Pterygium among Staff of College of Science, KNUST, Kumasi

Abstract

The aim of the study was to determine the prevalence of pterygium among the staff of College of Science, Kwame Nkrumah University of Science and Technology and an association between computer use and pterygium development. A descriptive cross-sectional study in which 150 staff of the College of Science, KNUST, Kumasi, aged 25 to 60 years who volunteered were examined for pterygium. A close-ended questionnaire was used to interview the participants. Majority (68.00%) of the participants were males. The ages of the participants ranged from 25 years to 60 years, with a mean age of 38.85 years. Majority (79.33%) of the participants were generally indoor workers while 31(20.67%) were outdoor workers. One hundred and sixteen (77.33%) of the participants were computer users (either at work, home or both) and 34 (22.67%) of the participants were not. The general prevalence of pterygium was 41.33%. The proportion of pterygium was highest among males (43.14%), highest in the age group 41 – 50 years (51.22%) and was higher among outdoor workers (51.61%) than indoor workers (40.33%). The proportion of pterygium among computer using participants was 40.52%. A significant association (95 CI, p = 0.02) was observed between the number of hours of computer use per day and pterygium development, with the highest number of cases recorded among those who spent more than 2 hours on the computer daily. Pterygium is more prevalent among outdoor workers than indoor workers. For indoor workers, individuals who spend time on the computer may be predisposed to the development of pterygium, with persons who spend an average of more than two hours per day on the computer both at home and at work , most susceptible.

Keywords: Pterygium; Computer; Outdoor; Indoor; Prevalence

Research Article

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Introduction

Pterygium refers to a fibrovascular sub epithelial in-growth of degenerative conjunctival tissue. It is usually triangular in shape and encroaches on the cornea from either sides of the palpebral fissure [1,2]. Usually asymptomatic, pterygium can present with symptoms like itching, ocular irritation, dry eyes and pain [3-6]. When left untreated, pterygium could result in significant visual morbidities such as induction of corneal astigmatism and decreased vision secondary to the development of pupillary axis block by the increased in growth [7-14]. Several risk factors have been identified for development of pterygium. These include ultraviolet (UV) light exposure, exposure to irritants such as dust, smoke and wind, dry ocular surface and inflammation [15-25]. Ultraviolet (UV) light exposure is believed to be the single most important risk factor for development of pterygium [26]. Individuals with increased UV light exposure such as outdoor workers (farmers, welders, surfers, fishers, gardeners etc) have an increased risk of pterygium development compared to indoor workers [15].

According to the Barbados eye study, individuals who work outdoor are almost twice as likely to have pterygium as those who work indoor [27,28]. The Meiktila eye study reported outdoor occupation to be an independent predictor of pterygium ($p<0.01$) [29]. There is very little evidence-based data on the prevalence of pterygium among persons who engage in indoor activities. Most population based studies have been conducted in the tropics or settings where majority of the people engage in outdoor activities such as farming, leaving the prevalence among indoor workers largely unknown. The aim of the study was to determine the prevalence of pterygium among the staff of College of Science, KNUST and an association between computer use and pterygium development. This will provide data on the prevalence of pterygium among indoor workers and the association of pterygium development with computer use.

Materials and Methods

The study was conducted in the College of Science, KNUST. College of Science, KNUST consist of two faculties and eight departments with an academic staff of approximately 150 and a considerable number of non-academic staff. A descriptive cross-sectional study involving 150 participants. Participants were selected on a volunteer basis, after letters were sent to the Provost of the college and the various department heads introducing the study and asking for volunteers. The consent of the participants was obtained after the details of the study were explained to them. A closed ended questionnaire was used to interview the participants. Visual acuity test, external eye examinations

(with pen touch) and ophthalmoscopy were performed on each participant. Data was analyzed with the Statistical Package for Social Sciences (SPSS) software version 16 and Microsoft Excel.

Results and Discussion

Majority (68.00%) of the participants were males. This is contrary to findings in studies by Jiao et al. [30] and Maharjan et al. [31] in which majority of the participants were females. The ages of participants ranged from 25 years to 60 years, with a mean age of 38.85 years (Table 1). Majority (119, 79.33%) of the participants were generally indoor workers while 31(20.67%) were outdoor workers. One hundred and sixteen (77.33%) of the participants were computer users (either at work, home or both). Sixty-two (62) of the participants had pterygium, giving a general prevalence of pterygium of 41.33%. The prevalence value obtained in this study is midway between the prevalence figures obtained in two similar studies in the Kumasi metropolis, Ghana. Kumah et al. [32], in their studies of the prevalence rate of pterygium among welders and kitchen staff in Kumasi metropolis reported prevalence figures of 56.60% and 31.00% respectively. However, considering the fact that the sample used in this study is made up of close to 80.00% indoor workers, a prevalence rate of 41.33% is remarkable compared to that obtained in the studies of Kumah et al. [33].

Table 1: Demographics of participants.

Age/Gender	Males [n (%)]	Females [n (%)]	Total [n (%)]
21 – 30 years	25 (16.67)	8 (5.33)	33 (22.00)
31 – 40 years	47 (31.33)	21 (14.00)	68 (45.33)
41 – 50 years	23 (15.33)	18 (12.00)	41 (27.33)
51 – 60 years	7 (4.67)	1 (0.67)	8 (5.34)
Total	102 (68.00)	48 (32.00)	150 (100)

Of the 62 participants with pterygium, 44 (70.97%) were males and 18 (29.03%) were females (Table 2). The prevalence of pterygium was higher in males (43.14%) than in females (37.50%). This is probably due to males forming majority (68.00%) of the study sample. Several studies have reported gender to be an independent predictor of pterygium, with males more likely to develop pterygium than females [15,17,20,24,29,34-37]. The Tanjong Pagar survey reported males to be five times more likely to develop pterygium than females [38]. The prevalence of pterygium in this study was highest (51.22%) in the age group 41-50 years. As age increased, the prevalence of pterygium increased. Exposure to UV light is an established risk factor for pterygium development. The duration of exposure also plays a role in pterygium development. The longer the exposure to UV light, the higher the risk of pterygium development. As age increases, the cumulative amount of time spent in the sun by an individual and as such the cumulative exposure to UV light increases, increasing the risk of pterygium development [39,40]. Also, an ocular condition commonly associated with increasing age is dry eye syndrome [41]. Dry eye syndrome, if not treated usually results in a dry ocular surface. Dry ocular surface is a known risk factor for pterygium development [4,5,42,43]. Other studies have reported the association of pterygium development with increasing age. Prevalence of pterygium, however decreased from the age group 41-50 years to the age group 51-60 years. This fall in prevalence is probably because some individuals would have had the pterygium excised by the time they reach the age range 51-60 years.

Table 2: Distribution of pterygium by age and gender.

Age/Gender	Males [n (%)]	Females [n (%)]	Total [n (%)]
21 – 30 years	4 (6.45)	6 (9.68)	10 (16.13)
31 – 40 years	19 (30.64)	9 (14.52)	28 (45.16)
41 – 50 years	18 (29.03)	3 (4.84)	21 (33.87)
51 – 60 years	3 (4.84)	0 (0.00)	3 (4.84)
Total	44 (70.97)	18 (29.03)	62 (100)

Of the 62 participants with pterygium, 46(74.19%) were indoor workers while 16(25.81%) were outdoor workers. Prevalence of pterygium was higher among outdoor working participants (51.61%) than indoor working participants (40.33%). Outdoor workers tend to spend a greater portion of their productive hours in the sun. The sun is the main source of ultraviolet (UV) light on earth. Exposure to UV light is an established risk factor for development of pterygium and believed to be the single most important risk factor [26,44]. Several other studies have also reported an association between outdoor occupation and pterygium development [19,23,29,45]. Forty-seven (47,75.81%) of the 62 pterygium cases were seen in computer users while fifteen (15, 26.56%) were seen in non-computer users. Forty-three (43,91.49%) of the pterygium cases among computer users were seen in participants who used computers both at work and home, four (4,8.51%) in participants who used the computer at work only and none among participants who used the computer at home only.

A significant association (95 CI, p = 0.02) was observed between the number of hours of computer use per day and pterygium development, with the highest number of pterygium cases in computer using participants seen in participants who spent more than two hours on the computer (Table 3). The prevalence of pterygium among computer using participants was 40.52%. Pterygium prevalence was higher in participants who used the computer both at work and at home than those who used it only at work or at home and was in participants who spent more than two hours per day on the computer. Blinking helps distribute tears evenly over the surface of the eye and also coats the tear film with the meibomian glands secretions (meibum). Meibum prevents evaporation of tears. During computer use, blinking reduces and the number of incomplete blinks also increases [46-49]. Reduced blink rate and incomplete blinks results in uneven distribution and increased evaporation of tears causing dry ocular surfaces. Dry ocular surface is a known risk factor for pterygium development. Also, reduced blink rate and increased incomplete blinks results in an increased amount of dust and other ocular irritants coming into contact with the ocular surface. Ocular irritants such as dust are known risk factors for pterygium development [50].

Table 3: Length of computer use and pterygium development.

Hours of Computer use per day	Pterygium Cases [n (%)]
< 1 hour	7 (14.89)
1 – 2 hours	12 (25.53)
>2 hours	28 (59.58)
Total	47 (100)

Conclusion

The prevalence of pterygium was found to be 41.33%. Pterygium is more prevalent among outdoor workers than indoor workers. For indoor workers, individuals who spend time on the computer may be predisposed to the development of pterygium, with persons who spend an average of more than two hours per day on the computer both at home and at work , most susceptible.

Limitations of Study

Factors such as exposure to wind, smoke and dust, amount of time spent outdoors and the presence of dry eye conditions which could influence pterygium development were not measured in this study. This, however, does not affect the importance of the study and the results obtained.

Conflict of Interest

The authors have no conflict of interest to declare.

References

1. Khurana AK (2007) Comprehensive Ophthalmology. doi:10.1007/s13398-014-0173-7.2.
2. Kanski JJ (2007) Clinical ophthalmology. A Syst Approach (2nd edn), Boston, Massachusetts Butterworth-Heinemann, USA pp. 629.
3. Julio G, Lluch S, Pujol P, Merindano D (2013) Ocular discomfort in pterygium patients. Optom Vis Sci 90(3): 269-274.
4. Kampitak K, Leelawongtawun W (2014) Precorneal tear film in pterygium eye. J Med Assoc Thail 97(5): 536-539.
5. Ishioka M, Shimmura S, Yagi Y, Tsubota K (2001) Pterygium and dry eye. Ophthalmologica 215(3): 209-211.
6. Kadayifçilar SC, Orhan M, Irkeç M (1998) Tear functions in patients with pterygium. Acta Ophthalmol Scand 76(2): 176-179.
7. Jaffar S, Dukht U, Rizvi F (2009) Impact of pterygium size on corneal topography. Rawal Med J 34: 145-147.
8. Kheirkhah A, Safi H, Molaei S, Nazari R, Behrouz MJ, et al. (2012) Effects of pterygium surgery on front and back corneal astigmatism. Can J Ophthalmol 47(5): 423-428.
9. Kampitak K (2003) The effect of pterygium on corneal astigmatism. J Med Assoc Thail 86(1): 16-23.
10. Oner FH, Kaderli B, Durak I, Cingil G (2000) Analysis of the pterygium size inducing marked refractive astigmatism. Eur J Ophthalmol 10(3): 212-214.
11. Maheshwari S (2007) Pterygium-induced corneal refractive changes. Indian J Ophthalmol 55(5): 383-386.
12. Ashaye AO (2002) Refractive astigmatism and size of pterygium. African J Med Med Sci 31(2): 163-165.
13. Holladay JT, Lewis JW, Allison ME, Ruiz RS (1985) Pterygia as cause of post-cataract with-the-rule astigmatism. J Am Intraocul Implant Soc 11(2): 176-179.
14. Chan CM, Liu YP, Tan DT (2002) Ocular surface changes in pterygium. Cornea 21(1): 38-42.
15. Liu L, Wu J, Geng J, Yuan Z, Huang D (2013) Geographical prevalence and risk factors for pterygium: a systematic review and meta-analysis. BMJ Open 3(11).
16. Demirok A, Cinal A, Yener HI, Yasar T, Kiliç A (2008) The risk factors of pterygium development: a hospital-based study. Ann Ophthalmol (Skokie) 40(2): 103-106.
17. Shiroma H, Higa A, Sawaguchi S, Iwase A, Tomidokoro A, et al. (2009) Prevalence and Risk Factors of Pterygium in a Southwestern Island of Japan: The Kumejima Study. Am J Ophthalmol 148(5): 766-771.
18. Saw SM, Tan D (1999) Pterygium: prevalence, demography and risk factors. Ophthalmic Epidemiol 6(3): 219-228.
19. Gazzard G, Saw SM, Farook M, Koh D, Widjaja D, et al. (2002) Pterygium in Indonesia: prevalence, severity and risk factors. Br J Ophthalmol 86(12): 1341-1346.
20. Fotouhi A, Hashemi H, Khabazkhoob M, Mohammad K (2009) Prevalence and risk factors of pterygium and pinguecula: the Tehran Eye Study. Eye (Lond) 23(5): 1125-1129.
21. Al-Bdour MD, Al-Latayfeh MM (2004) Risk factors for pterygium in an adult Jordanian population. Acta Ophthalmol Scand 82(1): 64-67.
22. Sun LP, Lv W, Liang YB, Friedman DS, Yang XH, et al. (2013) The prevalence of and risk factors associated with pterygium in a rural adult chinese population: the handan eye study. Ophthalmic Epidemiol 20(3): 148-154.
23. Cajucom-Uy H, Tong L, Wong TY, Tay WT, Saw SM (2010) The prevalence of and risk factors for pterygium in an urban Malay population: the Singapore Malay Eye Study (SiMES). Br J Ophthalmol 94(8): 977-981.
24. Asokan R, Venkatasubbu RS, Velumuri L, Lingam V, George R (2012) Prevalence and associated factors for pterygium and pinguecula in a South Indian population. Ophthalmic Physiol Opt 32(1): 39-44.
25. Liang QF, Xu L, Jin XY, You QS, Yang XH, et al. (2010) Epidemiology of pterygium in aged rural population of Beijing, China. Chin Med J (Engl) 123(13): 1699-1701.
26. Sekelj S, Dekaris I, Kondza-Krstonijević E, Gabrić N, Predović J, et al. (2007) Ultraviolet light and pterygium. Coll Antropol 31(Suppl 1): 45-47.
27. Luthra R, Nesesure BB, Wu S, Xie SH, Leske MC, et al. (2001) Frequency and Risk Factors for Pterygium in the Barbados Eye Study. Arch Ophthalmol 119: 1927-1832.
28. Nemesure B, Wu SY, Hennis A, Leske MC (2008) Nine-Year Incidence and Risk Factors for Pterygium in the Barbados Eye Studies. Ophthalmology 115(12): 2153-2158.
29. Durkin SR, Abhary S, Newland HS, Selva D, Aung T, et al. (2008) The prevalence, severity and risk factors for pterygium in central Myanmar: the Meiktila Eye Study. Br J Ophthalmol 92(1): 25-29.

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30. Jiao W, Zhou C, Wang T, Yang S, Bi H, et al. (2014) Prevalence and risk factors for pterygium in rural older adults in Shandong Province of China: A cross-sectional study. Biomed Res Int doi:10.1155/2014/658648.

31. Maharjan IM, Shreshth E, B G, Karmacharya S (2014) Original article Prevalence of and associated risk factors for pterygium in the high altitude communities of Upper Mustang , Nepal. Nepal J Ophthalmol 6(1): 65-70.

32. Kumah DB, Oteng-Amoako A, Harriette A (2011) Prevalence of pterygium among kitchen staff in Senior High Schools in the Kumasi metropolis, Ghana. J Ghana Sci Assoc 13(2): 83-88.

33. Kumah DB, Cobbina F, Duodu DJ (2011) Radiation-related eye diseases among welders of suame "magazine" in the kumasi metropolis. J Sci Technol 31(1): 37.

34. West S, Muñoz B (2008) Prevalence of pterygium in Latinos: Proyecto VER. Br J Ophthalmol 93(10): 1287-1290.

35. Panchapakesan J, Hourihan F, Mitchell P (1998) Prevalence of pterygium and pinguecula: the Blue Mountains Eye Study. Aust N Z J Ophthalmol 26(Suppl 1): S2-5.

36. Viso E, Gude F, Rodríguez-Ares MT (2011) Prevalence of pinguecula and pterygium in a general population in Spain. Eye (Lond) 25(3): 350-357.

37. Ang M, Li X, Wong W, Zheng Y, Chua D, et al. (2012) Prevalence of and racial differences in pterygium: A multiethnic population study in Asians. Ophthalmology 119(8): 1509-1515.

38. Wong TY, Foster PJ, Johnson GJ, Seah SK, Tan DT (2001) The prevalence and risk factors for pterygium in an adult Chinese population in Singapore: the Tanjong Pagar survey. Am J Ophthalmol 131(2): 176-183.

39. Taylor HR, West S, Munoz B, Rosenthal FS, Bressler SB, et al. (1992) The long-term effects of visible light on the eye. Arch Ophthalmol 110(1): 99-104.

40. Yam JC, Kwok AK (2014) Ultraviolet light and ocular diseases. Int Ophthalmol 34(2): 383-400.

41. Ding J, Sullivan DA (2012) Aging and dry eye disease. Exp Gerontol 47(7): 483-490.

42. Goldberg L, David R (1976) Pterygium and its relationship to the dry eye in the Bantu. Br J Ophthalmol 60(10): 720-721.

43. Rajiv, Mithal S, Sood AK (1991) Pterygium and dry eye-A clinical correlation. Indian J Ophthalmol 39(1): 15-16.

44. Nolan TM, DiGirolamo N, Sachdev NH, Hampartzoumian T, Coroneo MT, et al. (2003) The role of ultraviolet irradiation and heparin-binding epidermal growth factor-like growth factor in the pathogenesis of pterygium. Am J Pathol 162(2): 567-574.

45. Khoo J, Saw SM, Banerjee K, Chia SE, Tan D (1998) Outdoor work and the risk of pterygia: A case-control study. Int Ophthalmol 22(5): 293-298.

46. Portello JK, Rosenfield M, Chu CA (2013) Blink rate, incomplete blinks and computer vision syndrome. Optom Vis Sci 90(5): 482-487.

47. Chu CA, Rosenfield M, Portello JK (2014) Blink patterns: Reading from a computer screen versus hard copy. Optom Vis Sci 91(3): 297-302.

48. Patel S, Henderson R, Bradley L, Galloway B, Hunter L (1991) Effect of visual display unit use on blink rate and tear stability. Optom Vis Sci 68(11): 888-892.

49. Cardona G, García C, Serés C, Vilaseca M, Gispets J (2011) Blink Rate, Blink Amplitude, and Tear Film Integrity during Dynamic Visual Display Terminal Tasks. Curr Eye Res 36(3): 190-197.

50. Gierek-Łapińska A, Lange E, Mrukwa-Kominek E, Gierek-Ciaciura S (2003) Pterygium: allergic etiology? Pol Merkur Lekarski 14(84): 718.

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