Prevalence and Racial Differences in Pterygium: A Cross-Sectional Study in Han and Uygur Adults in Xinjiang, China

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PURPOSE. To understand the prevalence and associated risk factors of pterygium in Han and Uygur population in Xinjiang, China and to assess the racial differences.

METHODS. A cross-sectional study was conducted in two rural and three urban regions of Xinjiang. A multistage and stratified sampling method was used to select representative samples. Risk factors associated with pterygium were screened in logistic regression models.

RESULTS. Among 4617 participants aged 30 years and older, 2452 were Han and 2165 were Uygur Nationality adults. The overall prevalence of pterygium was 11.95% ($n = 546$), with 4.27% ($n = 197$) were bilateral and 7.56% ($n = 349$) were unilateral. Multivariate analysis indicated that race, age, and rural residence were significantly associated with any pterygium ($P < 0.001$ for all). The prevalence of pterygium ($P < 0.01$) in Han subjects was higher than that of Uygur subjects. Both age and rural residence were associated with any pterygium in Han and Uygur. Low education level had significant positive association with pterygium in Han population ($P < 0.001$).

CONCLUSIONS. Pterygium affects approximately one-ninth of Han and Uygur population. Compared with Uygur, Han ethnicity is a significant risk factor of pterygium. Our results indicated a higher prevalence of pterygium in rural areas of Xinjiang, China compared with urban cities. Age increase was also associated with presence of pterygium. Strategies are warranted to prevent the serious effects caused by pterygium.

Keywords: pterygium, prevalence, Han and Uygur population, risk factors

Pterygium is a wedge-shaped fibrovascular tissue of the bulbar conjunctiva growing toward and over the corneal limbus, and it may cause cosmetic concerns, irregular astigmatism, and even visual impairment.^{1,2} Variable prevalence of pterygium have been reported worldwide.^{3–5} The prevalence in Chinese population was also inconsistent according to published studies. The Yunnan Minority Eye Study (YMES)⁴ reported a relatively higher prevalence of pterygium (39.0%) in rural Chinese Bai aged 50 years and older compared with other population-based studies, whereas the Beijing Eye Study showed a significant lower prevalence (2.9%) in rural and urban people aged 40 years and over.⁶ Age, sex, smoking, ultraviolet exposure, and hereditary factors associated with pterygium have been reported.^{5,7,8} Race and geography also have been shown to be linked with pterygium in several studies.^{5,9} The Barbados Eye Studies found that people with darker skin have a higher prevalence of pterygium than white persons.⁹ Similarly, race was reported as a significant risk factor for pterygium in Singapore Epidemiology of Eye Disease Study.⁵

Our study is a part of the China National Health Survey (CNHS), an ongoing nationally representative and population-based cross-sectional survey conducted in different provinces in China. The survey was conducted in urban and rural areas,

and participants comprised different sexes, age groups, and races. Xinjiang province is located in the northwest part of China, at eastern longitude 75°–95° and northern latitude 35°–50°. Spanning over approximately 1.66 million km², it is the largest Chinese administrative division and the eighth largest country subdivision in the world. Xinjiang is home to a number of ethnic groups, including Uygur, Han, and Kazak. The Uygur population comprises approximately one-half of the whole population in Xinjiang.

To our best knowledge, no study has been conducted to investigate the prevalence of pterygium among Uygur population and assess the racial differences of pterygium in Xinjiang. In the present study, we reported the prevalence and associated risk factors of pterygium in two major racial groups in Xinjiang (Han and Uygur) and described the racial differences in the same geographical location.

METHODS

Study Population

In this cross-sectional study, sampling process was stratified according to the level of urbanization (large cities [Urumqi,

TABLE 1. Characteristics of Participated Han and Uygur Population

	Nationality		<i>P</i> Value*
	Han, <i>N</i> = 2452	Uygur, <i>N</i> = 2165	
Age, y	49.81 ± 11.41	47.29 ± 10.84	<0.001
Sex, <i>n</i> (%)			0.002
Male	1003 (40.91)	786 (36.30)	
Female	1449 (59.09)	1379 (63.70)	
Height, cm	161.83 ± 8.20	160.97 ± 8.30	<0.001
Weight, kg	65.15 ± 12.02	68.33 ± 12.78	<0.001
BMI, kg/m ²	24.78 ± 3.56	26.32 ± 4.31	<0.001
Astigmatism,			
<−0.5 D, <i>n</i> (%)	920 (37.52)	649 (29.98)	<0.001
Residence, <i>n</i> (%)			<0.001
Urban	1428 (58.45)	1045 (48.58)	
Rural	1015 (41.55)	1106 (51.42)	
Education, <i>n</i> (%)			<0.001
No education	194 (7.95)	58 (2.71)	
Elementary	368 (15.09)	484 (22.62)	
Middle school	760 (31.16)	524 (24.49)	
High school	524 (21.48)	494 (23.08)	
University or higher	593 (24.31)	580 (27.10)	
Occupation, <i>n</i> (%)			<0.001
Outdoor	830 (33.85)	835 (38.57)	
Indoor	1622 (66.15)	1330 (61.43)	
Hypertension, <i>n</i> (%)	456 (18.67)	297 (13.74)	<0.001
Diabetes, <i>n</i> (%)	178 (7.29)	108 (5.01)	0.001
Smoking status, <i>n</i> (%)			<0.001
Never	1678 (68.71)	1570 (72.89)	
Past	266 (10.89)	169 (7.85)	
Current	498 (20.39)	415 (19.27)	
Alcohol use, <i>n</i> (%)			<0.001
Never	1228 (50.66)	1646 (76.67)	
Past	152 (6.27)	231 (10.76)	
Current	1044 (42.07)	270 (12.58)	
Exercise, <i>n</i> (%)			<0.001
Never	1018 (42.03)	1292 (61.49)	
Not regular	480 (19.82)	331 (15.75)	
Regular	924 (38.15)	478 (22.75)	
Physical work			<0.001
Light	1451 (59.39)	1160 (53.95)	
Moderate	317 (12.98)	329 (15.30)	
Heavy	675 (27.63)	661 (30.74)	

* *P* value based on nonparametric test or χ^2 test.

43°46'N], midsize cities [Wusu and Karamay City, 44°27'N and 45°35'N, respectively], county seats [Hami, 42°47'N and Toksun, 42°46'N], and rural townships). After different cities and counties were chosen, we randomly selected different districts in cities and rural townships in counties. Then, the sample was stratified according to the sex and age distribution in Xinjiang, on the basis of Chinese population data of 2010. Only people who had lived in their current residence over 1 year were eligible to participate. The study was conducted according to the tenets of the Declaration of Helsinki. The ethics approval was obtained from the bioethical committee of the Institute of Basic Medical Sciences, the Chinese Academy of Medical Sciences. Written

informed consent was obtained from each participant after explanation of the nature and possible consequences of the study.

Data Collection

Each participant underwent a comprehensive interview by trained interviewers with a questionnaire to collect information, such as age, sex, occupations (laborer, agriculture, managerial work, service and sale, technological work, student, housework, and others), education level (no education, elementary, middle school, high school, and university or higher), history of hypertension and diabetes, and lifestyle (e.g., smoking, alcohol consumption, physical work, and exercise). The agriculture work was classified as outdoor work, while the others were considered as indoor work. Height and weight were measured in centimeters and kilograms. Body mass index (BMI) was calculated using the universally recognized formula: weight (kg)/height (m)². Systolic and diastolic blood pressures were measured with a digital automatic blood pressure monitor. The average of three measurements was recorded.

The anterior segment of the eye was examined with a portable hand-held slit-lamp (KJ5S2, Suzhou Kangjie Medical Co., Ltd., Jiangsu, China). The diagnosis of any pterygium (in either eye) was as a radially oriented fibrovascular lesion passing laterally through the limbus into the cornea or a history of pterygium excision. The grading was under standard lighting condition in accordance with the location of pterygium head.^{4,10,11} Grade 1: on the limbus. Grade 2: between the limbus and the undilated pupil margin. Grade 3: on the pupil margin. Grade 4: beyond the pupil margin. If bilateral pterygium was identified in participants, the eye with the higher grade was counted. Distance visual acuity was measured with a logarithm of the minimum angle of resolution E chart (Wehen Co., Ltd., Guangzhou, China) at 4 m. The noncycloplegic refraction and corneal curvature radius were measured with an auto ref-keratometer (ARK-510A, Nidek Co., Ltd., Tokyo, Japan). Astigmatism was defined as cylinder value < −0.50 D. Digital photographs of the fundus were taken using a Canon CR2-NM2 camera (Canon, Inc., Tokyo, Japan).

Statistical Analysis

We first conducted an analysis with data from all participants to investigate the possible risk factors, and then we conducted an analysis for Han and Uygur separately. The age-standardized prevalence was based on the National Census 2010. The risk factors were first screened in a univariate manner. If the *P* value was <0.05 in univariate models, then these factors were included in multiple logistic regression models. A *P* value < 0.05 was considered significant. A logistic model was employed to investigate whether race modified the association effects of the other significant risk factors (based on the stepwise algorithm). Statistical analysis was performed with SAS software (SAS 9.3; SAS Institute, Inc., Cary, NC, USA).

RESULTS

Among 5529 participants older than 30 years old, 4617 subjects (1789 males and 2828 females) underwent the ophthalmic examinations (response rate = 83.51%). In 2452 Han and 2165 Uygur adults, Han adults were older than the Uygur (*P* < 0.001). The percentile of males, urban residence, history of hypertension and diabetes, exercise, past smokers,

FIGURE 1. The distribution of various grades of pterygium in the Han and Uyghur population.

and current drinkers was also significantly higher in the Han group than in the Uyghur group (Table 1). The average age of all participants was 48.63 ± 11.22 . Pterygium was found in 546 (11.95%; 95% confidence interval [CI]: 11.01–12.89) subjects, with 197 (4.27%) were bilateral and 349 (7.56%) were unilateral. In patients with unilateral pterygium, 168 cases were found in the right eye, and 181 cases have their left eye affected. The majority of pterygium occurred in the nasal side (11.54%), only two people (0.04%) had temporal pterygium, and 11 people (0.24%) had both nasal and temporal pterygium. Only one participant underwent pterygium removal surgery. The age-adjusted prevalence rate of pterygium was 11.75% (95% CI: 10.75–12.75) among people aged 30 years and older. After adjusting the age, there was no sex difference in the prevalence of pterygium ($P > 0.05$). Among pterygium patients, 174 cases (3.77%) were classified as Grade 1, 258 cases (5.59%) were in Grade 2, 102 cases (2.21%) were in Grade 3, and 12 cases (0.26%) were in Grade 4. The distribution of the four grades of pterygium in Han and Uyghur population was shown in Figure 1 ($P < 0.01$ for trend).

Risk Factors of Pterygium

Increasing age ($P < 0.001$ for trend), Han population ($P < 0.001$), rural residence ($P < 0.001$), height ($P = 0.004$), weight ($P = 0.03$), astigmatism ($P < 0.001$), lower education level ($P < 0.001$ for trend), outdoor work ($P < 0.001$), hypertension ($P < 0.001$), smoking ($P < 0.001$ for trend), no exercise ($P < 0.001$ for trend), and heavy physical work ($P < 0.001$ for trend) were significantly associated with any pterygium. For bilateral pterygium, only age ($P < 0.001$ for trend), Han population ($P = 0.02$), rural residence ($P < 0.001$), lower education level ($P < 0.001$ for trend), outdoor work ($P < 0.001$), hypertension ($P < 0.001$), smoking ($P = 0.03$ for trend), and heavier physical work ($P < 0.001$ for trend) were significantly associated. Other factors such as sex, BMI, diabetes, or alcohol use had no

association with any pterygium or bilateral pterygium (Table 2).

Figures 2 and 3 showed the results of multivariate analysis of any pterygium and bilateral pterygium, respectively. For any pterygium and bilateral pterygium, increasing age, Han ethnicity, and rural residence were the risk factors. Poor education level was the associated risk factor for any pterygium only.

Compared to Uyghur ethnicity, the odds ratio (OR) of Han ethnicity was 1.63 (95% CI: 1.31–2.01; $P < 0.001$) for any pterygium after controlling for age, residence, and education level, and 1.53 (95% CI: 1.11–2.10; $P = 0.01$) for bilateral pterygium after controlling for age and residence, respectively. The interaction between race and education level was found in any pterygium ($P = 0.04$), showing that lower education level with pterygium was more common in Uyghur than Han people. In bilateral pterygium, the modification effect of race on residence was found ($P = 0.03$), and the rural residence with pterygium was more common in the Han group than in the Uyghur group.

Han Versus Uyghur Adults

The age-adjusted prevalence of pterygium in Han people (13.18%; 95% CI: 9.12–17.23) was higher ($P < 0.01$) than in the Uyghur population (8.97%; 95% CI: 4.58–13.36). In univariate analysis, the prevalence of any pterygium in both Han and Uyghur population increased significantly with age increase, rural residence, lower education level, and outdoor and heavier physical work ($P < 0.001$ for all). Interestingly, any pterygium in Han ethnicity was also significantly associated with height, astigmatism, and physical exercise ($P < 0.001$ for all). In Uyghur ethnicity, pterygium was significantly associated with females, BMI, and hypertension. Other factors such as weight, alcohol consumption, or diabetes were not associated with the prevalence of pterygium in either race (Table 3).

TABLE 2. Univariate Analysis for Risk Factors of Any Pterygium and Bilateral Pterygium

	Any Pterygium		Bilateral Pterygium	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Age, y				
30–39	1.0		1.0	
40–49	2.68 (1.85–3.88)	<0.001	2.27 (1.18–4.35)	0.01
50–59	5.98 (4.15–8.60)	<0.001	7.02 (3.80–12.98)	<0.001
60–69	8.59 (5.89–12.55)	<0.001	8.26 (4.37–15.62)	<0.001
70–80	6.23 (3.92–9.90)	<0.001	6.30 (2.94–13.50)	<0.001
P for trend		<0.001		<0.001
Sex				
Male	1.0		1.0	
Female	0.85 (0.71–1.02)	0.09	0.90 (0.68–1.21)	0.49
Race				
Uygur	1.0		1.0	
Han	1.59 (1.32–1.91)	<0.001	1.42 (1.06–1.91)	0.02
Residence				
Urban	1.0		1.0	
Rural	3.36 (2.76–4.09)	<0.001	3.99 (2.85–5.58)	<0.001
Height	0.98 (0.97–0.995)	0.004	0.98 (0.97–1.00)	0.06
Weight	0.99 (0.98–0.999)	0.03	0.99 (0.98–1.00)	0.15
BMI	0.99 (0.97–1.01)	0.32	0.99 (0.96–1.03)	0.59
Astigmatism				
No	1.0		1.0	
Yes	1.47 (1.22–1.76)	<0.001	1.32 (0.98–1.76)	0.06
Education				
No education	1.0		1.0	
Elementary	0.56 (0.41–0.77)	<0.001	0.58 (0.37–0.93)	0.02
Middle school	0.35 (0.25–0.47)	<0.001	0.33 (0.21–0.53)	<0.001
High school	0.22 (0.15–0.31)	<0.001	0.31 (0.19–0.51)	<0.001
University or higher	0.09 (0.06–0.13)	<0.001	0.09 (0.04–0.17)	<0.001
P for trend		<0.001		<0.001
Occupation				
Outdoor	1.0		1.0	
Indoor	0.37 (0.31–0.44)	<0.001	0.37 (0.28–0.49)	<0.001
Hypertension				
No	1.0		1.0	
Yes	1.46 (1.17–1.82)	<0.001	1.79 (1.29–2.50)	<0.001
Diabetes				
No	1.0		1.0	
Yes	1.15 (0.81–1.64)	0.44	1.37 (0.81–2.32)	0.24
Smoking status				
Never	1.0		1.0	
Past	1.71 (1.31–2.24)	<0.001	1.39 (0.90–2.14)	0.13
Current	0.90 (0.71–1.14)	0.36	0.67 (0.44–1.01)	0.06
P for trend		<0.001		0.03
Alcohol use				
Never	1.0		1.0	
Past	1.23 (0.90–1.69)	0.20	1.18 (0.73–1.92)	0.50
Current	1.15 (0.94–1.40)	0.17	0.80 (0.57–1.12)	0.19
P for trend		0.24		0.27
Exercise				
Never	1.0		1.0	
Not regular	0.58 (0.44–0.76)	<0.001	0.72 (0.48–1.09)	0.12
Regular	0.75 (0.61–0.93)	0.007	0.70 (0.50–0.99)	0.04
P for trend		<0.001		0.07
Physical work				
Light	1.0		1.0	

TABLE 2. Continued

	Any Pterygium		Bilateral Pterygium	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Moderate	1.31 (0.998–1.73)	0.05	1.18 (0.74–1.87)	0.49
Heavy	2.06 (1.70–2.51)	<0.001	2.15 (1.58–2.92)	<0.001
P for trend		<0.001		<0.001

Figures 4 and 5 showed the multivariate analysis of the prevalence of any pterygium in Han and Uyghur, respectively. Age and rural residence were found to be the risk factors of pterygium in both Han and Uyghur population ($P < 0.001$ for both). The higher education level was a protective factor for pterygium in Han but not in Uyghur population. BMI (OR: 0.96; 95% CI: 0.92–0.995; $P = 0.03$) and hypertension (OR: 1.61; 95% CI: 1.08–2.42; $P = 0.02$) were marginally associated with any pterygium in Uyghur population. After multivariate analysis, sex, height, astigmatism, outdoor work, physical work, and exercise were not risk factors for any pterygium in either race anymore. In a similar analysis, age and rural residence also were associated with bilateral pterygium in both Han and Uyghur population. Poor education level was only the risk factor for Han.

DISCUSSION

We performed a cross-sectional study to investigate and compare the prevalence and risk factors of pterygium in Han and Uyghur population in the same geographical location. The

prevalence of pterygium in our study was 11.75% in people older than 30 years old. Investigators proposed the presence of a “pterygium belt” located 37° north and south of the equator within which pterygium prevalence increased correspondingly with greater proximity to the equator.¹² Our studied places in Xinjiang province (42–46°N) are beyond the “pterygium belt,” while the prevalence of pterygium was close to other published studies performed in cities within the “pterygium belt,” such as Andhra Pradesh Eye Disease Study (11.7%)¹ and rural region (10%) in Central India Eye and Medical Study.¹³ For people aged 40 years and older in our study, the prevalence (14.99%) was also similar to the results in the “pterygium belt,” such as 17.8% in Mongolian and 14.49% in Zeku Eye study,^{14,15} 16.2% in Proyecto VER,¹⁶ 12.3% in Singapore Malay Eye Study (SiMES),¹⁷ and 10.2% in Barbados Eye Study.¹⁸ Exceptions also existed in Greenland (65° north, 8.6%)¹⁹ and Solomon Island (10° south, 0.3%).²⁰ This indicated that prevalence of pterygium was not only associated with latitude, but also the race, lifestyle, and residence of participants, as well as the sample size of study.⁷

FIGURE 2. Multivariate analysis of the risk factors of any pterygium.

FIGURE 3. Multivariate analysis of the risk factors of bilateral pterygium.

In analysis with combined data, we found race was significantly associated with any pterygium and bilateral pterygium. At the same time, we found a higher prevalence of any pterygium and bilateral pterygium in Han population compared to Uyghurs, with an OR of 1.63 and 1.53, respectively. The effect of ethnicity on the prevalence of pterygium has also been observed in multiethnic population study in Singapore,⁵ Barbados Eye Study,¹⁸ and Tehran Eye Study.²¹ The racial difference in our study may be partially due to the special lifestyle such as wearing a headscarf or hat in Uyghur population, or the genetic predisposition to pterygium in Han population.

The associations between pterygium and older age and rural residence appeared to be explicit in many studies.^{1,2,6,22} It could be explained by the cumulative exposure to sunlight in people with increased age and rural residence. In our study, age and rural residence were also the risk factors for pterygium in both Han and Uyghur population. Interestingly, an interaction association between race and residence was found in bilateral pterygium, showing that the effect of race on bilateral pterygium was modified by the location.

Low education level also was found to be a risk factor in many studies, which indicated a relationship between occupations with excess sunlight exposure and pterygium.^{8,18} Andhra Pradesh Eye Disease Study,¹ YMES,⁴ and Shahroud Eye Cohort Study²³ all reported a higher risk of pterygium in populations with a lower education level. Especially, in the Singapore Epidemiology of Eye Disease Study, Ang et al.⁵ reported that people with a higher education level had lower incidence of pterygium. In our combined analysis, we also found lower education level was the associated risk factor of pterygium. In addition, an interaction between race and education existed, showing that education level affected the correlation between race and pterygium. In a separate analysis, we found that only Han ethnicity with lower education level were likely to have pterygium. It remains unclear why no association exists between the pterygium in Uyghur group and education level.

The different lifestyles and work patterns in Uyghurs may play a role.

The relationship between sex and pterygium was undetermined. Some studies found men had a higher risk for pterygium,^{8,13,24} while others reported women had higher risk,^{4,15} and no association between sex and pterygium also have been reported.^{1,7,18} In the present study, sex was not significantly associated with pterygium in either race. This result was consistent with the data from the Andhra Pradesh Eye Disease Study,¹ Kumejima Study,²⁵ and Tehran Eye Study.²¹ The different socioeconomic status, physical work, and exercise maybe explain the inconsistent results.

With regard to the association between pterygium and systematic characteristics (e.g., hypertension and diabetes, height, and weight) and lifestyle (e.g., smoking, alcohol intake, physical work, and exercise), we only found a borderline association between hypertension and pterygium in Uyghur. It was similar to other published studies such as Norfolk Island Eye Study,²⁶ YMES,⁴ and Chennai Glaucoma Study.²⁷

The main strengths of this study include the multistage and stratified sampling method, as well as a comprehensive and comparative assessment of risk factors in two races living in the same geography. However, the major limitations of our study were no information about the history of ocular sun exposure or the use of protective devices were collected. That information would help directly assess the association between the ultraviolet exposure and pterygium. However, we used outdoor work as a surrogate to assess sunlight exposure indirectly. Another limitation is, like all other cross-sectional studies, we are unable to establish causality between risk factors and pterygium.

CONCLUSIONS

We investigated the prevalence of pterygium and associated factors in two ethnicities, Han and Uyghur, living in the same

TABLE 3. Univariate Analysis for Risk Factors of Pterygium in Han and Uyghur Populations

	Han		Uyghur	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Age, y				
30–39	1.0		1.0	
40–49	3.33 (1.90–5.86)	<0.001	2.17 (1.32–3.58)	0.002
50–59	8.37 (4.83–14.51)	<0.001	3.81 (2.29–6.33)	<0.001
60–69	11.31 (6.41–19.94)	<0.001	6.23 (3.68–10.55)	<0.001
70–80	7.71 (4.07–14.61)	<0.001	4.48 (2.08–9.68)	<0.001
P for trend		<0.001		<0.001
Sex				
Male	1.0		1.0	
Female	1.04 (0.82–1.31)	0.74	0.65 (0.49–0.88)	0.005
Residence				
Urban	1.0		1.0	
Rural	3.87 (3.03–4.95)	<0.001	3.13 (2.24–4.36)	<0.001
Height	0.97 (0.96–0.99)	<0.001	1.00 (0.98–1.02)	0.97
Weight	1.00 (0.99–1.01)	0.44	0.99 (0.98–1.00)	0.11
BMI	1.03 (1.00–1.07)	0.05	0.96 (0.93–0.997)	0.03
Astigmatism	1.48 (1.18–1.87)	<0.001	1.32 (0.97–1.79)	0.08
Education				
No education	1.0		1.0	
Elementary	0.64 (0.44–0.94)	0.02	1.07 (0.49–2.36)	0.86
Middle school	0.32 (0.23–0.46)	<0.001	0.71 (0.32–1.58)	0.40
High school	0.19 (0.13–0.29)	<0.001	0.52 (0.23–1.18)	0.12
University or higher	0.07 (0.04–0.11)	<0.001	0.26 (0.11–0.60)	0.002
P for trend		<0.001		<0.001
Occupation				
Outdoor	1.0		1.0	
Indoor	0.33 (0.26–0.41)	<0.001	0.42 (0.31–0.56)	<0.001
Hypertension				
No	1.0		1.0	
Yes	1.13 (0.85–1.50)	0.40	2.01 (1.44–2.92)	<0.001
Diabetes				
No	1.0		1.0	
Yes	1.05 (0.68–1.62)	0.83	1.23 (0.66–2.28)	0.52
Smoking status				
Never	1.0		1.0	
Past	1.63 (1.18–2.26)	0.003	1.64 (1.02–2.64)	0.04
Current	0.78 (0.57–1.06)	0.11	1.08 (0.74–1.56)	0.70
P for trend		0.001		0.12
Alcohol use				
Never	1.0		1.0	
Past	1.05 (0.66–1.69)	0.83	1.46 (0.95–2.23)	0.08
Current	0.96 (0.76–1.21)	0.72	0.94 (0.60–1.49)	0.80
P for trend		0.90		0.20
Exercise				
Never	1.0		1.0	
Not regular	0.42 (0.29–0.60)	<0.001	0.79 (0.52–1.23)	0.30
Regular	0.60 (0.47–0.78)	<0.001	0.81 (0.56–1.18)	0.27
P for trend		<0.001		0.39
Physical work				
Light	1.0		1.0	
Moderate	1.38 (0.98–1.97)	0.07	1.32 (0.85–2.07)	0.22
Heavy	2.05 (1.60–2.63)	<0.001	2.24 (1.63–3.08)	<0.001
P for trend		<0.001		<0.001

FIGURE 4. Multivariate analysis of the risk factors of pterygium in Han population.

FIGURE 5. Multivariate analysis of the risk factors of pterygium in Uyghur population.

geographic area. Our data showed a higher prevalence of pterygium in Han population than Uyghur. Age and rural residence were important risk factors in both races, lower education level was the only risk factor for pterygium in Han, and other factors such as smoking and alcohol had no significant influence on pterygium in either race. The genetic or ethnic predisposition in pterygium will be investigated in our future studies. Further studies are needed to explore the causative factors on pterygium. In addition, preventions, like wearing sunglasses or hats, are suggested for people who are exposed to risk factors to avoid unexpected serious side effects of pterygium.

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