



Review Article

Prevalence of Pterygium and its Related Factors in India

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Abstract

The pterygium is very common condition, among the Indian people which usually follow a normal course, with slight variations in the appearance having almost nil effect on the visual acuity or on the eye as a whole. This review was envisaged with an aim to measure the pterygium's prevalence and its prime determinants in Indian scenario. A narrative review was done by searching (on PubMed and Google scholar search engine). The importance of factors like geographical region, environment, etc. in various age groups having pterygium was also observed and reviewed. The available data about the prevalence and associated risk factors of pterygium were studied based on wide population cross-sectional survey-based studies. A strong association amongst various risk factors and pterygium was observed which implies a multi-factorial nature of this disease. The prevalence of pterygium is in direct relation with the older aged people, outdoor working professionals and prominent in males.

Keyword: Pterygium, Factors, UV, Old aged, Association

1. Introduction

A pterygium (from the Greek, pterygos, "little wing") is a wing appearance like vascular, fleshy growth with whitish-yellow color that actually originates from the conjunctival tissue and extends up to the limbal area or at times spreads beyond limbus onto cornea. The pterygium is very common condition, among the Indian people which usually follow a normal course, with slight variations in the appearance having almost nil effect on the visual acuity or on the eye as a whole. The initial stage of pterygium is generally asymptomatic; little investigation or study has been done till now to better understand its natural course, history and treatment protocol. Most eye specialists/ practitioners consider it as non-significant condition till it actually blocks the visual axis and in turn the vision. According to Hassan Hashemi et al, Pterygium is associated with a variety of factors such as UV light of sun which is believed to be the probable reason of pterygium due to high prevalence in the tropical area [1].

Also, pterygium has been found to be associated with various demographic factors such as age, sex, ethnic background and environmental conditions for eg., occupations with outdoor exposure etc. According to Shi Song Rong *et.al*, though its pathogenesis is hardly understood, many possible factors responsible for the origination of pterygium had been identified or confirmed, like ageing, male gender specific and exposure to UV -light (low level latitude and outdoor job). Smoking, a manageable factor and an important community health concern, has been regarded as a key causative factor of pterygium [2]. As per Raffaele Nuzzi & Federico Triadic, Pterygium is considered as an unwanted growth of epithelial as well as fibro-vascular tissue that spreads beyond the limbus onto the cornea which leads to defective vision (because of outgrowth or resultant astigmatic error/toxicity) or frequent inflammation [3]. Pterygium is the outcome of increased epithelial cell formation with enhanced vascularization.

1.1 Morphological structure

A pterygium has three components: the cap or starting edge, the head portion and the tail area. The cap is a flat-shaped region over the cornea that is mostly made-up of fibroblasts that, after invading destroy Bowman's layer. The head comprises of vasculature that follows the cap and is strongly joined to the cornea. The mobile

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portion of the bulbar conjunctiva is the tail area, which is easily dissectible from the below tissue [4]. Stocker's line is an indicator of the chronic nature of pterygium.

1.2 Etiological basis

Many researchers tried to gather information regarding the pathogenesis of a pterygium; although the etiology is not fully understood. Mostly all researches have depicted variation in incidence due to geographical conditions, higher prevalence was seen in places/regions nearby the equator because of the harmful UV rays, mainly UV-B[5]. It is assumed that these rays lead to mutations in the p53 tumor suppressor gene, thus in turn results in abnormal proliferation of limbal epithelium membrane. Sub-epithelial tissue demonstrates age-related elastosis of the stromal membrane having defective collagen fibers. The Bowman's layer degenerates with invasion of the superficial region of cornea. Therefore, positive immuno-histo-chemical staining is seen in epithelial cell of pterygium for different types of matrix metallo-proteinases that are usually absent in corneal, conjunctival or limbal cells.

1.2 Symptomatic condition

Initially non-symptomatic; but later, symptoms of dry eye (like irritation, itching sensation or watering) due to the uneven lubrication of the anterior corneal layer. With progression of the condition, pterygium increases in length and appears more visible and hence more cosmetically unpleasant in appearance. Further uncontrolled growth may result in decreased vision because of resultant astigmatism error due to obstruction of the visual axis.

Although the correct pathogenesis of this condition is not actually known, "the pathogenic factors associated with pterygium origin or formation are UV rays, viral infections (mainly herpes simplex virus, cytomegalovirus, etc.), epigenetic aberrations, conversion from epithelial to mesenchymal tissue, mechanisms of inflammation and anti-apoptosis, neo-angiogenic up-regulation, stimulation of lymph-angiogenic response, de-regulation of extracellular matrix modulators, growth factors, recruitment of bone marrow-derived stem and progenitor cells, and alterations in cholesterol metabolism". Anguria *et al.* inferred that hereditary predisposition may be probable reason for the origin as well as persistence of pterygium [6]. There was no clarity about the role of smoking in pterygium origin and also evidences were not in conformity. Pinguecula, regarded as the primary form of pterygium which never encroaches the cornea. The prevalence of pterygium was found to vary from 1.2% to 40% approximately in different regions or parts of the world. The prevalence of pinguecula is quite higher than the pterygium (reported in nearly 70% of people with >49 years age). "Pterygium belt" is located b/w 37° north and south of equator in many Asian countries. Therefore, Pterygium has been considered as

one of the most common chronic eye diseases in Asia and other regions located near to this equatorial belt. Living in rural area is one of the most important associated factors of the prevalence of pterygium. Hence, the higher risk of pterygium in rural regions is because of environmental and lifestyle-based factors as well as poor access to basic medical or public health services. This review was planned with an objective to measure the prevalence of pterygium in addition to its causative factors in Indian scenario.

2. Methodology

A narrative review was done by searching (on PubMed and Google scholar search engine) and referring previously conducted India-based research studies. The comparisons were made to know the various causes and management techniques of pterygium employed in urban and rural background in India. The importance of factors like geographical region, environment, etc. in various age groups having pterygium was also observed and reviewed.

3. Discussion

Pterygium prevalence varied from 9.5% in Tamil Nādu to 11.7% in Andhra Pradesh (AP) while 8.47% in Central India. The lower prevalence in Central India was because of the inclusion of different age groups were included in various studies.

The prevalence % along with the probable causative factors for pterygium from wide population based cross-sectional researches in Table-1. Pterygium was found out to be a multi-factorial condition. Strong correlation was seen between the pterygium as well as older age and outdoor job. Increase in pterygium with rise in age was found to be due to the enhanced exposure life span to UV light. Higher cases of pterygium among males in comparison to females indicated gender-based association.

Much higher pterygium's prevalence was observed among people with lower education levels and low socio-economic status in many studies. In the rural population, significantly higher prevalence of pterygium was seen in majority of the researches. Andhra Pradesh people-based study found to have higher risk of pterygium in hypertensive patients. No significant association between pterygium and hypertension and even diabetes was established in South and Central India based studies. Due caution has to be taken when confirming hypertension and diabetes as these are mainly based on self-reporting only which can lead to underestimation the prevalence as most people is actually unaware of the existence of the disease. Alcohol intake and smoking as risk factors for pterygium were mainly misunderstood. Higher level of prevalence of pterygium was seen who reported higher alcohol intake in comparison to who were teetotaler.

Table-1. Comparison of Pterygium's prevalence in various geographical regions of India

Place	Study year	Age interval	Prevalence %	Variable in the multivariable model	Significant probable causative factor in the multivariable analysis
Tamilnadu [7]	2001- 04	≥ 40	9.5	Smoking, Alcohol, Nature of work, Diabetes, Hypertension	UV exposure, Rural Residence, Older age, Socio-economic Status
Andhra Pradesh [8]	2013	≥ 30	11.7	Smoking, Alcohol, Outdoor work, Hypertension	UV exposure, Rural Residence, Older age, Socio-economic Status
Central India [9]	2013	≥ 30	8.47	Smoking, Alcohol, Outdoor work, Level of education	UV exposure, Rural Residence, Age group, Economic Status
North India [10]	2016- 17	31- 50	7.9	Outdoor job, Level of education	Socio-demographic factors especially age, gender, profession, Level of position

40% of people having Pterygium were in the age group of 31-40 years. 60% males in comparison to females (40%) provided the evidence about the prevalence among males. More reported cases of pterygium in rural areas (66.67%) than urban areas (33.33%) indicated the effect of environmental factors. The results pointed towards the effect of occupational nature (outdoor or indoor) on pterygium subjects. The higher cases of the condition were seen among farmers (35.56%) in comparison to indoor office workers (12.22%) and housewives (13.33%). Pterygium was prevalent followed the nasal course (97.78%). Progressive nature of the pterygium was found in 80% subjects while 20% had atrophic type pterygium.

According to the age group, the susceptibility of pterygium rises in subjects from their third decade of life (who usually works outdoors). Quite similar results were seen by Chavan WM et al. [11], they found progressive pterygium to the tune of 72.4% while atrophic ones 27.6% cases. In his study on 115 pterygium subjects, Krishnaram K [12] found that nearly 78 had progressive while 37 had atrophic type pterygium.

Conclusion

The available data about the prevalence and associated risk factors of pterygium were studied based on wide population cross-sectional survey-based studies. A strong association amongst various risk factors and pterygium was observed which implies a multi-factorial nature of this disease. The prevalence of pterygium is in direct relation with the older aged people, outdoor working professionals and prominent in males.

Conflicts of Interest

Authors declare that there are no conflicts of interest.

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