandipora	13	3
Shopian	42	9.6
Kupwara	28	6.4
Ladakh	1	0.2
Jammu Division	9	2.1



**Figure 3**

## DISCUSSION

Prevalence of keratoconus in our study was 0.5%. The prevalence of Keratoconus varies widely, ranging from 0.0003% to 2.3% in different studies.<sup>(24,25)</sup> Geographical area with cooler climates and less sunshine such as Finland, Denmark, Minnesota, Japan and Russia have lesser prevalence compared to the areas with lot of sunshine and hot weather such as India and the Middle East.<sup>(24-29)</sup> Likewise, Kashmir being a cold place in India is supposed to have low prevalence.

The mean age of keratoconus patients in our study was 25.67 years. This was similar to the previous studies from India majority of the patients were in the age group of 20 to 30 years.<sup>(30,31)</sup> Keratoconus is a disease of young adults, onset is usually around puberty.<sup>(32)</sup> Keratoconus presents at younger age in Indian population than in West, earlier age of onset is associated with rapid progression.<sup>(30,33)</sup>

In our study we found that about 54.7% males were affected than 45% females. This is in accordance with a study in India where male preponderance was found,<sup>(33,34)</sup>

although some studies have shown female preponderance in India.<sup>(30,31)</sup> Some studies have reported no gender predisposition.<sup>(35,36)</sup> Increased incidence of Keratoconus in males can be because of more outdoor activities and UV exposure. Association of keratoconus with UV exposure has been reported. Excessive UV exposure causes exudative damage to cornea resulting in reduced amount of key enzymes catalase, aldehyde dehydrogenase or superoxide dismutase that are necessary in the removal of proinflammatory reactive oxygen species.<sup>(37,38,39)</sup>

In our study we found that maximum number of cases were from Srinagar followed by Pulwama and Budgam districts. In our study we found that most of the patients gave itching and eye rubbing as a symptom and were associated with VKC. This is in accordance to the previous studies where they found strong association between eye rubbing and multivariate analysis.<sup>(10,40-42)</sup> The repeated mechanical pressure on cornea causes structural modification of collagen.<sup>(14)</sup>

## CONCLUSION

We believe that the prevalence of keratoconus in Kashmir is way beyond which is diagnosed. This is because of the lack of proper investigative tools like topography, usually patients get neglected and are advised changing of glasses only as keratoconus keeps on progressing. Keratometry reading only cannot lead to diagnosis. The number is just the tip of iceberg which we got in our hospital. Moreover, eye rubbing, VKC and UV exposure has been the most important risk factor.

### Declaration by Authors

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

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