



Research Article

Influence of Geography and Demographics on the Prevalence of Pterygium: A Cross-Sectional Study

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Abstract

Background: A pterygium is an external fleshy mass that surrounds the limbal conjunctiva and cornea. There are certain causes of pterygium in which ultraviolet rays top the list. The habitat of the individual plays an important role in the growth of pterygium furthermore, age, race, gender, area, environment, genetic factors, etc are indicated to be potential risk factors in the development of pterygium. The study is taken to observe the influence of geography and demographics on the prevalence of pterygium.

Objective: This study aims to assess the influence of geography and demographics on the prevalence of pterygium.

Method: This cross-sectional study was conducted from May to July in Khairunisa Eye Hospital at their Primary healthcare department. The participants included in the study had signed up their consent form. Participants in the age group 18 and above and diagnosed with pterygium were taken in the study. Both smokers, non-smokers and ex-smokers were included in the study. There were also no boundaries for patient with any medical history or any family history. Individuals with language barriers and patients who were unable to provide consent forms were not nominated in this study. Pregnant women were also excluded from the research. Every member of this research has gone through all the protocols of eye examination including visual acuity, iop checking, slit lamp and funduscopy examination. Patients were diagnosed in primary healthcare department of Khairunisa and were given every possible comfort and treatment for the betterment of the disease. The data was collected by the proforma.

Result: The research constituted 60 study participants with a response rate of 99.50%. The study determined the fact that a high duration of sun exposure 78.3% (47) was keen in the development of pterygium. Males were a little more found to be diagnosed with pterygium

53.3% (32). The study also showed an association of pterygium with people with increased outdoor activities 75% (45), non-sunglasses users 81.7% (49) and people living in Sindh 75% (45). Shockingly, non-smoker candidates 76.7% (46) had a great rate of pterygium similarly no medical history 58.3% (35) and no family history candidates 80% (48) were still involved in the disease. However, the age group between 40-60 years 48.3% (29) and householders and housewives 50% (30) were the dominant group in the diagnosis of pterygium.

Conclusion: Pterygium had a huge association with geography as well as demographic factors. The rate of exposure and outdoor activities that point to UV rays proved to be the potential risk of pterygium and should be avoided by wearing sunglasses/ hat which will result in lower cases of pterygium in even hot climates and promote an individual with less to no disease which will automatically lead to a healthy society.

Keywords: Pterygium; Sun Exposure; Area; Working Area; Age; Gender; Systematic Disease; Family History; Smokers and Non-Smokers

Introduction

A pterygium is an external mass that is found around the limbal conjunctiva and can also cover the corneal surface [1]. Pterygium is a condition of the eye that is both proliferative and degenerative [2,3]. Pterygium is more common in tropical areas, according to epidemiological research, which suggests that UV radiation exposure and the condition's incidence are probably related. Due to the possible impact of Ultraviolet (UV) B light exposure, pterygia development may occur at different rates in different places. It is possible that UV B radiation will cause cellular changes in the cornea's middle limbal region. Several studies have attempted to accurately quantify UV radiation exposure and determine [3]. According to a study, genetic factors may interfere with the regulation of fibrovascular proliferation and UV light especially sunlight is thought to be the primary cause of pterygium development by causing the release of growth factors that engorge vigorous fibro vascular growth in those who are predisposed to the condition. Previous studies have also suggested that getting older, being male and participating in outdoor activities could be risk factors for the development of pterygium [3,4]. Assessing a pterygium entails determining its size, location, vascularity, extent and involvement with the cornea [3]. There are three components to a pterygium: The leading edge of the cap features an avascular zone. The head is situated on the edge of the cap. The bulbar conjunctiva is connected to the body. Pterygium can be categorized as either atrophic, which is thin, poorly vascularized and stationary or progressive, which is defined by thick, fleshy, vascular tissue pushing towards the corneal centre. People who are getting older are more likely to get this illness. Pterygium can present with a variety of symptoms and indications, ranging in severity from conjunctival redness and swelling, especially during the growth stage, to the appearance of a yellowish patch or protrusion on the sclera, Dry, itchy or burning sensations in the eyes or the impression that grit or sand is stuck in the eye, visual impairment [3-12].

It's advised to adopt the following preventative measures to stop pterygium from developing or from getting worse: Put on sunglasses with UV protection to protect your eyes from Ultraviolet (UV) rays. Wear goggles or glasses to protect your eyes from dust and other irritants when needed. Keep your eyes moistened with artificial tears to combat dryness. By taking these precautions, you can reduce the chance of acquiring pterygium and protect the health of your eyes. Steroid or lubricating eye drops can be used to treat pterygium-related irritation, redness or swelling. It could be advised to remove a pterygium surgically if it gets to the point where it causes problems. Replace the damaged area with a little piece of good tissue after removal. The goal of the procedure is to reduce the chance of a pterygium recurrence. Recurrence of pterygium must be avoided at all costs by limiting exposure to dust, sunshine and dry circumstances [8]. Pterygium prevalence varies from 0.3 to 29 percent worldwide. An estimated 10-15 million Americans are afflicted by it; older men and those who work outside have greater prevalence. Pterygium was found to be 2.4% common in Ta'if, a high-altitude district in Saudi Arabia, with a significant increase in cases observed among those over 40. Pterygium prevalence in Ethiopia varies from 8.8% to 38.7%. The prevalence of pterygium in Koreans 40 years of age and above was 8.8%. The incidence in China varies geographically, ranging from 2.9% to 33.0%. [9]. The prevalence rates of pterygium in Shahrud and Tehran are 1.3% and 9.4%, respectively. Five percent of the cases in Pakistan were male, ages 61-70 and primarily from arid and hot locations, according to a research. There are other contributing factors, including exposure to hazardous substances and family history. Pterygium incidence showed an increase with age, in people living in rural and high-altitude areas and in people working outside; it also showed a clear correlation with the amount of sunlight exposure. Strangely, there seems to be a correlation between smoking and a lower risk of developing pterygium. However, some studies indicate that the recurrence of pterygium was exclusively linked to dry eyes. The majority of the male cases in Pakistan, 53.46%, were found to be from hot and dry regions and were between the ages of 61 and 70. There are other factors that come into play, such exposure to harmful substances and family history. Pterygium incidence increased with age, in those living in rural and high-altitude areas and with people working outside; it was significantly correlated with solar radiation intensity. Strangely, smoking seems to be associated with a lower risk of developing pterygium [16]. However, other studies indicate that dry eyes alone may be the cause of pterygium recurrence. Several studies have found that characteristics such as alcohol intake, dust exposure, male gender, family history of older age, rural residency, poorer educational attainment and nonsmoking status can contribute to the beginning of pterygium [17]. Pterygium's effects on geography and population are being studied because of the growing consequences of global warming and rising humidity levels in our surroundings. Comprehensive research is necessary because weather patterns are crucial to the development and course of many diseases. Furthermore, there may be a correlation between the growth and prevalence of pterygium and the common incidence of dry eye syndrome in the current environmental conditions. By giving priority to preventative measures and increasing public awareness, we protect visual health in addition to fighting the disease, which promotes both individual and community well-being. The study's goal is to find out how pterygium prevalence is affected by demographics and geography.

Material and Methods

The cross-sectional study was carried out at Khairunisa Eye Hospital's primary care clinic Karachi-Pakistan. The six-month research project ran from February 1 to July 30. We used Openepi to compute the sample size of 60 and the 95% confidence interval was used. First, we calculate the ratio of pterygium patients admitted to Khair Un Nisa Eye Hospital and then we display that ratio on an open graph. We adopted a straightforward non-probability sampling strategy for sampling and a quantitative method was employed for data gathering. Khair Un Nisa Eye Hospital provided an earlier ethical approval letter. The study's inclusion requirements required that participants have a primary or recurring pterygium diagnosis and be older than age of eighteen. The study comprised non-smokers and smokers both. This strategy guarantees an accurate assessment of the treatment's safety and efficacy over a wide range of demographics. People who couldn't give informed consent or take part in the study because of cognitive impairment or linguistic problems were excluded from the trial. In our study, pregnant women were not included.

Data Collection Procedure

Upon a patient's admission to the hospital, we obtain their medical history, ask them questions from our questionnaire, perform a comprehensive eye examination to determine the patient's pterygium grade and address any chief complaints they may have.

Dependent Variable

The prevalence rate or the proportion of a given population affected by the disorder, was the dependent variable in the demographic and geographic research of pterygium prevalence.

Independent Variable

A separate variable Socioeconomic status, occupation, age, gender, ethnicity and maybe aspects of lifestyle like sun exposure or smoking were among the independent variables. Latitude, altitude, temperature, UV radiation levels and living in an urban or rural area were among the geographic factors.

Data Analysis

Data was analyzed through the software SPSS version 23.0. For every continuous variable, the mean $\pm$ SD was displayed. A frequency and percentage representation was used for each category variable. For several variables, a bar, pie and histogram were created. To see the significance between variables Chi-square test was applied. A p-value < 0.05 considered to be statistically significant.

Result

This pterygium research constitutes 60 study participants with a response rate of 99.50%. The mean age of our study was (1.85). Male participants were more than the females (Table 1). There were many occupations included in our research with a mean of (4.37) which involved students, laborers and farmers, private workers, government officers and others comprised of householders and housewives. The workup also encompassed systematic disease (1.58) and family history (1.80).

Participants with a high duration of sun exposure were 78.3% (47) than the participants with less sunlight exposure 21.7% [13]. In addition, the number of people living in Sindh and balochistan 75% (45) were found with the disease drastically more than people living in other areas 25% (15). Furthermore, of candidates with a history of smoking 23.3% (14) were rarely diagnosed with pterygium and the rate of pterygium was astonishingly much higher in non-smoking candidates 76.7% (46) as shown in Table 2 [14-17].

Patients with no history of smoking (76.7) were noticeably identified with the disease than the patients with smoking habit (23.3). Nevertheless, sunglasses users were hardly exposed to the disease 18.3% (11) as compared to the non-sunglasses user 81.7% (49) shown in Table 3. Moreover, Male participants 53.3% (32) were a little more exposed to pterygium than the female participants 46.7% (28).

Frequency of pterygium in sunglasses user Likewise, pterygium was frequently found in patients with outdoor working environment 75% (45) as compared to the patients with indoor working environment 25% (15). Besides, the systematic disease

was not a significant finding in pterygium as there were substantially more participants who were not associated with any systematic disease but still suffering from pterygium 58.3% (35) and there were fewer patients associated with both systematic disease and as well as pterygium 41.7% (35).

Systemic disease had a little to no effect in the occurrence of pterygium. Similarly, there were a small number of patients who had a family history of pterygium 20% (12) and noticeably more patients with no sign of disease in their family as they could recall 80% (48). Of the members who fall into the age group between 40-60 years 48.3% (29) were much more affected by the disease than members who fall into the age group between 20-40 years 33.3% (20) and >60 years 18.3% (11). Lastly, depending on the occupation, workers in private jobs 10% (6), government servants 6.7% (4), students 6.7% (4) and businessmen 3.3% (2) were barely diagnosed with the disease however, farmers and labors were considerably more affected by the disease 23.3% (14) but overall, highest rate of association with the pterygium were found in householders and housewives which were included in our others category 50% (30).

Out of 60 participants, 4 were students 12 were labours, 2 were businessmen, 6 were employed in private job, 4 serving in government offices and 32 involved in other categories (Table 1).

	Frequency (n=60)	Percent
Gender		
Male	32	53.3
Female	28	46.7
Smoking Status		
Yes	14	23.3
No	46	76.7
Sunglass use		
Yes	11	18.3
No	49	81.7
Family history of pterygium		
yes	25	41.7
No	35	58.3
Profession		
Students	4	6.7
Farmer / Labor	12	20
Business	2	3.3
Private Job	6	10
Government Job	4	6.7
Others	32	53.3

Table 1: Demographic characteristics.

Four factors grossly contribute on the formation and growth of pterygium which are working area, occupation, sunglasses use and sun exposure. We correlate these factors with different variables which shows that there values are significant. We first compare the working area (outdoor and indoor) with persons living area which shows that provinces difference did affect the pterygium prevalence as it has significance value. It can be stated that people who has more sun exposure are at risk of developing pterygium in contrast to people with no sun exposure (Table 2).

	Province of Pakistan			
Working Area	Sindh (n=45)	Balochistan (n=15)	Total	P-value
Outdoor	31	14	45	0.048

	68.90%	93.30%	75.00%	
Indoor	14	1	15	
	31.10%	6.70%	25.00%	
Sun Exposure				
Yes	33	14	47	0.103
	73.30%	93.30%	78.30%	
No	12	1	13	
	26.70%	6.70%	21.70%	
*Chi-square test applied to see the significance at P-value < 0.05				

Table 2: working area and sun exposure correlation according to geographical location.

Occupation grossly effected on pterygium as it can be seen that more farmers and labors are the ones who developed pterygium as it can be seen in Table 3.

	Occupation						P-value
Working Area	Students (n=4)	Farmer / Labor (n=14)	Business (n=2)	Private Job (n=6)	Government Job (n=4)	Others (n=30)	
Outdoor	4	14	2	5	2	18	0.037
	100.00%	100.00%	100.00%	83.30%	50.00%	60.00%	
Indoor	0	0	0	1	2	12	
	0.00%	0.00%	0.00%	16.70%	50.00%	40.00%	
*Chi-square test applied to see the significance at P-value < 0.05							

Table 3: Occupation with working area.

	Gender		P-value
Sun Exposure	Male (n=32)	Female (n=28)	
Yes	30	17	0.002
	93.80%	60.70%	
No	2	11	
	6.30%	39.30%	
*Chi-square test applied to see the significance at P-value < 0.05			

Table 4: Gender with sun exposure.

As in Pakistan males are the ones who earn living for their family so they stay outdoor more than the females so they are at risk of developing pterygium more than them (Table 4).

Discussion

This study explores the demographic and geographical factors influencing the prevalence of pterygium which is a common ocular condition associated with abnormal vascular growth of conjunctival growth over cornea results in irritation, redness, watering, dryness etc. In 60 study participants, found that Males 53.3% were the dominant gender associated with pterygium than females 46.7%. The study analyzed that individuals with more sunlight exposure 78.3% were highly exposed to the disease than patients with less sunlight exposure 21.7%. Patients belonging to Sindh had an increased rate of pterygium by 75% than

patients belonging to other provinces by 25%. The number of non-smokers 76.7% was astonishingly identified with the disease than the people with the habit of smoking 23.3%. Of the patients with no coverage through sunglasses or hats, 81.7% were more involved in the disease than the sunglasses users 18.3%. Likewise, pterygium was more frequently diagnosed in patients with a lot of outdoor work 75% than indoor workers 25%. Surprisingly, candidates of pterygium with no sign of medical history had more 58.3% than a medical history individual 41.7%. Noticeably, family history was not a significant finding as more patients with no family history had pterygium 20% as compared to patients with a history of pterygium 80%. Specifically, the age group between 40-60 years was the largest age group identified with pterygium 48.3% than the age group between 20-40 years 33.3% and fewer people above 60 were diagnosed with pterygium 18.3%. Occupations like businessmen 3.3%, students 6.7%, government servants 6.7% and private job workers 10% were rarely diagnosed with the disease than occupations like farmers/laborers 23.3% but still patients fell into the other group i.e. householders and housewives were frequently diagnosed with pterygium 50%. The study of Gambella town in Southwest Ethiopia has shown a higher involvement of the Male gender with pterygium i.e. 54.80%, the research in Spain had shown a similar result as 56.4% of men were suffering from pterygium and the Harbin eye study also reflected that Male gender has been the major factor in the prevalence of pterygium, A Jordanian study also brought alike results i.e. 83% Male were with the pterygium, there is also a study in Pakistan Chandka medical hospital had found 53% Male involved in the research with pterygium which shows positive correlation with our study which is 53.3% male [9]. The proportion of sun exposure was a high risk factor among the participants of pterygium in our study likewise the study took place in Jordanian people and concluded that 81% of people with high sun exposure were identified with pterygium [24]. People belonging to Sindh were more affected by the pterygium than any other area affiliated with the study took place in Chandka Medical Hospital, Pakistan where 86.635 participants with pterygium belong to hot and dry climates [14-25]. Age was also a factor found in our study as people between 40 to 60 years were largely diagnosed with pterygium which was 48.3% a study about the prevalence of pterygium in a tertiary eye hospital of Hyderabad has shown a likewise result as three fourth of the patients fell in the group of 30-60 years. People involved in outdoor activities were the ones who suffered more from the disease which shows an association with the Jordanian study of pterygium with 64.6% of outdoor workers suffering more from the disease. xxiv People with no smoking habit were diagnosed with pterygium and ii shows correspondence with the study of Jordanian which shockingly demonstrates 56% of pterygium cases with the absence of smoking habit [24-29]. The number of people with no history of pterygium in their families suffered the most from the disease a study presented with pterygium with zero family history of disease i.e. a case-control study of Singapore where 54% of participants with no sign of family history. The study concluded that the participants who fell into the category of others in occupations were diagnosed with the disease and laborers and farmers were the second this shows the relation with the study. The patient with no coverage neither with sunglasses nor a head or scarf is indulged into the disease as shown in our study with a positive relation with the Jordanian research with 71% of participants with no use of sunglasses, a case-control study of Singapore shows similar result about 43% participants involved in pterygium donot wear sunglasses and clearly suffered the most with pterygium. Xxiv-xxvi Some studies elaborate on the fact that 60-70 years participants were diagnosed with the disease 31.1% in Chandka Medical Hospital, Pakistan [25]. Occupation was not a main player when its came to pterygium as our investigation described householders and houses wives the larger group diagnosed with pterygium around 50% and second would be farmers and laborers 23.3% but the studies have shown different results making householders and housewives the 2nd most group in terms of pterygium the laborers and farmers top the list. Somehow, our research was limited to correlation with gene mutation, education level, ethnicity, hot and cold both climates. The prevalence rate of pterygium is increasing day by day. It relates to various eye diseases such as dry eye. The ongoing progression of global warming and raised exposure to UV light have been the factors that influence the growth of pterygium which can be the reason for the distribution of disease in society through our study if people would avoid such factors it would not only lead to decreasing in the rate of the disease but also it will promote better vision in society. The need to continue this research is extremely important as our research has brought the significance of the disease and it is relevant that this research should be carried on in the future in various climates and different and diverse areas. The study should be resumed on a greater scale to a diverse level which will guide the community which surely be prosperous for the community and eventually will reduce the number of cases of pterygium.

Conclusion

Pterygium is a disease of eye care if prevented would result in no or fewer cases which would automatically lead to a healthy and disease-free community.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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