A Hospital Based Study of Pterygium in Tertiary Care Hospital of Nepal

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ABSTRACT

Background

Pterygium, a triangular fibrovascular subepithelial growth of degenerative bulbar conjunctival tissue over the limbus onto the cornea, is one of the common ocular conditions that may result in discomfort, tearing, photophobia and significant visual impairment. Little is known about its epidemiology in Nepalese context.

Objective

The current study aims to analyze the epidemiology of pterygium in a hospital-based population in Kavre District, a mid hilly region of central Nepal.

Method

This was a prospective hospital based study carried out in the Department of Ophthalmology in Dhulikhel Hospital, Kathmandu University Hospital for a period of one year from January to December 2013. All the patients with pterygium, aged 21 years and above attending the outpatients department were included into the study. The epidemiological data was collected using a standard questionnaire and complete ocular examination was performed by the Ophthalmologist.

Result

A total of 7925 patients were seen in the Ophthalmology outpatient department during a one year period, out of which 5622 patients (age range 20-80 years) were eligible for the study. A total of 137 patients, 43(31.4%) males and 94 females (68.6%) had different grades of pterygium with mean age of 48.6± 12.8 years. The overall prevalence of pterygium was 2.4 %. Majority of the patients with pterygium were between 41-60 years. Fifty-eight percent of pterygium were of grade I followed by 41% of grade II. Unilateral and nasal pterygia were common.

Conclusion

The prevalence of pterygium is low in this hospital based population, majority of cases affecting females and old age population.

KEY WORDS

Prevalence, pterygium, risk-factors

INTRODUCTION

Pterygium is a triangular, fibrovascular, subepithelial growth of degenerative bulbar conjunctival tissue over the limbus onto the cornea which may result in discomfort, tearing and photophobia.[1] Apart from being cosmetic blemish, it can cause significant visual impairment induced due to corneal astigmatism and also cause persistent ocular discomfort to the patients often requiring surgical intervention.[2] This disease occurs throughout the world, and the prevalence rates vary widely from 1.30% in Tehran, 10.08% in upper Mustang, 27.20% in Lhasa to 39% in rural Dali China.[3-6] These study populations differ in race, latitude, and sun exposure, but generally prevalence rates in the tropics are higher than at temperate latitudes.[7] The exact etiology and pathogenesis of pterygium which is described as an ophthalmic enigma, remains unclear but it has been linked to excessive ultraviolet exposure that induces oxidative stress and expression of cytokines and growth factors in pterygial epithelial cells, which initiates cellular proliferation, blood vessel formation, tissue invasion, and inflammation.[8,9] Several population based studies have linked pterygium with risk factors like increasing age, male gender, outdoor occupation with ultraviolet (UV) light exposure, rural residence, lower education and low socioeconomic status, cigarette smoking and drinking alcohol.[2,6-18] However, in Nepal, with a large proportion of its population mainly engaged in agricultural activities and several outdoor occupations like manual labourers, porters, etc. there have been only few population-based studies showing the prevalence of pterygium. Hence, this study aims to evaluate the prevalence and sought the epidemiological information about development and effects of pterygium in Nepalese population attending Dhulikhel Hospital, Kathmandu University Hospital which is a tertiary care hospital for the people of Kavrepalanchowk and its surrounding districts. Knowledge thus gained about the risk factors, causes, impact on vision, severity and the distribution of the disease may be useful in implementing appropriate preventive and treatment strategies against this annoying disease.

METHODS

This is a prospective hospital based study carried out in the Department of Ophthalmology in Dhulikhel Hospital, Kathmandu University Hospital from January to December 2013, for a period of one year after obtaining ethical clearance from Institutional Review Committee of Kathmandu University, School of Medical Sciences.

All the patients with pterygium, aged above 21 years attending the outpatient department, were explained about the study and those who could understand and give consent were enrolled into the study. Written informed consent was obtained from all the subjects before participation. All enrolled cases of pterygium underwent a complete ophthalmological examination by the Ophthalmologist and the relevant data were collected in a standard structured questionnaire by the Ophthalmologist. Visual acuity was assessed by Snellen Vision Box with multiple optotype; E-chart was used for illiterate patients. Both presenting and best corrected visual acuity after refraction was recorded and accordingly the type of refractive error was classified and designated. Presence of astigmatism was defined as cylinder ≥ 0.5 dioptres. Diagnosis of pterygium was made by using a slit-lamp biomicroscope (Haag-Streit model BQ-900, Bern, Switzerland) by the same Ophthalmologist. Pterygia were defined as a radially oriented fibrovascular lesion crossing the nasal or temporal limbus. The number, location, grade and size of pterygia were recorded by the Ophthalmologists using slit lamp with pterygium grading depending on the extent of corneal involvement as follows. Grade I: head of pterygium at the limbus Grade II: head of pterygium present between the limbus and pupillary margin (nasal pupillary margin in case of nasal pterygium and temporal margin in case of temporal pterygium) Grade III: head of pterygium crossing the pupillary margin. If a patient had bilateral pterygia, the grade was classified according to the grade in the worse eye. All the participants underwent dilated posterior segment evaluation and examination of the fundus by 90 diopter Volk lens.

A detailed socio-demographic data was collected from all the participants including personal characteristics like age, sex, level of education, occupation, income, smoking status, alcohol use; environmental variables including job location (outdoors versus indoors), hat or umbrella use, and the use of sunglasses; and medical factors including general medical history, ocular factors including presence of any eye disease or history of eye surgery. Each participant answered a validated questionnaire on the symptoms of dry eyes, such as feeling of dryness, grittiness, burning sensation, redness and tendency to shut the eyes.

Each subject's main occupation was classified as either predominantly 'indoor' (such as office workers, clerks, teachers, etc.) or 'outdoor (such as taxi drivers, construction workers, etc.) based on the nature, location and circumstances of their work. Details on sunlight exposure (number of hours outdoors in the sun) was obtained in hours per day.

Statistical analysis was performed using SPSS version 12.0 with significance attributed to $P < 0.05$. The prevalence rates and 95% confidence intervals (CIs) of pterygium for patients were calculated.

RESULTS

Out of 7925 patients who visited the Ophthalmology outpatient department in one year, 5697 patients (age > 21 years) who met the inclusion criteria were enrolled in this study. Among 5697 patients, 137 patients had pterygium of which 43 males (31.4 %) and 94 females (68.6%) had

Table 1.Prevalence rate of Pterygium according to age and gender

Age Group (Years)	Total No. of patients enrolled	No. of patients with Pterygium	Prevalence Rate (%)	Total male patients	No. of male with Pterygium	Prevalence Rate (%)	Total female patients	No. of female with Pterygium	Prevalence Rate (%)
21-40	3132	43	1.3	1242	14	1.1	1890	29	1.5
41-60	1812	65	3.5	912	21	2.3	900	44	4.9
> 60	753	29	3.8	321	8	2.5	432	21	4.9

different grades of pterygium with mean age of 48.6 ±12.8 years. The overall prevalence rate of pterygium was 2.4% with the rates of 1.2% in males and 2.2% in females respectively. The present study has shown an increasing trend of pterygium in relation to age as the prevalence rate of 3.8% was found to be in the age group >60 years (Table 1). In addition, the prevalence of pterygium was found to be significantly higher (Chi-Square=; p< 0.05) in female patients in comparison to male. The prevalence rate was found to be higher even on the basis of age group when compared with male patients (Table 1 and 2).

Table 2. Prevalence of Pterygium is significantly higher in Male gender.

	Male Population	Pterygium Cases	
Male	2475	43	Chi Sq 79277
Female	3222	94	p value 0.048 (<0.05)

Table 3. Characteristics of patients with Pterygium

Characterritics	Number (%)
Gender	
Male	43(31.4)
Female	94(68.6)
Laterality	
Unilateral	81(59.1)
Bilateral	56(40.9)
Location	
Nasal	134(97.8)
Double headed	3(2.1)
Grading of Pterygium	
Grade I	80(58.3)
Grade II	56(40.8)
Grade III	1(0.7)

Regarding the laterality, nearly 60% of cases were unilateral pterygium while rests of the cases were bilateral. Most patients had nasal pterygium (98%) while three patients had double headed pterygium. Furthermore, while investigating into the grade of pterygium, the present study has shown 58% of grade I pterygium while nearly 41% were of grade II (Table 3).

Table 4. Grading of Pterygium and Occupation

Grading of Pterygium	Indoor Occupation	Outdoor Occupation
Grade I		
Unilateral	41	29
Bilateral	21	19
Grade II		
Unilateral	4	7
Bilateral	5	10
Grade III		
Unilateral	0	0
Bilateral	1	0

Moreover, exploring into the association between grade of pterygium and nature of occupation, patients with grade II pterygium were found to be employed in outdoor occupation more than those patients with lower grade of pterygium (Table 4). All the patients enrolled in our study were not accustomed to using protective tools (sunglasses, hats, or umbrellas) when outdoors.

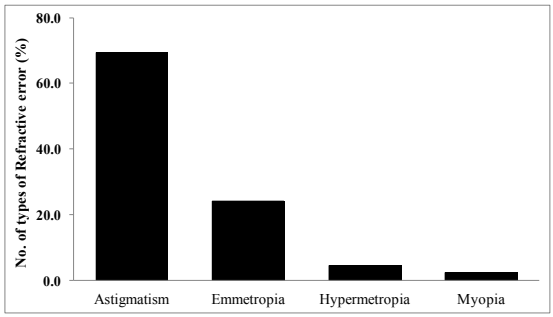

Figure 1. Refractive errors observed in patients with Pterygium (N=137)

Table 5. Types of Astigmatism in Pterygium cases (N=95)

Types of Astigmatism (N=95)	Number (%)
Simple Myopic Astigmatism	53(0.55)
Compound Myopic Astigmatism	13(13.6)
Simple Hyperopic Astigmatism	11(11.5)
Compound Hyperopic Astigmatism	17(17.9)
Mixed Astigmatism	1(1.05)

Astigmatism was observed in 95(69.3%) patients, among which simple myopic astigmatism was the commonest. Among 95 cases with astigmatism, 69 patients had cylinder power greater than or equal to 0.5 dioptres (Fig. 1 and Table 5). Fifty four cases had Against the rule astigmatism (ATR), 12 cases had With the rule astigmatism (WTR) and three cases had oblique astigmatism.

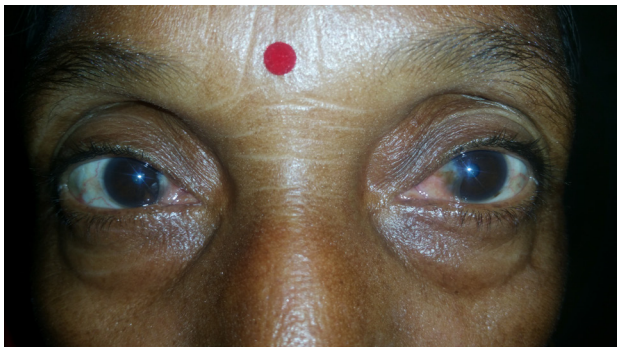

Figure 2. Showing left nasal pterygium

DISCUSSION

There is a wide variation in the reported prevalence of pterygium worldwide, ranging from 0.074% to 37.4%, probably because development of this condition is associated with various geographical and environmental factors apart from genetics and ethnicity.[19,20] In our study, the results indicate a fairly low prevalence rate of pterygium which was 2.4%. There are few other studies with low pterygium prevalence rates whose finding is consistent with our study like 1.3% in Tehran, 2.83% in Victoria Australia, 2.88% in Beijing eye study, 3.0% in Ankara, Turkey and 3.4% in a study by Moran et al.[3,9,21-23] In contrast to our study, results as high as 36.6% has been demonstrated in Brazilian Amazon forest because it lies around equatorial region and is about 70 kms from the equator.[24] In 1965, Cameron has introduced the term "Pterygium Belt" located between 37° North to 37° South Latitude, where pterygia are more common, due to the fact that those areas around equator receive high ultraviolet radiation.[25] The current study done at Dhulikhel, includes people in and around Kavre and the surrounding districts, lie at latitude of 27°34'60"N and 85°40'0"E. This study does not seem to support the Pterygium belt concept because inspite of being within the pterygium belt, the overall prevalence of pterygium is low. It can be explained by the fact that this study involves a highly selected population with pterygium from the Ophthalmology clinic whereas other studies were large population based studies. Hence, the results of this study may not be exact representative of study population. Similarly, it is a known fact that higher altitudes have lower pressure, hypoxia, dry and cold weather with strong UV radiation, all the factors contributing to higher prevalence of pterygium. Few studies from Nepal showed higher prevalence in high altitude communities like in Maharjan et al had 10.08% prevalence in upper Mustang and in study by Shrestha et al. showed prevalence of pterygium of 12.4 % in Kathmandu (1400 m) versus 39.6% in Mustang (2750 m to 6700 m).[4,26] It shows that probably altitude has stronger relation with the development of pterygium thanwith the latitude. The prevalence of our current study of 2.4% at 600 to 1600 meters altitude, which is comparatively low is consistent with the above hypothesis.

Most of the literatures have mentioned higher prevalence with increasing age, though the age group for comparison is not uniform. In Victoria Australia, the prevalence of pterygium was 1.39% in age group 40-49 years which increased upto 6.40% in age groups 80years and above.[21] Similarly, in Central Sahara Africa, the prevalence was 1.1% in 2-19 years age increasing upto13% in 40-87 years.[27] Lei Liu et al. in their meta-analysis of 20 studies with 900545 samples also showed increasing prevalence of pterygium with increasing age.[13] Our current study finding is consistent with most of the studies where prevalence of pterygium increases with increasing age in both males and females groups, which can be explained by the fact that advancing age provides greater exposure to ultraviolet radiation which is known to induce mutation in p53 gene and has been associated with prevalence of pterygium.[15,23,28]

Likewise, prevalence of pterygium in either gender has variable dominance. Few literatures show increased prevalence in females as in study done in Tibetian population in China, in Doumen County of China, in counties of Hainan province and in Mustang and Kathmandu valley of Nepal by Shrestha et al.[8,26,29,30] The current study also shows female pre-ponderance than males in all age groups which can be explained due to the fact that in rural areas, Nepalese women are equally involved in outdoor activities like farming, animal rearing, manual labour in order to balance the low economic status thus increased exposure to potential risk factors like ultraviolet radiation in outdoor jobs. In contrast to our study, most of the studies have male preponderance as in meta-analysis by Lei et al. Liang et al. in Beijing China and Saw et al. in Singapore.[13,15,31] But some studies do not reveal significant differences in the prevalence among male and females as in Al Khobar province of Saudi Arabia, Mongolian population in China, Viso et al. in Spain and Gazzard et al. in Indonesia.[19,32,12,17] This variability in prevalence with respect to gender in different geographical areas may be due to variability in pattern of risk factors in different areas.

Regarding the characteristics of pterygium, unilateral ones were more common and almost all the patients (98%) had nasal pterygium except few cases. This is consistent with the findings of Monsudi et al and Krishnaram where nasal pterygium was present in 99% patients.[33,34] The predominance of nasal pterygium is thought to be due to reflection of ultraviolet light from the nose to nasal conjunctiva.[35] Similarly, the finding of our study of increased pterygium prevalence in people with outdoor occupation without use of protective devices is consistent with almost all of the available literatures indicating the increased

chances of exposure to risk factors as sunlight, dust and dryness causing pterygium.

Among the patients with pterygium, Grade I lesions were more commonly seen while grade II lesions were observed more in patients with predominantly outdoor occupation, indicating the increased chances of exposure to risk factors as sunlight, dust and dryness.

In this study, most common type of refractive error found was astigmatism and in greater number of patients, presence of pterygium was associated with cylinder greater than or equal to 0.5 dioptres. This finding is consistent with Durkin et al. and Gazzard et al. who also demonstrated the significant presence of astigmatism in patients with pterygium.[16,17] It has been suggested that pterygium induces astigmatism by contraction and scarring with resultant flattening of cornea or tear film abnormalities.[23]

In the present study, all patients were examined by the same Ophthalmologist, minimizing the inter-observer error, which strengthens the survey including the standardized ocular assessment using an objective means of grading pterygia and the comprehensive assessment of associated risk factors. However, the current study has some limitations. It is a single hospital-based study with a small sample size; a multicenter trial or a community based study would have perhaps given a more representative inference. An extensive case-control or cohort study design in which ocular prevalence data with its correlation regression analysis to the risk factors is suggested for further studies to monitor the prevalence of pterygium in Nepalese context.

CONCLUSION

This study has provided us with the epidemiological information about occurrence of pterygium and some of the risk factors associated with this condition in the local context. The obtained data in this study may allow physicians to counsel the patients about potential modifiable risk factors. Public education should focus on encouraging people to take appropriate protective measures to avoid unnecessary sunlight exposure.

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