THE PREVALENCE OF PTERYGIUM AND PINGUECULA IN A CLINIC POPULATION

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ABSTRACT

Purpose : This study aimed to measure the prevalence of pinguecula and pterygium from patients pool attending the International Islamic University Malaysia Optometry Clinic (IIUM-OC). This study also aimed to study the differences of pterygium and pinguecula between sexes and ocular surface zones, and their relationship to tear break up time (TBUT) and ocular surface zones. The management of pterygium and pinguecula in IIUM-OC is also reviewed.

Method : This is a clinical-record-based retrospective study which the data were retrieved from clinic record of patients that attended the IIUM-OC from January 2017 to September 2018. Pterygium and pinguecula cases were identified from the clinic records. Data retreived from the record includes sexes, affected ocular surface zones, TBUT, and the management given to the patients.

Results : The total number of clinic records considered in this study were 1229. There were 30 patients diagnosed with pinguecula, and 48 patients with pterygium, giving rise to a prevalence of 2.4% and 3.9%, respectively. There were 21 cases reported in males, for pterygium and pinguecula, respectively. The prevalence of pterygium was significantly higher in female (chi-square test; p=0.02) while the prevalence of of pinguecula was significantly higher in male (chi-square test; p=0.02). The mean age of male patient diagnosed with pterygium was 54.24±11.89 years while female was 48.48±14.57 years. The mean age of male patient diagnosed with pinguecula was 44.24±13.80 years while female was 42.33±14.32 years. There was no association of TBUT with the ocular surface zones in eyes affected with pinguecula and pterygium. The most common management for patient with pinguecula and pterygium was by monitoring through series of follow up.

Conclusion : Pterygium and pinguecula is prevalent among patients attended in IIUM-OC. The optometric management of pinguecula and pterygium should be improved for for a better patient care.

Keywords: prevalence, pterygium, pinguecula, tear break-up time

INTRODUCTION

Pinguecula is a round, yellowish elevated tissue growth of conjunctiva that usually occurs bilaterally, and usually on the nasal side (Zarbin et al., 2001). Diagnosis of pinguecula is usually made upon discovery of yellowish lesion on the nasal or temporal conjunctiva (Viso, 2011).

Pterygium is a common eye disorder of less known aetiology in which wing-shaped, fibrovascular conjunctiva crosses either the nasal or temporal limbus or both (Jiao et al., 2014), and overgrow onto the cornea (Rezvan et al., 2012). The pathogenesis of pterygium is still in debate but a few authors speculated continuous exposure to ultraviolet (UV) light (Chui et al., 2011), abnormal fibrovascular proliferation, and hereditary predisposition (Gazzard et al., 2002) are the causes for pterygium formation.

Pinguecula comparatively is similar to pterygium except that pinguecula spares the corneal area (Rezvan et al, 2012). Pinguecula extends and may develop into pterygium. The histopathology of pinguecula and pterygium are similar except there is disruption of Bowman's layer by the fibrovascular conjuctiva in-growth in pterygium (Zarbin et al., 2001). People with pinguecula will have normal clear vision, but usually report of ocular irritations which include dryness, itching, burning and foreign body sensation (Zarbin et al., 2001). Patients suffering from pterygium usually complain of ocular irritation, cosmetic dissatisfaction (Hall, 2016) and to the extreme of visual disturbances (Anderson et al., 2017). An

interesting finding by Balogun and colleagues (2005) indicated that tear film abnormalities was only associated with pterygium but not pinguecula.

The prevalence of pinguecula has been reported as 47.9% in North Western Spain (Viso et al., 2011), 61.0% in Shahroud Iran (Rezvan et al., 2012), 69.5% in Blue Mountains Australia (Panchapekesan et al., 1998) and 10.53% in rural China (Jiao et al., 2014). Studies conducted in Asian countries reported of 10.1% prevalence in Singapore (Ang et al., 2012), 4.4% in Japan (Shiroma et al., 2009), and 10.0% in Indonesia (Gazzard et al., 2002) to point a few. Past studies have shown that pinguecula is associated with age which elderly are at higher risk in relative to young people (Viso et al., 2011; Rezvan et al., 2012, Tan et al., 2006). Other risk factors include geographical location in which rural areas are highly associated with the development of pinguecula (Asokan et al., 2012). This may be logical as people in rural areas may have economic activities that engage in environment that expose to excessive UV radiation. Tang et al., (1999) reported that workers in urban area with more outdoor exposure such as postal workers are at a higher risk of getting pinguecula. It is suggested that outdoor workers are prone to pinguecula due to the long exposure to UV radiation from the sun (Rezvan et al., 2012) or from the reflective surfaces, and sandy or dusty environment (Khoo et al., 1998). People living in countries near the equator, or commonly called as the 'pterygium zone', (Ribeiro et al., 2011) are at a higher risk of getting pterygium (Rosman et al., 2012; Liu et al., 2013; Hashemi et al., 2017).

This study was conducted to determine the prevalence of both pinguecula and pterygium in IIUM-OC. The possible relationship between pinguecula, pterygium and tears were also investigated. This study also documented the management for both pinguecula and pterygium in IIUM-OC.

METHODOLOGY

This study was conducted in IIUM-OC, Department of Optometry and Visual Science, Kulliyyah of Allied Health Science, International Islamic University Malaysia, Kuantan, Pahang. The study was approved by the KAHS Ethics Committee (KAHS 89/18). This is a clinic-based retrospective study in which the data was retrieved from the IIUM-OC patient records from January 2017 to September 2018. Only records of patients' first visit were taken. Collected data includes ocular zones affected with pinguecula/pterygium, tear break up time (TBUT) and the management given. Consent from the patients were obtained prior of every eye examination in IIUM-OC, allowing data from the files to be extracted, in accordance of the tenets of Declaration of Helsinki.

STATISTICAL ANALYSIS

The data was analyzed using Statistical Package for the Social Science (SPSS) 21.0. Descriptive analysis was presented as frequency and percentage. Chi-squared test was used to compare sexes and ocular surface zones. Independent sample t-test was used to compare age difference between sexes. Crosstab test was used to study the relationship between TBUT and ocular surface zones. For the association with TBUT, the ocular surface zones were taken individually for an appropriate relationship analysis between ocular zones and TBUT.

RESULTS

A total of 1229 new patients were treated in IIUM-OC from January 2017 until September 2018. Patients diagnosed with pterygium were 48 patients (3.9%) and with pinguecula were 30 patients (2.4%).

Thirty-two patients have bilateral pterygium while 16 patients have in one eye. Twenty-seven patients with ptegygium were females compared to 21 in males (chi-square test; p=0.02). The average age of patients with pterygium was 51.00 ± 13.63 years (Figure 1). The mean age of males with pterygium was 54.24 ± 11.89 years while female was 48.48 ± 14.57 years (p=0.73). The majority with pterygium were of malay descent with 43 cases (90%), and chinese descent recorded 5 cases (10%). The demographics of pterygium by sex, race and ocular zone affected is presented in Table 1.

Nineteen patients have bilateral pinguecula while 11 patients have in one eye. Twenty-one patients with pinguecula were males compared to 9 in females (chi-square test; p=0.02). The average age of patients with pinguecula was 43.67 ± 13.73 years (Figure 1). The mean age of males with pinguecula was 44.24 ± 13.80 years while female was 42.33 ± 14.32 years (p=0.49). The majority with pinguecula were of malay descent with 28 cases (93.3%), and chinese descent recorded 2 cases (6.7%). The demographics of pinguecula by sex, race and ocular zone affected is presented in Table 1.

No cases of pterygium or pinguecula were presented in children below 19 years old for both pterygium and pinguecula. The highest group age of pterygium was 51-60 years while pinguecula was in 41-50 year group (Figure 1).

Most patients have pinguecula and pterygium on the nasal ocular surface zone at 63.3% and 77.1% respectively. The temporal area were affected in 13.3% and 8.3% of pinguecula and pterygium, respectively. Seven patients were diagnosed on both sides with piguecula or pterygium (Table 1).

The TBUT and quadrant either nasal, temporal or both sides were depicted in form of cases in Table 3. There is no significant association of TBUT with the ocular surface zones in both pterygium (crosstab test; p=0.122) or pinguecula (crosstab test; p=0.133).

The management for pterygium was not specified in most of the case (37.5%). Nevertheless, 29.2% of the patients were monitored and 14.6% were given artificial tears. Other forms of management includes artificial tears with monitoring (2.1%); artificial tears with sunglasses (8.3%); referral to ophthalmologist (6.3%); and sunglasses (2.1%; Figure 2). For pinguecula cases, the management was not specified (36.7%), while 26.7% were monitored, 20% were prescribed with artificial tears, and 10% were prescribed with artificial tear and sunglasses (10%). The balance 6.7% patients were given sunglasses (Figure 3).

Table 1
The demographics of patients diagnosed with pinguecula and pterygium that attended in IIUM-OC from January 2017 to September 2018.

	Attributes		N	%
Pinguecula		**Total**	30	100
	Sex	**Male**	21	70
		Female	9	30
		Malay	28	93
	Race	**Chinese**	2	7
		Others	0	0
	Ocular zones affected	**Nasal**	19	63
		Temporal	4	13
		Both sides	7	24
Pterygium		**Total**	48	100
	Sex	**Male**	21	44
		Female	27	56
		Malay	43	90
	Race	**Chinese**	5	10
		Others	0	0
	Ocular zones affected	**Nasal**	37	77
		Temporal	4	8
		Both sides	7	15

Table 2
The mean age of patients with pinguecula and pterygium. The p value indicates the statistical analysis of comparison using independent sample t-test.

Diagnosis	Age (years)		p (independent sample t-test)
	Male	Female	
Pinguecula	44.24 ± 13.80	42.33 ± 14.32	0.149
Pterygium	54.24 ± 11.89	48.48 ± 14.57	0.734

Table 3
The tear break up time (TBUT) and ocular zones affected. The p value indicates the statistical analysis of comparison using Crosstab test.

Tear break up time (sec)	Ocular surface zones affected			p value (Crosstab test)
	Nasal 89 (%)	Temporal 12 (%)	Both sides 27 (%)	
Pterygium (n = 79)				
0	3 (5.1%)	0 (0.0%)	0 (0.0%)	
1	1 (1.7%)	1 (16.7%)	2 (14.3%)	
2	9 (15.3%)	1 (16.7%)	2 (14.3%)	
3	22 (37.3%)	0 (0.0%)	8 (57.1%)	0.122
4	11 (18.6%)	2 (33.3%)	1 (7.1%)	
5	7 (11.9%)	1 (16.7%)	0 (0.0%)	
6	4 (6.8%)	0 (0.0%)	0 (0.0%)	
7	0 (0.0%)	0 (0.0%)	1 (7.1%)	
8	2 (3.4%)	1 (16.7%)	0 (0.0%)	
Pinguecula (n = 48)				
0	4 (13.3%)	0 (0.0%)	0 (0.0%)	
1	2 (6.7%)	0 (0.0%)	3 (25.0%)	
2	8 (26.7%)	0 (0.0%)	3 (25.0%)	
3	6 (20.0%)	1 (16.7%)	4 (33.3%)	
4	2 (6.7%)	1 (16.7%)	1 (8.3%)	
5	3 (10.0%)	3 (50.0%)	0 (0.0%)	0.133
6	0 (0.0%)	0 (0.0%)	1 (8.3%)	
7	0 (0.0%)	0 (0.0%)	0 (0.0%)	
8	1 (3.3%)	1 (16.7%)	0 (0.0%)	
9	0 (0.0%)	0 (0.0%)	0 (0.0%)	
10	3 (10.0%)	0 (0.0%)	0 (0.0%)	
11	1 (3.3%)	0 (0.0%)	0 (0.0%)	

Figure 1
Patients with pterygium and pinguecula in IIUM-OC based on age.

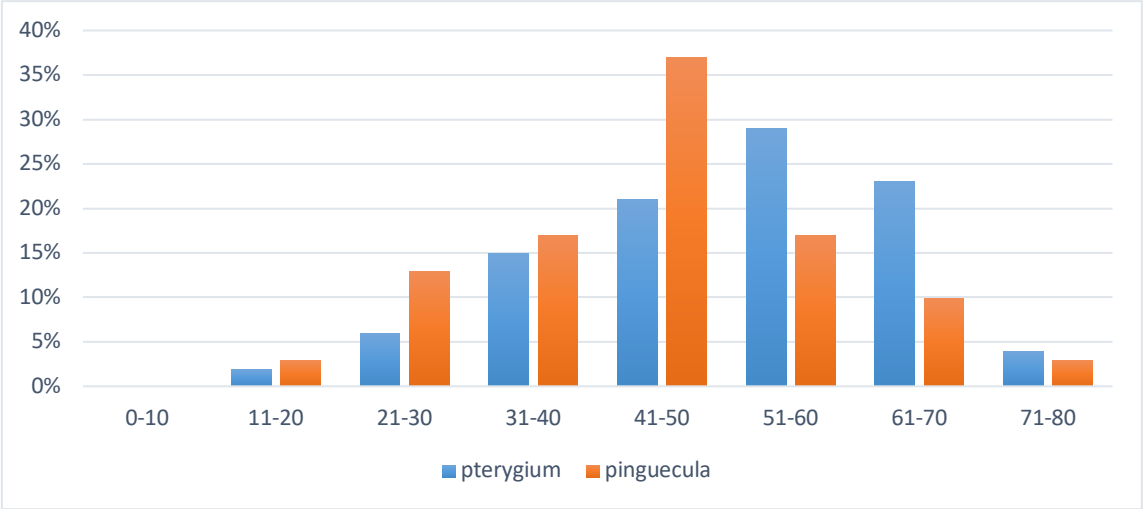


Figure 2
The management of pterygium (%) in IIUM-OC.

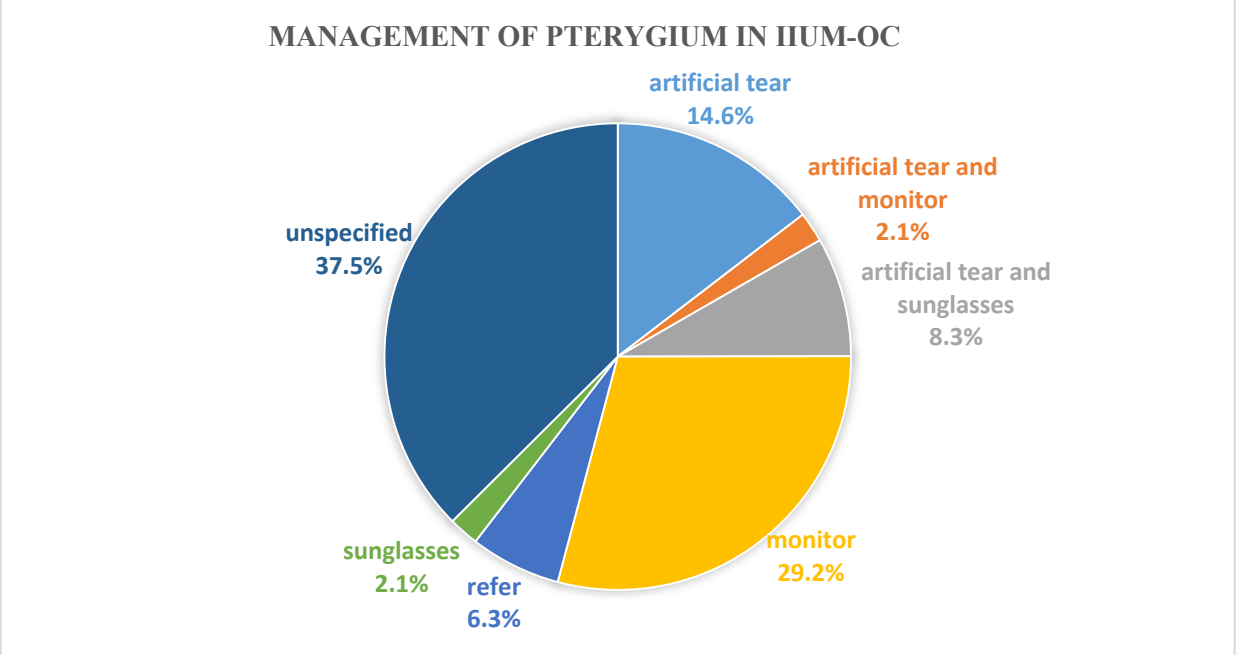
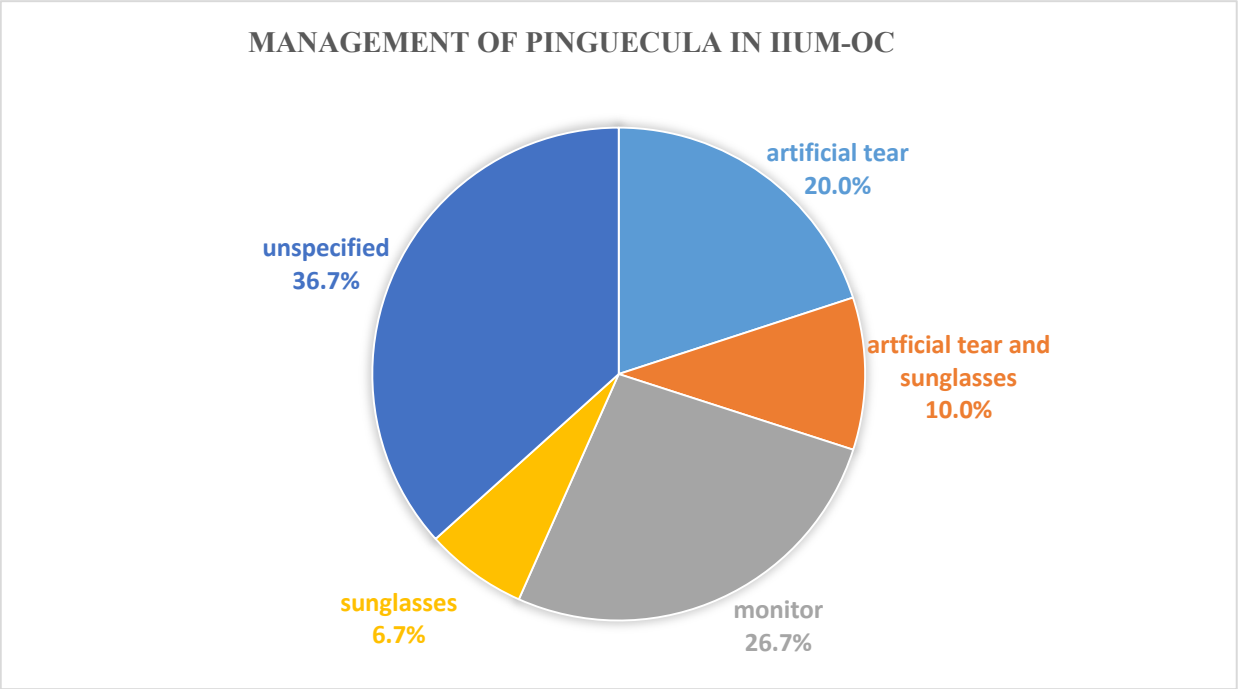


Figure 3
The management of pinguecula (%) in IIUM-OC.



DISCUSSION

In this study we evaluated the prevalence of pterygium and pinguecula in IIUM- OC from January 2017 until September 2018. The prevalence of pterygium was 3.9% while pinguecula was 2.4%. Panchapakesan, Hourihan & Mitchell (1998) reported a higher pinguecula prevalence of 69.5% compared to pterygium at 7.3% where 70% of the cases were above the age of 49 years. The study was conducted in Australia where the pterygium was associated with reduced skin sun sensitivity and increased skin pigmentation. A study in Singapore on the other hand reported a lower prevalence of pterygium at 7% (Wong et al., 2001) while in rural China recorded a big 39% (Zhong et al., 2012). The stark difference in the prevalence may be rooted from the risk factor of the disease which closely related to environment (Rezvan et al., 2012), occupation (Luthra et al., 2001), climate (Moran et al.,1984) and lifestyle (Khoo et al.,1998). The low prevalence reported in the current study may be stemmed from the population of patients that attend IIUM-OC mainly consist of young people at the age of less than 30 years old.

The prevalence of pterygium also has been reported higher in high altitude region (Lu et al., 2007). This may be due to low air pressure, hypoxia, dry and cold weather, long exposure of sunlight, strong solar infrared light and UV radiation in the high altitudes pose as risk factors for pterygium. The risks of developing pinguecula and pterygium are raised to 2.1% and 0.8%, respectively, upon the increment of cumulative occupational sunlight exposure by one unit (one year x hour/day) (Tang et al., 1999).

In our study, the prevalence of pterygium is higher in female compared to male. Our findings is in line to the report by Peng et al., (2007) which noted that woman in Tibet have higher risk of getting

pterygium compared to man. They opined that the higher risk factor among women is due to the working environment and occupational activities relative to men. However, in another study, Hashemi et al., (2016) and Rezvan et al., (2012) reported that the prevalence of pterygium is higher in male compared to female in rural Iran. A study by Tan et al., (2006) on the other hand reported that there is no association of sex and pterygium among rural population in eastern China (Jiao et al., 2014). This may be due to the fact that both females and males in that population engage in outdoor activities . We also reported the prevalence of pinguecula as higher among males. Studies by Viso et al., (2011), Rezvan et al., (2012) and Fotouhi et al.,(2009) also reverberated the similar findings where pinguecula prevalence was higher among males. All of the studies pointed that their population has mostly the males which involved occupational activities which expose them to greater amount of UV light. These set of results signified that, occupational and social behavioral of any sexes give rise to the prevalence, rather a true effect of sex. Regardless being male or female, the exposure to UV radiation poses higher risk factor to the diseases.

Most studies suggested that both pinguecula and pterygium increased in incidence with age (Hashemi et al., 2016; Viso et al., 2011; McCarty et al., 2008; Jiao et al., 2014). It is observable in our study where the number of cases increases with age up until 50 to 60 years of age. Nevertheless, we show a decrease in prevalence at a higher age group. This may be due to the lack of patients aged 60 and above that receives treatment in IIUM-OC. Secondly, patients 60 years old have retired their outdoor activities which may have reduce risk factor to developing the condition.

We reported higher prevalence for both pterygium and pinguecula among Malay relative to other races. The effect of race on the prevalence of pterygium has also been reported in multiethinic population study in Singapore (Ang et al., 2012), Barbados (Luthra et al., 2001; Nemesure et al., 2008), and Tehran (Fotouhi et al., 2009). Inferring to a study resembling a closer population mixture to this current study, Cajucom-Uy et al. (2010) reported higher prevalence of pterygium among urban Malays aged 40 years and older than the Chinese ethnic of similar age. The reason may be due to the fact that Malays have a darker skin tone than the Chinese. This is related to report in The Barbados Eye Studies which found that darker skin colour is one of the risk factor of pterygium (Nemesure et al., 2008). Chen et al. (2015) added that the different prevalence between different races is due to lifestyle and genetic predisposition. Nevertheless, it is important to note that the majority of patients that receive treatment in IIUM-OC are of Malay decent, which may have contributed to the finding.

We found that the nasal ocular surface zone has the higher likelihood to be affected with either pterygium or pinguecula, compared to the temporal ocular surface zone. Our result is in line to those reported by Coroneo (1997) and Musytaq et al. (2017). A proper explanation of mechanism by which a predominantly nasal location for pterygium occurs is still lacking (Coroneo , 1997). However, Musytaq et al., (2017) argues that the lacrimal gland which is located above the bulbar conjunctiva at the temporal reduces the likelihood of the zone to drying, inhibiting the formation of pinguecula or pterygium. Other than that, the longer eyelashes at the temporal side relative to the nasal shades the zone from the harmful UV (Balogun et al., 2005).

We found no association between TBUT and ocular surface zones where pterygium or pinguecula exists. A study by Balogun et al., (2005), reported unstable TBUT found in eyes with pterygium compared to pinguecula.

The management for majority of the pinguecula and pterygium cases were not specified. Nonetheless, most of the patients were monitored before given other management such as artificial tears,

sunglasses or referral for surgery. This findings is understandable considering the chronic nature of these diseases which treatment are usually initiated upon disturbance to vision. The management of pterygium is limited to excision surgery (Hall 2016; Zheng et al., 2012), ocular irrigation to eleviate discomfort, and precautionary protection from UV radiation (Lu et al., 2007). Reports from the Barbados Eye Study (Luthra et al., 1998), Rosenthal et al. (1988), and Lu et al., (2007) have shown that people who do not wear sunglasses are more prone to pterygium formation. As for pinguecula, artificial tears and topical corticosteroid may be given to relieve ocular irritation, while tissue excision is only done if topical drops are not successful (Zarbin et al., 2001). It is to note that optometrists in Malaysia have yet the rights to prescribe topical drugs, which may render to the statistics related to the mangement of these diseases.

It should be noted that the our data were generated from a clientele of an optometry clinic that mostly treated the younger population, considering the location of the IIUM-OC in a university campus. This study may have included a relatively small sample size and heavily representing the Malay race. Future studies should consider to compare the prevalence of pterygium and pinguecula of pupulation in rural, highlands, and coastal area in Malaysia. The data representation should include myriad of populations of different races that represents Malaysia more thoroughly.

In conclusion, pterygium and pinguecula is prevalent in the IIUM-OC and warrants a better management of the diseases.

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