

A community-based study: the prevalence and associated factors of pterygium among the elderly living in Thu Duc district

Doan Phuoc Thuoc^{1*}, Le Cong Linh², Nguyen Thi Phuong Thao¹ and Nguyen Thi Thuy Hang¹

¹Hue University of Medicine and Pharmacy, Vietnam

²Thu Duc district Hospital, Vietnam

Abstract

Pterygium is a popular disease in tropical monsoon climate. In Vietnam, the prevalence of this disease is from 5.2% to 17.0% in the community, and around 20.0% in the elderly. The proactive prevention of pterygium plays a vital role in primary health care. The aim of this study was to assess the prevalence and associated factors of pterygium among the elderly living in Thu Duc district, Ho Chi Minh city. A cross sectional design study was carried out in 1000 elderly people living in Thu Duc district, Ho Chi Minh city from August 29th to October 15th, 2016. The raw data has been entered and analyzed by SPSS version 20.0. Descriptive statistics was summarized descriptive data. Logistic regression was used to summarize the predictors of pterygium. The variables with p-value less than 0.05 were considered as carrying significant risks of pterygium. Results showed that the prevalence of pterygium among the elderly at high altitude was 15.6%. Age, gender, education level, average outdoor time/day (hours/day), total outdoor time (years), alcohol consumption, level of smoking, wearing sunglasses, level of exercise, level of ophthalmic drop, level of doing physical activity, dry eye syndrome (DES) and genetic factors/family history of pterygium were significantly associated with pterygium ($p < 0.05$). There is a high prevalence of pterygium in the elderly living in Thu Duc district, Ho Chi Minh city. Study of related factors will contribute to the development of community intervention programs, effective health education and communication in the local area.

Keywords: Pterygium, the elderly, community-based study, Thu Duc, HCM city.

1. Introduction

Pterygium is the fibro vascular ingrowth of bulbar conjunctival tissue onto the cornea. Its appearance might result in several symptoms that could cause discomfort and degradation in the quality of life and the aesthetic features of patients. Pterygium is one of the most common diseases in the world and particularly in tropical countries like Vietnam with the prevalence of roughly 5.2 - 17.0% in the community. It is noticeable that patients of old age are reported to have a high change of developing pterygium, at 20%. [1]

The costs of treating pterygium are high and treatment seems to be inefficient as this condition typically has a post-operative

recurrence rate of 30% [2]. Thus, the proactive prevention of this disease is vitally important in the initial health care of ophthalmology in particular and health sector in general. However, the management, follow-up and treatment of pterygium have not been synchronously implemented among regions and the prevention has not been available in the community. In addition, there is not much scientific research on this topic that provides a basic foundation for establishing the prevention plan and program against pterygium in an effective way in Thu Duc district, Ho Chi Minh city, where the favorable epidemiological factors for the emergence and progression of pterygium are available. Furthermore, we need to address the factors associated with

Corresponding author: Doan Phuoc Thuoc
Hue University of Medicine and Pharmacy, Vietnam
Tel: +84.914932577
Email: doanphuocthuoc@gmail.com

Received 18 April 2018; In revised form 17 June 2018; Accepted 15 August 2018

pterygium to reduce the incidence of this disease, in order to create proactive prevention effective. These factors can work independently or together in a pathogenic manner to increase or decrease the incidence in the community. As a result, we carry out this scheme with two principal objectives: To study the prevalence of pterygium among the elderly in Thu Duc district, Ho Chi Minh city in the year 2016 and to identify some related factors.

2. Materials and Methods

Subjects

The elderly (aged 60 or above) living in Thu Duc district, Ho Chi Minh city; under the supervision of the Association of the Elderly; presenting themselves to be examined at the exact dates and locations according to the invitation of the Association of the Elderly during the period from August 29th 2016 to October 15th 2016.

- *Exclusion criteria:* People who are not willing to participate in the survey; who are incapable of cooperating during the survey, the examination... such as complete deafness, psychos, memory loss; who are without or lose one/two eyes; who have congenital disorders in eye lid and eye ball; who have a history of corneal or conjunctival transplant.

Research design: A cross-sectional descriptive study

Time and setting

- *Time:* from August 29th 2016 to October 15th 2016.
 - *Setting:* At 12 communes, participants were invited to health stations and are examined and interviewed in 12 health stations of Thu Duc district.

Sample size

The calculation of sample size is according to the formula of estimating rates. In which: p: the prevalence (p= 0.2) is the incidence of pterygium among people aged ≥ 60 . According to the result of the study "Characteristics of pterygium in 16 provinces of Vietnam" of Do

Nhu Hon (2013) [1]; d: accuracy (tolerance) = 0.03 with the expected accuracy 97% (3% error); $Z(1-\alpha/2) = 1.96$ with a confidence of 95%.

The minimum sample size is 683 patients. To avoid inadequate sample size, we planned to choose 1 000 participants to be studied in 20,000 elderly people under the supervision of the Association of the Elderly of Thu Duc district.

Research techniques: Interview techniques; basic ophthalmic examination techniques.

Definitions

- *Dry eye syndrome:* Dry eye is a damaging condition of the tear film layer due to decreased secretion or increased evaporation of tears due to various causes, which lead to uncomfortable symptoms and inflammation of the eyeball surface. Dry eye syndrome is classified into 2 groups: No; Yes.

A person is considered to have dry eye syndrome (both present and pre-existing) when at least one of the following six symptoms occurs frequently or at all times:

- + Feeling dry eyes
- + Feel like having sand in your eyes
- + Feeling a burning sensation
- + Red eyes
- + Eyelashes are scaly
- + Two eyelids

- *Physical activities:* Physical activities are all activities that use strength in various distinct degrees. Physical activity is divided into three levels:

+ *Light:* working as administrative staff, intellectual occupations, freelance workers, housewives, teachers.

+ *Medium:* construction workers, farmers, fisheries, soldiers.

+ *Heavy:* a number of agricultural occupations, heavy industry workers, mining, sports athletes, soldiers in training, forestry, and forging.

- *Frequency of wearing sunglasses:* Sunglasses are lenses that are naturally dark in color or when sunlight shines on (color changing lenses). Wearing sunglasses when going out can help to avoid direct sunlight, thus to protect the eye or can assist in reducing the harmful effects of ultraviolet (UV) radiation. The frequency of wearing sunglasses is divided into 3 categories

+ Do not wear: usually do not bring out the sun.

+ Wear occasionally: when it is sunny, sometimes not.

+ Wear regularly: usually when it is sunny.

- *The usage of eye drops*: Use common eye drops such as NaCl 9 % or Chloramphenicol 0.4% or artificial tears to drip into eyes to clean eyes every time going to work or working outside. The usage of eye drops is divided into 3 categories:

+ Not used: never used.

+ Irregular use: used but average <1 time/day.

+ Regular use: use on average ≥ 1 time/day

Statistical analysis

The data was coded, stored and analyzed using SPSS version 20.0. Descriptive factors have been summarized by frequency and proportions, and summary statistics such as mean, standard deviation and ranges. The analytical statistics was done using single variable by test χ^2 ; then multivariate logistic regression was used to find the multivariate correlation between pterygium and variables with $p < 0.05$ in single-variable analysis.

Ethical consideration

Firstly, the proposal and questionnaire of this research were submitted for the approval to the Institution Review Board (IRB), Hue University of Medicine and Pharmacy, Vietnam. After that, researcher contacted local governments and Thu Duc community health center for permission of data collection. Finally, consent form, purpose of study and data collection method of this study were orally presented to

participants before collecting data.

3. Results

General characteristics of the sample

The average age of participants included in the sample was 72.7 ± 7.6 years. Among them, the smallest was 60 and the largest was 94. People in the 60-69 age group accounted 46.3% of the sample, followed by the 70-79 age group (38.5%); group of people aged 80 or above accounted for the only 15.2%. With regards to gender, the proportion of men and women were 48.3% and 51.7%, respectively. The past/continuing occupational profiles of the sample have varied, with the majority belonging to farmer group (37.9%); followed by general workers (21.0%); trades folk (19.8%); officials and civil servants (7.8%); the lowest proportion was fishermen, forestry and workers. The highest proportion belonged to senior high school and junior high school graduates, with 26.2% and 25.2%, respectively; followed by people with primary education (20.7%) and vocational training, college, university (14.6%). The illiteracy rate was the lowest (13.3%).

Prevalence of pterygium

Among 1,000 elderly people included in the study, 156 had pterygium (15.6%). The prevalence of pterygium in all wards in each district ranged from 13.9% to 17.0%. Classified according to eye which has pterygium, the vast majority of patients had unilateral pterygium (39.3% for left eye and 41.0% for right eye). The study recorded a total of 173 eyes with pterygium, specifically as follows:

Table 1. Characteristics of 173 eyes with pterygium

Characteristics of 173 eyes with pterygium		n = 173	%
Quantitative descriptors	Single headed	156	90.2
	Double headed	17	9.8
Position	Nasal	139	80.4
	Temporal	17	9.8
	Nasal and temporal	17	9.8
Recurrence features	Primary	134	77.4
	Previous surgery, non-recurrent	28	16.2
	Previous surgery, recurrent	11	6.4
Morphology	Atrophic	71	41.0
	Intermediate	75	43.4
	Fleshy	27	15.6

This study shows that most of pterygia developed on the nasal side (80.4%). Classified in terms of quantitative descriptors, the number of single-headed pterygia was dominant (90.2%). The incidence of primary pterygia was 77.4%.

Regarding morphology, intermediate and atrophic pterygia accounted for 43.4% and 41.0%, respectively; fleshy pterygia accounted for only 15.6%. Among the 39 patients who had already had surgery, 11/39 witnessed a recurrence.

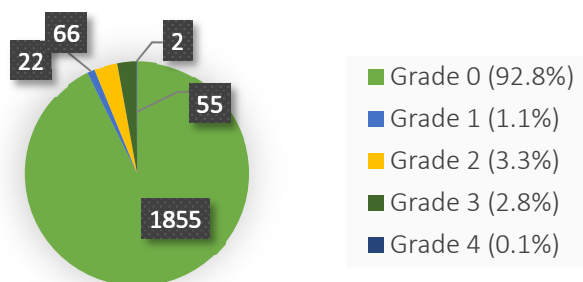


Fig.1. The proportion of pterygium based on grades

Grading based on level of progression/2 eyes, 92.8% of the eyes were classified as zero (no pterygium or previously surgical treated and non-recurrent pterygium). For patients who were currently suffering from pterygium

or recurrence after surgery, the prevalence of grade 1 was 1.1%, that of grade 2 was 3.3%, the figure for grade 3 was 2.8% and the fourth is the lowest, at 0.1%.

Some factors related to pterygium

• Single variable analysis

Table 2. Single variable analysis examining the factors associated with pterygium

Factors	Pterygium	Yes		Total		p
		n	%	n	%	
Age group	60 - 69	58	12.5	463	46.3	p < 0.05
	70 - 79	70	18.2	385	38.5	
	≥ 80	28	18.4	152	15.2	
Sex	Male	99	20.5	483	48.3	p < 0.05
	Female	57	11.0	517	51.7	
Education level	Below junior high school	124	20.9	592	59.2	p < 0.05
	Senior junior school and over	32	7.8	408	40.8	
Occupation	Farmer group	68	17.9	379	37.9	p < 0.05
	Manual workers, trades folk	56	13.7	408	40.8	
	Officials and civil servants	8	10.3	78	7.8	
	Other	24	17.8	135	13.5	
Outdoor time (hours/day)	≤ 4hours/day	22	7.7	286	28.6	p < 0.05
	> 4hours/day	134	18.8	714	71.4	
Total outdoor time (year)	≤ 5years	32	10.3	310	31.0	p < 0.05
	> 5years	124	18.0	690	69.0	
Average daily working time in polluted air	≤ 4 hours/day	80	15.7	509	50.9	p > 0.05
	> 4 hours/day	76	15.5	491	49.1	
Total working time in polluted air (years)	≤ 5 years	84	15.5	542	54.2	p > 0.05
	> 5 years	72	15.7	458	45.8	
Level of drinking	No	50	9.8	509	50.9	p < 0.05
	Less	25	13.8	181	18.1	
	Much	81	26.1	310	31.0	
Duration of alcohol / beer consumption	≤ 5 years	54	9.9	547	54.7	p < 0.05
	> 5 years	102	22.5	453	45.3	
Level of smoking (Cigarettes / day)	No	60	10.8	555	55.5	p < 0.05
	1 - 10	21	15.4	136	13.6	
	11 - 20	39	22.7	172	17.2	
Smoking duration	> 20	36	26.3	137	13.7	p < 0.05
	≤ 5 years	61	10.4	589	58.9	
Frequency of wearing sunglasses	> 5 years	95	23.1	411	41.1	p < 0.05
	No	118	20.1	587	58.7	
	Infrequently	22	10.2	215	21.5	
	Frequently	16	8.1	198	19.8	

Factors	Pterygium	Yes		Total		p
		n	%	n	%	
Exercises	No	57	21.0	271	27.1	p < 0.05
	Infrequently	47	14.3	329	32.9	
	Frequently	52	13.0	400	40.0	
Level of ophthalmic drop use	No	74	33.0	224	22.4	p < 0.05
	Infrequently	58	16.2	357	35.7	
	Frequently	24	5.7	419	41.9	
Level of physical activity	Light	20	9.3	215	21.5	p < 0.05
	Medium	50	14.6	342	34.2	
	Heavy	86	19.4	443	44.3	
Dry eye syndrome	Yes	115	27.7	415	41.5	p < 0.05
	No	41	7.0	585	58.5	
Genetic/family factors	Yes	121	12.7	955	95.5	p < 0.05
	No	35	77.8	45	4.5	

The results showed that there was a correlation (p <0.05) between pterygium and 16 factors: age, sex, educational level, occupation, average time of outdoor activities per day, total outdoor time (years), level of drinking, duration of alcohol/beer consumption (years), level of smoking (cigarettes/day), smoking duration (years), frequency of wearing sunglasses, level of exercise,

level of ophthalmic drop use, level of physical activity, dry eye syndrome, genetic/family factors; No correlation was found (p > 0.05) between pterygium and two factors: average daily working time in polluted air (hours / day), and total working time in polluted air (years).

• *Multivariate analysis*

Table 3. Logistic multivariable regression model examining the factors associated with pterygium

Independent variables	B	p	OR	KTC 95%	
				Lower limit	Upper limit
Outdoor time (days)	3.652	< 0.05	38.55	14.845	100.108
Genetic / family factors	3.510	< 0.05	33.45	12.744	87.803
Outdoor time (years)	2.417	< 0.05	11.215	4.919	25.57
Dry eye syndrome	1.706	< 0.05	5.505	3.161	9.587
Sex	0.960	< 0.05	2.610	0.833	8.184
Alcohol consumption	0.739	< 0.05	2.093	1.123	3.902
Physical activities	0.637	< 0.05	1.891	1.300	2.751
Smoking level	0.590	< 0.05	1.804	1.213	2.682
Age group	-0.213	< 0.05	0.808	0.552	1.183
Education level	-0.464	< 0.05	0.629	0.492	0.803
Wearing sunglasses	-0.525	< 0.05	0.592	0.404	0.866
Using ophthalmic drop	-1.513	< 0.05	0.220	0.149	0.326
Exercise	-1.886	< 0.05	0.152	0.092	0.251
Duration of alcohol / beer consumption	0.363	> 0.05	1.437	0.569	3.631
Occupation	-0.068	> 0.05	0.934	0.825	1.058
Smoking duration	-0.088	> 0.05	0.916	0.312	2.688
Constant	-13.146	0.000	0.000		

The results of the table above show that the prevalence of pterygium is related to several factors expressed by the following equation:

$$\text{Prevalence of pterygium} = -13.146 + 3.652 \times (\text{average outdoor daytime activity}) + 3.510 \times (\text{genetic/family factors}) + 2.417 \times (\text{total outdoor time}) + 1.706 \times (\text{dry eye syndrome}) + 0.960 \times (\text{sex}) + 0.739 \times (\text{alcohol consumption}) + 0.637 \times (\text{physical activities}) + 0.590 \times (\text{level of smoking}) - 0.213 \times (\text{age group}) - 0.464 \times (\text{educational level}) - 0.525 \times (\text{the frequency of wearing sunglasses}) - 1.513 \times (\text{level of using ophthalmic drop}) - 1.886 \times (\text{level of exercise}).$$

4. Discussion

Among 1,000 elderly people included in the study, 156 had pterygium (15.6%). Different Vietnamese authors reported similar findings, which is equivalent to the study of Le Cong Duc (2016) (15.6%) [3] and Do Nhu Hon (2013) (17.0%) [1].

Classified according to eye which has pterygium, the vast majority of patients had unilateral pterygium (39.3% for left eye and 41.0% for right eye); The number of bilateral cases was 17, accounting for 19.7%. This result is similar to that of Lander J (2011) carried out in Australia [4]; Chen T (2015) conducted in China [5].

This study showed that most of pterygia developed on the nasal side (80.4%) because this area is more exposed to UV light owing to its reflection from the nose [6, 7]. It was similar to the results in Anbesse D.H's study (2017) where the figure of fornasal ptegygia was 98.7% [8] and to the results in Lander J's study (2011) (92.5%) [4]. Classified in terms of quantitative descriptors, the number of single-headed pterygia was dominant (90.2%), which was similar to Anbess D.H (2017) and Pyo.E.Y (2016) [8, 9]. The incidence of primary pterygia was 77.4%. Regarding morphology, intermediate and atrophic pterygia accounted for 43.4% and 41.0%, respectively, while fleshy pterygia accounted for only 15.6%. Among 39 patients who had already had surgery, 11/39 witnessed a recurrence. The recurrent rate depended on each of surgical techniques. Our study was carried out in the elderly population, and most of the patients had a previous surgery a couple of years before, when the

pterygium surgical techniques were not fully understood and developed, thus could have caused the high recurrent rate.

Grading based on the level of progression/2 eyes, pterygium is classified into 5 grades in which the zero grade is when eyes are without pterygium or have previous surgery but without recurrence. In our study, 92.8% of the eyes were classified as zero. For patients who were currently suffering from pterygium or recurrence after surgery, the prevalence of grade 1 was 1.1%, that of grade 2 was 3.3%, the figure for grade 3 was 2.8% and grade 4 was 0.1%. These figures can be explained by the development of local health services. Most patients with pterygium visited the clinic at early stages like grade 2, grade 3 - it was possible that patients with grade 4 pterygium were those who visited the clinic for ophthalmic examination only after they have experienced blurry vision. With similar results, some authors have suggested that it would be beneficial to diagnose and perform earlier surgery for patients with grade 2 or 3 pterygium. However, many patients might be afraid of the surgery procedure or the recurrence of that disease. Education, therefore, is essential to alleviate patients' fear.

In single-variable analysis, the results showed that there was a correlation ($p < 0.05$) between pterygium and 16 factors. Of the 16 factors found to be related to pterygium in single-variable analysis, there was a relationship between pterygium and a number of factors in the logistic multivariate analysis (enter method): age, gender, education level, average outdoor time/day (hours/day), total outdoor time (years), alcohol consumption, level of smoking, wearing sunglasses, level of exercise, level of ophthalmic drop, level of doing physical activity, dry eye syndrome, genetic/family factors; Three factors were not found, namely duration of alcohol consumption, occupation and smoking duration. Thus, during invention process, we should consider the overall factors involved instead of each issue individually in order to provide effective interventions.

The current study has some important limitations: The study was conducted in only 12 wards of Thu Duc district, so the proposed solutions only apply in a certain framework. Furthermore, our study focused on analyzing the prevalence and some related factors, but

we did not identify the cause of pterygium, so we could not propose the most effective preventive measure to reduce the prevalence of pterygium in the community. However, this will be the subject of ongoing studies.

5. Conclusions

The prevalence of pterygium was 15.6%. The prevalence of nasal side was 80.4% and single-headed pterygium was dominant (90,2%); the majority of patients had unilateral pterygium (39.3% on left side and 41.0% for right eyes).

There was a relationship between pterygium and a number of factors: age, gender, education level, average outdoor time/day (hours/day), total outdoor time (years), alcohol consumption, level of smoking, wearing sunglasses, level of exercise, level of ophthalmic drop, level of doing physical activity, dry eye syndrome, genetic/family factors.

References

1. Do Nhu Hon. Pterygium in communities of 16 provinces and cities of Vietnam. *Vietnam J Prev Med.* 2013; 23(6): 11-13.
2. Han JM, Choi HJ, Wee WR, et al. A Case of alkali burn treated with amniotic membrane graft and forniceal reconstruction. *J Korean Ophthalmol Soc.* 2010;51(7):1010-1015
3. Le Cong Duc. Evaluating the efficacy of pterygium surgery with limbal conjunctival autograft transplantation. *Scientific research topics, Ha Tinh Department of Health.* 2016.
4. Landers J, Henderson T, Craig J. Prevalence of pterygium in indigenous Australians within central Australia: The Central Australian Ocular Health Study. *Clin Exp Ophthalmol.* 2011; 39(7): 604-606
5. Chen T, Ding L, Shan G, et al. Prevalence and racial differences in pterygium: A cross-sectional study in han and uygur adults in Xinjiang, China. *Invest Ophthalmol Vis Sci.* 2015;56(2):1109-17.
6. Alqahtani JM. The prevalence of pterygium in Alkhubar: A hospital-based study. *J Family Community Med.* 2013;20(3):159-61.
7. Citation KK, Krishnaram K. Prevalence and Pattern of Pterygium. *The Internet Journal of Ophthalmology and Visual Science.* 2013; 10(1): 1-4.
8. Anbesse DH, Kassa T, Kefyalew B, et al. Prevalence and associated factors of pterygium among adults living in Gondar city, Northwest Ethiopia. *PLoS ONE.* 2017; 12(3): 1-9.
9. Pyo EY, Mun GH, Yoon KC. The prevalence and risk factors for pterygium in South Korea: The Korea National Health and Nutrition Examination Survey (KNHANES) 2009-2010. *Epidemiol Health.* 2016; 38: 15.