PREVALENCE AND PATTERN DISTRIBUTION OF PTERYGIUM AMONG COMMERCIAL BUS DRIVERS IN BENIN METROPOLIS

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BENIN CITY

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A PROJECT PRESENTATION TO THE DEPARTMENT OF OPTOMETRY, FACULTY OF LIFE SCIENCES, UNIVERSITY OF BENIN, NIGERIA

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DOCTOR OF OPTOMETRY (OD) DEGREE.

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CERTIFICATION AND APPROVAL

DEDICATION

My sentiments are just as Hannah's, who said of the only true God: "He raiseth up the poor out of the dust, and lifteth up the beggar out of the dunghill, to set them among princes; and to make them inherit the throne of glory;" 1 Sam. 2:8.

Without the love of this unbiased God, how far could I have possibly come, in this world of unequals? I am thankful for His love I do not deserve which has made all these possible.

I would also like to dedicate this research paper to Mummy Lydia Okuguni for her love, guidance and support through my university education.

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To my friends turned family, Chike, Lawrence, Naomi, Mmasi, Praise, Sherifat, Fega., Daniel, Franklyn, Samson, Humble, I love you all**.**

And lastly, I appreciate my parents, Reverend & Mrs. Peter Eden and siblings Goodness & Oteme Eden for their love and support all these years. God bless you all.

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ABSTRACT

A pterygium is a wing shaped hyperplastic and fibrovascular growth of the conjunctiva encroaching onto the cornea. Cell apoptosis and cell proliferation processes are strongly associated with the development and progression of pterygium. Esthetic concerns, irregular astigmatism, decreased vision and blindness are important issues associated with this condition if left untreated. Commercial motorcyclists in Benin City, Nigeria, have been found to have a high prevalence of pterygium. There has been a dearth of information about pterygium prevalence among commercial bus drivers in Benin Metropolis. This research paper seeks to highlight the prevalence, severity and pattern distribution of pterygium among this group. A total of one hundred and twenty two (122) commercial bus drivers with one to five years driving experience in Benin Metropolis was included in the study. A questionnaire which was divided into two parts A and B was administered to the subjects. Visual acuity was measured using the Snellen's literate and Tumbling letter "E' chart under standard testing conditions in order to determine the level of vision and for legal purposes. Penlight was used for external examination to determine the position and extent of pterygium. Statistical package for social science (SPSS) computer software version 22.0 was used to tabulate the various variables for association and meaningful interpretations'. Out of the one hundred and twenty-two (122) subjects that participated in the study, 92% were males while 8% were females. About 46% had pterygium in either or both eyes with 89% occurring unilaterally with grade 1 occuring mostly (71%) followed by Grade 2 (23%). Age and Gender had significant effects with males affected more and occurring mostly in those between 51-65 years. There was however no significant relationship between duration of working hours and severity of pterygium. Pterygium prevention and education efforts should be targeted toward persons in occupations or recreations in sunny environments. The prevalence of pterygium among commercial bus drivers in Benin Metropolis was high in our study population with a peak age incidence at 51-65 years of age, grade 1 was more common and predominantly nasal in laterality.

Keywords: Pterygium, Penlight, Snellen Acuity Chart, Questionnaire.

CHAPTER ONE

1.0 INTRODUCTION

Pterygium is a common fibrovascular degenerative conjunctival condition associated with chronic exposure to ultraviolet (UV) radiation. The term pterygium is derived from the Greek word “pterygion,” meaning “wing,” which reflects the condition’s characteristic appearance: a wing-like or triangular raised centripetal lesion that grows from the conjunctiva onto the cornea. It is usually bilateral and found on the nasal aspect of the eye but can also be present on the temporal side as well.

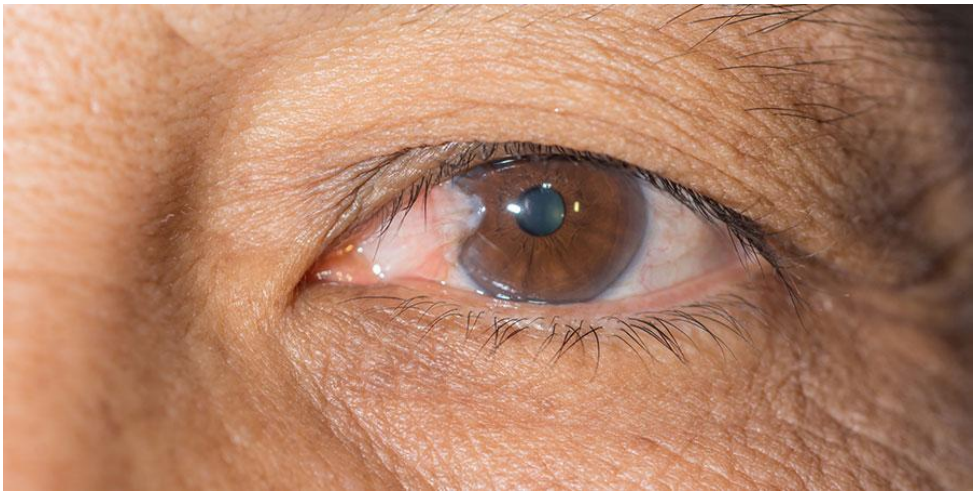

Figure 1.1: Pterygium

The anatomy of pterygium can be divided into three parts: apex or head, neck, and body. The conjunctival portion with a base toward the medial canthus is known as the body. The invading portion which contains the apex of the tissue is called the head, and the communicating part between the body and the head, which overlies the limbus, is named the neck.

1.1 BACKGROUND INFORMATION

The prevalence of pterygium globally averages 12%; however, the numbers vary vastly from 1.3% to 53%. Various risk factors such as demography and environment play a role in the discrepancy in reported prevalence, with higher numbers reported for older individuals living in sunny, dusty, equatorial regions or those with outdoor occupations. Most common in tropic regions.

Pterygium (also known as surfer's eye) is an ocular surface disease characterized mainly by a wing-shaped growth of limbal and conjunctival tissue over the adjacent cornea. As a result of alterations in local ocular surface homeostasis, the main components of pterygium include proliferative clusters of limbal stem cells (LSCs), epithelial metaplasia, active fibrovascular tissue, inflammation, and disruption of Bowman's layer along the invading apex of the pterygium. As the experimental models have failed to induce pterygium formation in animals, it seems that pterygium is an ocular disease only observed in humans. Although it is a well-known ocular condition since many years ago, numerous studies performed on pathophysiology and management of pterygium have never dissolved some main uncertainties about this common ocular surface disease.

1.1.1 Causes

Previous studies have indicated that numerous risk factors are associated with pterygium, including UV radiation, environmental irritants such as dust and wind, viral agents, familial and hereditary factors, and immunological and inflammatory factors. Other risk factors suggested by recent studies may include the transcription factors cAMP response element–binding protein, phospholipase D, cytochrome P450 1A1 protein, and aquaporin-1 and aquaporin-3 .

Despite of our recent expanding knowledge about the role of different factors in the pathogenesis of pterygium, sunlight exposure remains to be the most important risk factor for the initiation and progression of pterygium.

- **Ultraviolet Exposure**

The association between development of pterygium and UV radiation can be concluded from numerous epidemiological studies. The "pterygium zone" has been described as the area between 40° north and south of the equator, where a higher intensity of UV radiation influences the population of the region. The similarity between histopathologic findings of UV-induced skin damage and pterygium supports the idea. In addition, nasal predisposition of pterygium incidence is known to be correlated with an increase of more than 20-fold in irradiation of the nasal limbus, rendering the area more vulnerable for UV-induced injuries and development of pterygium.

UVA and UVB are the primary subtypes of solar UV rays that reach the ocular surface. Although initial studies focused on the role of UVB in DNA damage and alteration of intracellular signaling in ocular surface disease, epidemiological studies have revealed that both UVB and UVA are associated with the development of pterygium. Through inducing reactive oxygen species, UVA causes indirect damage to DNA and activation of transcription factors, which regulate the expression of multiple genes involved in ECM changes. UV-induced inflammation and tissue remodeling is involved in the pathogenesis of pterygium. Multiple studies have reported higher levels of inflammatory cytokines, growth factors, and MMPs in pterygia. In vitro experiments revealed that elevated expression of these factors in pterygium cells is inducible by UV radiation. UV-mediated alterations of limbal stem cells induce the production of numerous inflammatory factors and MMPs, contributing to the inflammation,

angiogenesis, and invasion of pterygium. Similarly, pterygium fibroblasts activated by UV produce high levels of growth factors and extracellular enzymes, which facilitate invasion of pterygium through ECM remodeling and dissolution of Bowman's layer.

- **Hereditary**

For the first time in 1893, familial incidence of pterygia was reported by Gutierrez-Ponce, where five affected males were detected in three generations of a family. Subsequent reports revealed high incidence of pterygium in certain families over numerous consecutive generations, suggesting the role of heredity factors in predisposing the conjunctiva to exacerbated reactions to environmental stimuli. Several familial genes and pathways have been proposed to be involved in the inheritance of pterygium. Familial defects in most of these pathways predispose affected individuals to an abnormal fibrovascular response to UV radiation. As a candidate gene, MMP-1 has been proposed to be involved in familial pterygium. It is believed that certain polymorphism of the MMP-1 promoter can predispose carriers to develop pterygia through a loss of heterozygosity process. Polymorphism of proangiogenic genes has provided another field of interest in familial pterygium. As special polymorphisms of vascular endothelial growth factors (VEGFs) are associated with higher vascularity of the pterygium and variable response to anti-VEGF agents, it is proposed that variation of VEGF genes may explain the familial incidence of the disease.

Grading System

Pterygium can be classified based on the size and location of the pterygium:

Grade 1: Pterygium is small and confined to the conjunctiva.

Grade 2: Pterygium extends onto the cornea but does not cover more than one-third of the corneal surface.

Grade 3: Pterygium covers more than one-third of the corneal surface.

Another grading system is based on the presence or absence of symptoms:

Grade 1: Pterygium is asymptomatic.

Grade 2: Pterygium causes mild symptoms such as redness, itching, or tearing.

Grade 3: Pterygium causes moderate to severe symptoms that interfere with vision or daily activities.

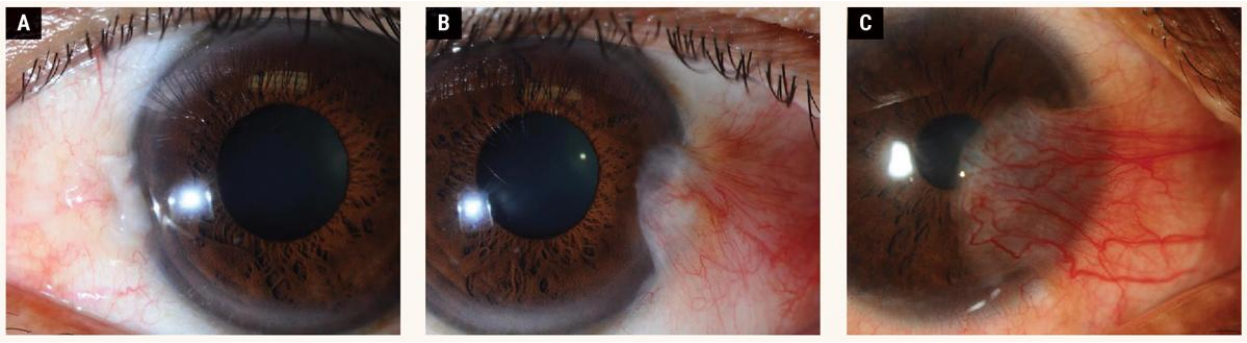

Figure 1.2: Grades of Pterygium (A: Grade 1, B: Grade 2, C: Grade 3)

1.1.2 Signs and Symptoms

Early in the disease process, pterygium is usually asymptomatic; however, there can be signs of dry eye (such as burning, itching or tearing) as the lesion causes irregular wetting of the ocular surface.

In later stages ,it manifests in the following ways:

- A visible fleshy growth on the surface of the eye.
- Redness and irritation of the eye.
- Dryness and foreign body sensation in the eye.
- Blurred vision or distortion of vision.
- Sensitivity to light

1.1.3 Pathophysiology

Ultraviolet radiation is pivotal in initiating and promoting pterygium formation through several mechanisms, including inflammation, fibroblast activation, extracellular matrix remodeling, angiogenesis and tissue invasion. Genetic factors and viral infection have also been associated with the pathophysiology.

Inflammation is a central component of pterygium pathophysiology. Chronic UV exposure causes oxidative stress on the DNA of conjunctival cells, which triggers an inflammatory cascade in the conjunctiva, characterized by releasing pro-inflammatory cytokines and chemokines. Inflammatory mediators stimulate the release of growth factors, such as vascular endothelial growth factor (VEGF) and fibroblast growth factor (FGF), in pterygium tissue. Angiogenesis, or the formation of new blood vessels, is promoted by VEGF, and these new blood vessels supply oxygen and nutrients to the developing pterygium and give the characteristic red eye appearance often associated with pterygium.

Expression of FGF within the conjunctival tissues stimulates the activation of fibroblasts. These normally quiescent cells transform into myofibroblasts, which are highly contractile and capable

of synthesizing and depositing extracellular matrix components like collagen and fibronectin. Myofibroblasts contribute to the fibrotic nature of pterygium tissue.

Another consequence of chronic inflammation is the over-expression of matrix metalloproteinases (MMPs), which leads to remodeling the conjunctiva's extracellular matrix (ECM). The cleaving of ECM structural proteins (collagen, fibronectin and proteoglycans) by MMPs achieves the degradation and remodeling of the conjunctival tissue. The presence of MMPs in pterygium tissue contributes to tissue invasion. As MMPs degrade the corneal basement membrane and collagen fibers, they create pathways for pterygium tissue to infiltrate and invade the cornea. This is a critical step in the progression of pterygium, as it allows the lesion to encroach further onto the cornea, thereby affecting vision.

Solar basophilic elastoid degeneration is observed in the pterygium stroma in all cases. The presence of stromal vessels is both a cosmetic issue and a therapeutic target in the management of pterygium. These vessels are associated with stromal fibrosis, where the vascularity is usually more prominent than the fibrosis. A mild chronic inflammatory response, either in the stroma or in the epithelium, has been reported in the majority of pterygium cases.

1.1.4 Diagnosis

A thorough patient history will elucidate exposure to risk factors and determine if the patient has any symptoms associated with pterygium, such as eye irritation, redness, restricted ocular movements or induced astigmatism leading to blurry vision (only in advanced cases where the growth has invaded the cornea significantly). Slit-lamp examination remains the cornerstone of pterygium diagnosis as it is an instrument that all eyecare practitioners have access to. It allows for a detailed pterygium size, location and vascularity evaluation. Stoker's line is an iron

deposition in the superficial cornea at the head of the pterygium and can also be viewed with a slit lamp.

Anterior segment optical coherence tomography (AS-OCT) is becoming more popular in assessing and tracking the progression of pterygium as it provides more detail than a slit-lamp evaluation. Automated methods using anterior segment images and computer programs are also being developed for screening purposes in rural areas to enhance diagnostic capacity in underserved areas. Pterygium can induce astigmatism and an irregular corneal surface, affecting visual acuity (VA).

Measurement of VA, refraction, and topography is necessary to monitor the effect of the pterygium if it has invaded the cornea.

1.1.5 Complications

Recurrence: The chief complication of surgery is the high recurrence rate. Risk factors for pterygium recurrence following surgery are younger age, more advanced stage of disease and untreated postoperative inflammation. The recurrence rate has been found to be as high as 97% within the first year postoperative.

Corneal astigmatism: Pterygium can have a noteworthy impact on the corneal surface regularity indices through inducing astigmatism and surface asymmetry. Pterygium usually results in a with-the-rule astigmatism due to the flattening of the horizontal meridian along its leading head.

Ocular surface squamous neoplasia: OSSN refers to a spectrum of ocular surface conditions ranging from mild dysplasia to invasive SCC.

Inflammation and infection: Pterygium can cause inflammation and infection if left untreated.

1.1.6 Prevention

There are several ways to prevent pterygium, or at least reduce the risk of developing these conditions:

- Wear sunglasses: Sunglasses can protect your eyes from harmful ultraviolet (UV) rays, which can cause pterygium. Make sure to choose sunglasses that block out at least 99% of UV-A and UV-B rays.
- Avoid dry eye: Dry eye can contribute to the development of pterygium. To prevent dry eye, try to avoid environments that are dry or have a lot of wind, and take breaks from screens and other activities that can cause eye strain.
- Avoid irritants: Certain irritants, such as dust, smoke, and chemical fumes, can irritate the conjunctiva and increase the risk of pterygium. To reduce the risk of these conditions, try to avoid exposure to these irritants.
- Protect your eyes at work: If you work in an occupation that exposes your eyes to dust, chemicals, or other irritants, make sure to wear protective eyewear to reduce the risk of pterygium.
- Eat a healthy diet: A diet rich in fruits and vegetables may help protect against pterygium. These foods contain antioxidants and other nutrients that can help protect the eyes from damage.
- Practice good eye hygiene: Proper eye hygiene can help reduce the risk of pterygium. This includes regularly washing your hands and avoiding touching your eyes with dirty hands.

1.1.7 Treatment

Before initiating management, the clinician must be certain that the diagnosis is correct. Pterygium development and proliferation appears to be linked to environmental exposure, management for asymptomatic or mildly irritative pterygium involves UV-blocking spectacles and liberal ocular lubrication. Patients should be advised to avoid smoky or dusty areas as much as possible. More inflamed or irritated pterygium may be treated with topical corticosteroids (e.g. 1% prednisolone acetate or 0.5% loteprednol etabonate q.i.d. for several days). Surgical excision of pterygium is indicated for unacceptable cosmesis, significant induced astigmatism, threats to peripheral corneal hydration and stability and/or significant threat by in growth to the visual axis. Surgical excision involves dissection and removal of the fibrous tissue down to the level of Tenon's capsule. Conjunctival autograft a technique that involves excision of the pterygium and covering of the resulting bare sclera with a free conjunctival graft harvested from an uninvolved site of the ocular surface is typically used to prevent recurrence. The use of fibrin glue Close-up view of pterygium; note the pronounced vascularity high rate of recurrence. Medical adjuncts in the form of the antimetabolites mitomycin C and 5- Fluorouracil may be used in order to reduce pterygium recurrence. However, these antimetabolites can have attendant complications and are frequently used in cases of previous surgical failure. Beyond medical adjuncts, single-dose beta-irradiation remains the simplest procedure following bare sclera surgery. It is an effective and safe treatment that reduces the risk of primary pterygium recurrence. Removal of large pterygium can greatly reduce the amount of induced comeal astigmatism and preserve limbal health, corneal degradative effects of a pterygium extend approximately three millimeters beyond the leading edge, or head, of the Jesion. This means that the pterygium need not cover the visual axis to inflict significant visual compromise. Clinicians have discovered that

seemingly benign pterygium at least two millimeters off the visual axis have induced in excess of 10 diopters of irregular corneal astigmatism and resulted in a best corrected acuity of 20/80. It is not wise to wait until a pterygium impacts the visual axis or vision before recommending surgical excision. Since healthy corneal tissue beyond the leading edge of the pterygium must be resected during excision, waiting until the visual axis is affected virtually guarantees permanent visual reduction. Follow-up on medium to large sized pterygium should be performed at least once or twice yearly. It should include a manifest refraction, corneal topography , slit lamp evaluation with measurement of the pterygium and photodocumentation if possible. Clinical Pearls has advanced the use of conjunctival autografts by eliminating the need for suturing, hence reducing both operating time and postoperative pain inflammation. An alternative to conjunctiva autograft involves use of an amniotic membrane transplantation. Amniotic transplants typically are reserved for patients with recurrence following conjunctival autograft and those with insufficient viable conjunctival tissue, or those with glaucoma who may need the superior conjunctiva preserved for future trabeculectomy. Unfortunately, amniotic membrane transplantation is associated with a pterygium present a benign clinical entity in most cases. Another clinical entity that must be ruled out in the diagnosis of pterygium is conjunctival intraepithelial neoplasia (CIN). CIN is a precursor of conjunctival squamous cell carcinoma, gelatinous, with deep irregular vascularization and amoeboid shape. CIN an invasive cancer with the capacity inflict significant morbidity. Biopsy be obtained if suspected.

1.1.8 Commercial Driver

A commercial driver is someone who has been trained and certified to drive a commercial vehicle professionally.

Commercial drivers are generally outdoor workers who spend a larger part of their day outdoors under intense heat and other conditions characteristic of this part of the world, Nigeria such as smoke, dust etc. Hence, they would be largely predisposed to having Pterygium. Ultraviolet radiation has been cited in the causation of eye diseases such as Pterygium, pinguecula, cataract and age related macular degeneration, etc. Commercial bus is the most common means of transportation in Benin Metropolis. Since Benin metropolis has a large number of commercial drivers, study of the prevalence and pattern distribution of the aforementioned disorder may prove significant.

1.2 STATEMENT OF PROBLEM

Over the years, it has been observed that commercial drivers tend to develop pterygium. This may be due to several factors such as exposure to ultraviolet rays from the sun, dust and other triggers which is commonly associated with this part of the world. Hence commercial drivers who spend majority of their day to day activities on the road are at the forefront of those more prone to having pterygium.

1.3 AIM AND OBJECTIVES

1.3.1 AIM OF STUDY

The aim of this study is to determine the prevalence and pattern distribution of Pterygium among Commercial bus drivers.

1.3.2 OBJECTIVES OF STUDY

1. To determine the prevalence of pterygium among Commercial bus drivers in Benin Metropolis.
2. To determine the relationship between the duration of Commercial bus driving and the prevalence of pterygium.
3. To determine the relationship between each grade of pterygium among each duration group.

1.4 SIGNIFICANCE OF STUDY

- To create awareness of the contributory factors for the growth of pterygium.
- To suggest preventive measures against development of Pterygium.
- It will serve as basis for counseling patients affected with the condition.
- To determine the prevalence of each grade of pterygium among each duration group.

CHAPTER TWO

2.0 LITERATURE REVIEW

Prevalence and pattern distribution of pterygium have been studied in various populations:

Adekoya *et. al* (2008) conducted a cross-sectional descriptive study of 399 commercial vehicle drivers in Ilorin, Nigeria. Structured questionnaires were administered and ocular examinations were done. The common ocular conditions seen were presbyopia (28.3%), allergic conjunctivitis (22.6%), pingueculae (18.0%), ocular hypertension (8.8%), pterygium (8.3%), cataract (7.8%), and uncorrected refractive error (6.0%). Visual impairment, based on legally required standard for commercial drivers in Nigeria, was found in 11.5% of the participants, while 3.3% of them had monocular blindness with a visual acuity (VA) of less than 3/60 in one eye. Cataract and glaucoma were the major causes of visual impairment.

Wade *et. al* (2011) conducted a descriptive cross-sectional survey of registered commercial intercity vehicle drivers at the Bauchi Road Motor Park Jos. The study instrument was a pretested semi-structured questionnaire. Two hundred and sixty eight 268 drivers were recruited and assessed (survey coverage: 82.5%). Their age ranged from 20-90 years (mean: 44.2, SD 9.2). Most 158 (71.5%) respondents had ocular symptoms, the most common were difficulty in reading small prints 78 (35.3%), itching 56 (25.3%), and poor distant vision 17 (7.7%). Ten (4.5%) drivers had a visual acuity of <6/12 and thus did not qualify to possess a driving licence. The prevalence of ocular morbidity was 72.9% (161/221). The most prevalent ocular morbidities were presbyopia (42.5%), allergic conjunctivitis (26.2%), cataract (8.6%), refractive errors and pterygium (2.7%).

In a cross sectional descriptive study by Ogbonnaya *et. al* (2018) of the ocular health of all drivers in 4 major commercial motor parks in Abakaliki, Southeastern Nigeria; who presented for eye screening during the Federal Road Safety Corps of Nigeria - organized drivers' sensitization on visual testing. The 103 drivers who participated in this study were all males. Their ages ranged from 24 to 75 years with a mean age of 43.2 ± 12.3 years. Nearly half of the participants (46 or 44.2%) had ocular complaints, out of which 43 (93.5%) reported difficulty with near vision (reading small prints), and 36 (78.3%) reported diminution of distant vision. Ocular examination revealed that 44 participants (42.7%) had no eye disorder, while 59 (57.3%) had various ocular disorders including glaucoma 25 (42.4%), refractive errors 11 (18.6%); cataract 11 (18.6%); pterygium 5 (8.5%); hypertensive retinopathy 4 (6.8%), age-related macular degeneration 2 (3.4%); and optic atrophy 1 (1.7%). Visual acuity testing revealed that only 86 (83.5%) of the drivers met the federal road safety commission's guideline for visual acuity level for commercial vehicle drivers of ≥ 6/12 in the poorer eye.

Pepple and Ejimadu (2019) conducted a study on four hundred commercial vehicle drivers in the 10 major motor parks of Port Harcourt LGA. A structured questionnaire on demographic characteristics, driving and ocular history was administered. Ocular examination included visual acuity, refraction, visual field, tonometry, colour vision test and ophthalmoscopy. The data collected was entered into computer using EPI-INFO statistical software for analysis. Ethical approval was obtained from relevant authorities. Seven drivers (1.8%) out of 400 drivers examined were visually impaired. One hundred and eighty two (45.5%) drivers had been involved in RTA, out of which 2 drivers (1.1%) were visually impaired ($p>0.05$). Cataract found in 37 cases was the leading cause of visual impairment (42.8%). Other common ocular problems were pterygium (26.7%), presbyopia (22.9%), glaucoma (11.5%), and refractive error (8.4%).

A retrospective study was conducted from 1st January 2014- 31st December 2014 by Monsudi *et. al* (2015). Folders of patients seen over this period were retrieved and reviewed. The following information were extracted; socio-demographics (age, gender, occupation, tribe), complaints, visual acuity at presentation, grade of pterygium, treatment offered, history of pterygium surgery, laterality and use of antimetabolities during surgery. The data was recorded and analysed using SPPS version 18. Out of 2760 patients, 98 patients presented with pterygium with a prevalence of 3.6%. Among these, 60.2% were males and 39.8% were females with a range of 22years-73 years (mean 40.28 ± 11.78years). Majority of the patients (31.6%) were between 30years to 39years. Most of them had bi-lateral pterygium (66.5%). Majority of the pterygium (46.9%) were of grade 1 followed by 39.8% grade 2. Only 9.2% had surgical procedure and intraoperative application of 5 Fulourouracil (5FU). Three out of 9 cases operated had recurrent pterygium.

A study carried out by Chukwuka and Nwachukwu (2020) on one hundred (100) subjects with an age range of 28 to 59 years (mean age = 31.1±13.3 years). Twenty-eight of the subjects (28.0%) were males while 72 (72.0%) were females. Only 5% of them had pterygium; 80% of the pterygium were unilateral, 60% occurred in the 40-49 years age group and 80% of the subjects had normal visual acuity.

Anbesse *et. al* (2017), in a study to assess the prevalence and associated factors of pterygium among adults living in Gondar city, Northwest Ethiopia, a cross sectional design study was carried out in 390 participants in Gondar city from April 15 to May 7, 2016. Basic ophthalmic examination was performed using portable slit lamb, 3.5x magnifying loop with torch light and a pretested and structured questionnaire was completed. The raw data has been entered into EPI INFO 3.5.1 and analyzed by SPPSS version 20. 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 significant risks of pterygium. The prevalence of pterygium among study participants was 151 (38.7%). Among those who have pterygium, 149 (98.7%) were developed pterygium on the nasal side and 15 (9.9%) on temporal side of the either eye and 13 (8.6%) have both. Age between 41-86, male sex, outdoor working area, the use of traditional eye medication and family history of pterygium were positively associated with pterygium whereas use of sunglass/hat was negatively associated. There is a high prevalence of pterygium in Gondar city northwest Ethiopia. Old age, male sex, outdoor working area, utilization of traditional eye medication and family history of pterygium were statistically significant predictors of pterygium. The use of sunglass/hat was protective against pterygium.

A cross-sectional study conducted in Inner Mongolian, China, found that the prevalence of pterygium was 6.4%, and the age-adjusted prevalence rate of pterygium was 6.38% among people aged 30 years and older. The study population included 1910 Han and 741 Mongolian adults. The mean age $\pm$ standard deviation of the study cohort was 48.93 ± 11.06 years. The overall prevalence of pterygium was 6.4% ($n = 169$); 1.4% ($n = 38$) of the cases were bilateral and 4.8% ($n = 128$) were unilateral. The most common grade of pterygium was Grade 2. Based on the results of the univariate analysis, eleven factors were included in a multivariate analysis. The results indicated that age ($P < 0.001$), outdoor occupation ($P = 0.026$), and time spent in rural areas ($P < 0.001$) were significantly associated with pterygium. Sex and ethnicity were not identified as risk factors.

A systematic review and meta-analysis of pterygium risk factors found that they fall into three categories: demographic, environmental, and lifestyle factors. Older age, male gender, and outdoor occupation were identified as risk factors. The prevalence of pterygium varies widely in

different regions and ethnic groups, with rates as low as 1.1% and as high as 39.0%. Risk factors for pterygium included older age, male gender, outdoor occupation, rural residency, and lack of formal education. (Farhad Rezvan *et al*., 2018)

In a study carried out by West and Munoz (2009) population-based sample of 4774 self-reported Latinos age 40 years from randomly selected block groups in Nogales and Tucson, Arizona, USA, were enrolled in the study. Questionnaires were conducted in the home on risk factors. A clinical examination by an experienced ophthalmologist was carried out, and the presence of pterygium was diagnosed at the examination. The prevalence of pterygium was high (overall 16%). Men had a higher rate than women (23.7% versus 11.5%, respectively). Low income and low educational status were associated with higher odds of pterygium. Current smoking, and smoking dose, was protective for pterygium; this finding has now been reported from several studies. Pterygium rates were high in this population of Latinos. Socioeconomic status markers for increased exposure to sunlight suggest this may be the target of simple interventions to reduce the risk of pterygium in this ethnic population.

In a cross-sectional study of 3851 selected individuals to evaluate the prevalence of pterygium and its determinants in the underserved, rural population of Iran by Hassan Hashemi *et. al* (2017), 86.5% participated in the study, and the prevalence of pterygium was evaluated in 3312 participants. A number of villages were selected from the north and south of Iran using multistage cluster sampling. Pterygium was diagnosed by the ophthalmologist using slit-lamp examination. The mean age of the study participants was 37.3 ± 21.4 years (2–93 years), and 56.3% (n = 1865) of them were women. The prevalence of pterygium was 13.11%. The prevalence of pterygium was 14.99 (95%) in men and 12.07 (95%) in women. Pterygium was not seen in children below the age of 5 years. The prevalence of pterygium increased linearly

with age; the lowest and highest prevalence of pterygium was observed in the age group 5–20 years (0.19%) and 61–70 years (28.57%). Evaluation of the relationship between pterygium with age, sex, educational level, and place of living using a multiple model showed that age, living in the south of Iran, and low educational level were correlated with pterygium.

In a cross-sectional population study with cluster sampling carried out by Fotouhi *et. al* (2009), 6497 residents of Tehran were selected from 160 clusters. Samples were chosen according to a door-to-door head counting and were then invited for free examinations. After the interview, ophthalmic examinations were performed at an eye clinic. Of the selected sample, 4564 people (70.3%) participated in the study. The age-and gender-standardized prevalence of pterygium in this population was 1.3%. The prevalence of pterygium was 1.4 and 1.1% in men and women, respectively (P> 0.05). The prevalence of pinguecula in this study was 22.5% 27.1% in men and 17.7% in women (P< 0.001). In both genders, the prevalence of pterygium and pinguecula showed a significant increase with age (P< 0.001). This study concerns the status of pterygium and pinguecula according to age and gender in the population of Tehran. The overall prevalence rates were 1.3 and 22.5% for pterygium and pinguecula, respectively. The comparison of the results with those reported from other areas of the world suggests lower prevalence rates in Tehran.

Jai Panchapakesanet *et.al* (1998) aimed to describe the prevalence of pterygium and pinguecula in an older population and to examine associations with skin, hair and eye colour, skin sun sensitivity, sun-related skin damage and skin cancer. The Blue Mountains Eye Study examined 3564 people aged 49 years or older Slit-lamp examination recorded pterygium and pinguecula and a questionnaire was used to collect information on physical variables. Two hundred and sixty-six subjects (7.3%) had pterygium (or had a history of pterygium surgery) and 2521

(69.5%) had pinguecula present in either eye. Significantly more men (11%) than women (4.5%) had pterygium. This sex difference was also found for pinguecula, present in 73.6 and 66.3% of men and women, respectively. A slight age-related increase in prevalence was found for both pterygium and pinguecula. The study found significant associations between pterygium and increased pigmentation (skin and hair colour), decreased skin sun sensitivity and sun-related skin damage. The age and sex-specific pterygium prevalence rates in the present study are similar to rates found in non-Aboriginals examined in the 1980 Australian Trachoma Programme.

Hiroki Shiroma *et. al* (2009) carried out a study to determine the prevalence and risk factors for pterygium in a Japanese population aged 40 years or older on Kumejima Island, Japan.In a cross-sectional, population-based study, all residents of Kumejima Island, Japan, located in Southwestern Japan (Eastern longitude 126 degrees, 48 feet and Northern latitude 26 degrees, 20 feet), aged 40 years and older were asked to undergo a comprehensive questionnaire and ocular examination. Of the 4,632 residents, 3,762 (81.2%) underwent the examination. The presence of pterygium could not be determined in 15 subjects. Of the 3,747 eligible subjects, 1,154 (30.8%) had pterygium in at least 1 eye and 491 subjects (13.1) had pterygium in both eyes. In the logistic regression analysis, older age ($P < .001$), male gender ($P = .024$), hyperopic refraction ($P = .001$), lower intraocular pressure ($P = .002$), and outdoor job experience ($P < .001$) were independently associated with a higher risk of pterygium. The prevalence of pterygium was 30.8% among adult Japanese aged 40 years and older in Kumejima. Older age, male gender, hyperopic refraction, lower intraocular pressure, and outdoor job history were independently associated with a higher risk of pterygium.

In a study on the prevalence, risk factors and severity of pterygium in Indonesia by Gazzard *et. al* (2007), a population based prevalence survey of 1210 adults aged 21 years and above was conducted in five rural villages and one provincial town in Riau province, Sumatra, Indonesia, an area near to the equator. A one stage household cluster sampling procedure was employed: 100 households were randomly selected from each village or town. Pterygia were graded for severity (T1 to T3, by visibility of episcleral vessels) and the basal and apical extent measured by an ophthalmologist (GG) with a hand held slit lamp. Refraction was measured by hand held autorefractor (Retinomax). Face to face household interviews assessed outdoor activity, occupation, and smoking. The participation rate was 96.7%.The mean age was 36.6 years (SD 13.1), 612 were male. The age adjusted prevalence rate of any pterygium was 10.0% and of bilateral pterygia was 4.1%. There was a significant dose-response relation with age (2.9%) for 21–29 years versus 17.3% ,50 years and above; p for trend <0.001) and occupations with more time outdoors (p for trend = 0.02). This was true for both sexes, all grades of lesion (T1 to T3), and bilateral disease. A multivariate logistic regression model showed pterygium was independently related to increasing age and outdoor activity 10 years earlier. The mean basal diameter = 3.3 mm (SD 1.51, range 0.1–9.5) and extent from limbus = 1.4 mm (SD 1.18, range 0.1–8.0). Higher grade pterygia were larger for basal and apical extent (p for trend <0.001). The presence of pterygium was associated with astigmatism (defined as cylinder at least −0.5 dioptres (D); p <0.001). This association increased with increasing grade of lesion (p for trend <0.001). Median cylinder for those with pterygium (−0.50 D) was greater than for those without (−0.25D), (p <0.001), and increased with higher grade of lesion (p for trend <0.001). For eyes with pterygia, magnitude of astigmatism was associated with greatest extent from the limbus, (p = 0.03), but not basal width (p = 0.99).

In a study to describe the prevalence and factors associated with pterygium and pinguecula in a south Indian population. Rashima A *et. al* (2011) examined 7774 (Urban 3850, Rural 3924) subjects aged above 40 years. All subjects underwent a comprehensive ophthalmic evaluation. Personal history, occupation and lifetime ultraviolet exposure were documented. The presence of pterygium and pinguecula on slit-lamp examination was recorded. The prevalence of pterygium and pinguecula, differences in the rural and urban populations and their association with age, gender, residence, nature of occupation, lifetime ultraviolet radiation exposure, tobacco use (smoking/smokeless), alcohol use, diabetes mellitus and hypertension were analyzed. The mean age of the subjects was 54.6 (SD: 10.6) years. Pterygium was present in either eye of 740 subjects (9.5%, 95% CI: 8.6–10.4%), of which 329 subjects were male and 411 subjects were female. The prevalence of pterygium differed significantly (OR: 4.60 95% CI: 3.82–5.56, $p < 0.0001$) between the urban (144, 3.7%, 95% CI: 3.1–4.3%) and the rural population (596, 15.2%, 95% CI: 14.1–16.3%). Pterygium were significantly associated with rural residence ($p < 0.0001$). We found rural residence and exposure to higher lifetime UV exposure to be significantly associated with the presence of pterygium ($p < 0.0001$). Non-use of spectacles was found to be associated with both pterygium (OR: 1.41, 95% CI: 1.12–1.79). The presence of pterygium was not associated with smoking, use of alcohol, nature of work, diabetes and hypertension. The prevalence of pterygium and pinguecula a South Indian population were 9.5% and 11.3% respectively. Rural residence were associated with presence of both pterygium and pinguecula. Higher lifetime UV exposure was associated with the presence of pterygia.

A retrospective study was conducted by Fasasi *et. al* (2015) from 1st January 2014-31st December 2014. Folders of patients seen over this period were retrieved and reviewed. The

following information were extracted; socio-demographics (age, gender, occupation, tribe), complaints, visual acuity at presentation, grade of pterygium, treatment offered, history of pterygium surgery, laterality and use of antimetabolities during surgery. The data was recorded and analysed using SPPS version 18. Out of 2760 patients, 98 patients presented with pterygium with a prevalence of 3.6%. Among these, 60.2% were males and 39.8% were females with a range of 22years-73 years (mean 40.28±11.78 years). Majority of the patients (31.6%) were between 30years to 39years. Most of the patients were house wives (31.6%) and Hausa (79.6%) by tribe. Most of them had bi-lateral pterygium (66.5%). Majority of the pterygium (46.9%) were of grade 1 followed by 39.8% grade 2. Only 9.2% had surgical procedure and intraoperative application of 5 Fulourouracil (5FU). Three out of 9 cases operated had recurrent pterygium. The prevalence of pterygium is low in this population, majority of cases affecting young and middle age population.

In order to determine the effect of pterygium excision on the degree of corneal induced astigmatism and visual acuity, a prospective interventional study was conducted between September 2012 and June 2013 by Lawan Abdu *et. al* (2018), consecutive patients with pterygium who met the inclusion criteria were recruited into the study. They had a basic eye examination, and those with existing comorbidity were excluded. Selected patients had pterygium excision using the bare sclera technique with intraoperative application of Mitomycin C. Detailed pre- and post-operative evaluation and refraction was done. There were 45 eyes of 33 patients aged 28–75 years. The mean age was 56.12 + 12.38 years. Six eyes had Grade I, 29 eyes had Grade II and 10 eyes had Grade III pterygium. The mean value for preoperative astigmatism was 2.12 ± 1.09 diopter cylinder (DC) while that for postoperative astigmatism was 0.72 ± 0.50 DC (P = 0.000). Surgery was associated with statistically significant increase in

postoperative visual acuity. (P = 0.000).This study has shown that the degree of pterygium-induced astigmatism reduces significantly following surgical excision. Pterygium excision was associated with improvement in visual acuity.

In a study by Fekadu *et. al* (2020) to determine the prevalence of pterygium and its associated factors among adults aged 18 years and above in Gambella town, Southwest Ethiopia,a community based cross-sectional study was conducted from April 15 to May 3, 2019, in Gambella town. A total of 402 study participants were selected using a systematic random sampling technique. A pre-tested semi-structured questionnaire, torch, and magnifying loops were used to collect data. The data was entered into epidemiological information 7.1 and exported to statistical package for social science version 20 for analysis. The binary and multivariate logistic regression analysis model was fitted to identify factors associated with pterygium. Odds ratio with respected 95% CI was used to identify the direction and strength of association. A total of 400 participants were examined with a response rate of 99.50%. The mean age of the study participants was 39.9±9.8years. The prevalence of pterygium among adults aged 18 years and above in Gambella town was 127(31.80%),male sex, sunlight exposure and outdoor works were positively associated with pterygium whereas wearing sunglass/hat was a protective factor. The prevalence of pterygium was high among adults living in Gambella town. Wearing sunglass/hat and reducing exposure time to the sun was important to reduce the development of pterygium in adults.

Erima Denis *et. al* (2020) carried out a study to determine the prevalence of pterygium and its associated factors in patients attending Mulago National Referral Hospital Eye Clinic. This was a prospective hospital-based cross-sectional study conducted between January 2019 and March 2019. We selected 516 patients from Mulago Hospital eye clinic(s) using a multistage stratified

probability sampling technique. A thorough history and clinical examination were conducted; a pre-tested questionnaire was filled out. Data were entered into a computer using EpiData 3.1 and analysed using STATA 11. A total of 516 patients were recruited of whom 60.3% were female and 39.7% were male. Out of the 516 patients, 70 (13.6%) had pterygium. Pterygium occurrence was associated with Age above 40 years ,Family history, Alcohol intake and Dust. The prevalence of pterygium was high in our study and found to be positively associated with increasing age, positive family history, alcohol intake and dust exposure.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 RESEARCH DESIGN

This was a cross sectional study with convenient sampling in which bus drivers in Benin Metropolis were selected for the study. Commercial Bus Drivers of not less than 1 year of commercial driving were randomly selected.

3.2 RESEARCH LOCATION

The study was carried out at the Central Park,Ring Road, Benin City.

3.3 STUDY POPULATION

The sample used for this study comprised of 122 participants.

3.4 SAMPLING TECHNIQUE

Using Fisher's Formula

Where n = sample size

z = Z statistic of confidence of 95% (1.96)

p =maximum reported prevalence of pterygium from previous studies (6.38%)

(Yuhan Wang *et al.*2020)

d =precision desired (5% ,d =0.05)

Therefore, $N= Z^2 \times p(1-p) / d^2$

$=1.96^2 \times 0.0638 (1-0.0638) / 0.05^2$

=92

Attrition factor is 10% of n =9.2

Therefore, total sample size =92+9 =101

3.5 MATERIALS

Snellen Acuity Chart (both literate & Tumbling E chart)

Penlight

Occluder

Ophthalmoscope

Questionnaire

Pen

Notebook

3.6 INCLUSION/EXCLUSION CRITERIA

3.6.1 INCLUSION CRITERIA

- Commercial Bus drivers of any age and sex.
- Drivers in Benin Metropolis.
- Drivers with more than one year commercial driving experience.

3.6.2 EXCLUSION CRITERIA

- Non commercial Drivers.
- Drivers who do not give their wiling consent to participate in the study.
- Drivers with less than one year commercial driving experience.

3.7 DESCRIPTION OF PROCEDURE:

The subjects were informed about the tests and procedures for the examination to be carried out. A standard questionnaire which was divided into two parts A and B and administered to the subjects . Part A consists of subject bio-data; riding history and ocular history while just B which was only be for official use was used to record the findings of the ocular examination that were carried on the subjects. The questionnaire was administered with assistants rendered where necessary. Visual acuity was measured using the Snellen's literate and Tumbling letter "E' chart under standard testing conditions in order to determine the level of vision and for legal purposes. Penlight was used for external examination to determine the position and extent of pterygium.

The age of the subjects ranged from 24-63 years of age was recorded and grouped into the following categories 20-30, 31-40, 41-50, 51-65. The working hours of the subjects ranged from 6-19 hours a day and was grouped into 6-8 ,9-11, 12-14, 15-17 and above 18.

Also the pterygium was graded from grade 1 - grade 3 depending on the severity and that which the subjects presented with at the time of examination.

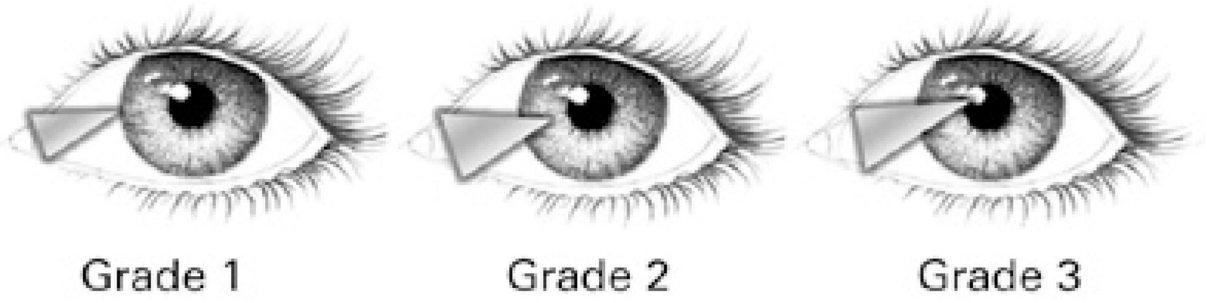

Figure 3.1: Pterygium Grades

3.8 DATA ANALYSIS

Data obtained from this study was tabulated into age ranges, working duration of driving ranges, protective wearing and non-protective wearing drivers categories.

Statistical package for social science (SPSS) computer software version 22.0 was used to analyse them for association and meaningful interpretations.

3.9 ETHICAL CONSIDERATION

- Ethical Clearance was obtained from the Departmental Research and Ethics Committee of the Department of Optometry, University of Benin, Benin City by the tenets of the Declaration of Helsinki.
- This was to ensure that all procedures performed on each subject was not against the public interest or inflict unnecessary harm to them.
- Informed consent of all the subjects was obtained before any procedure was done on them to ensure their full consideration.

CHAPTER FOUR

4.0 RESULTS AND DATA ANALYSIS

Table 4.1: Showing Sociodemographics of Participants

VARIABLE	FREQUENCY	PERCENT(%)
Gender		
Male	112	91.8
Female	10	8.2
Age		
21-30	4	3.3
31-40	38	31.1
41-50	39	32.0
51-65	41	33.6
Working Hours		
6-8	17	13.9
9-11	31	25.4
12-14	49	40.2
15-17	23	18.9
≥18	2	1.6
Mean ± SD = 11.86 ± 2.910		
Level of Education		
Uneducated	3	2.5
Quaranic Education	13	10.7
Primary School	32	26.2
Secondary School	35	28.7
Adult literacy	8	6.6
Tertiary School	31	25.4

Data was collected from a total of 122 participants for this study. Among them, 112 (91.8%) were males while 10 (8.2%) were females. The age range, working hours as well as level of education of the participants are shown in the table above.

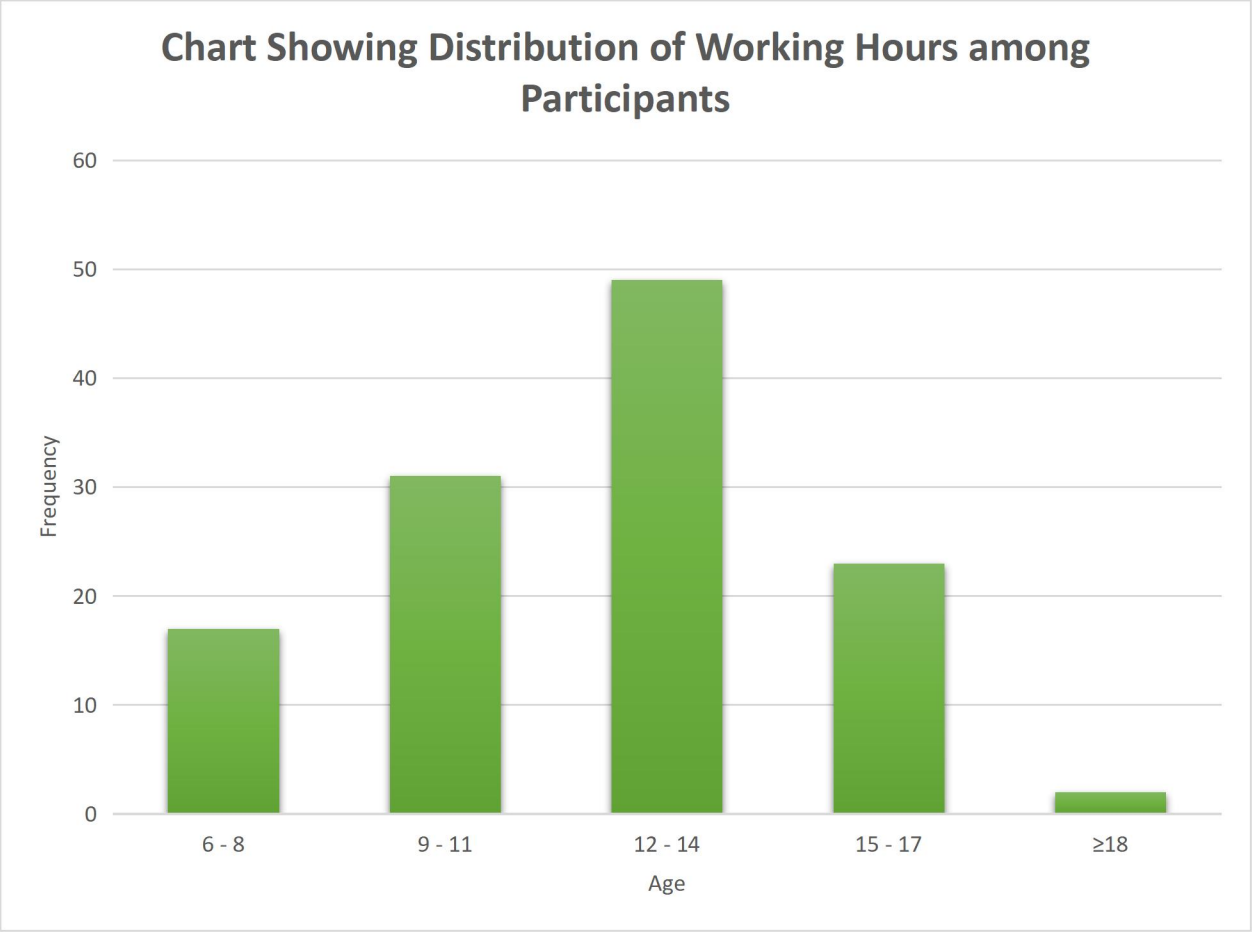

Figure 4.1: Distribution of participants according to working hours.

Seventeen (17) participants worked 6-8 hours, Thirty-one (31) participants worked 9-11 hours, Forty-nine (49) participants worked 12-14 hours, Twenty- three (23) participant worked 15-17 hours and Two (2) participants worked above 18 hours.

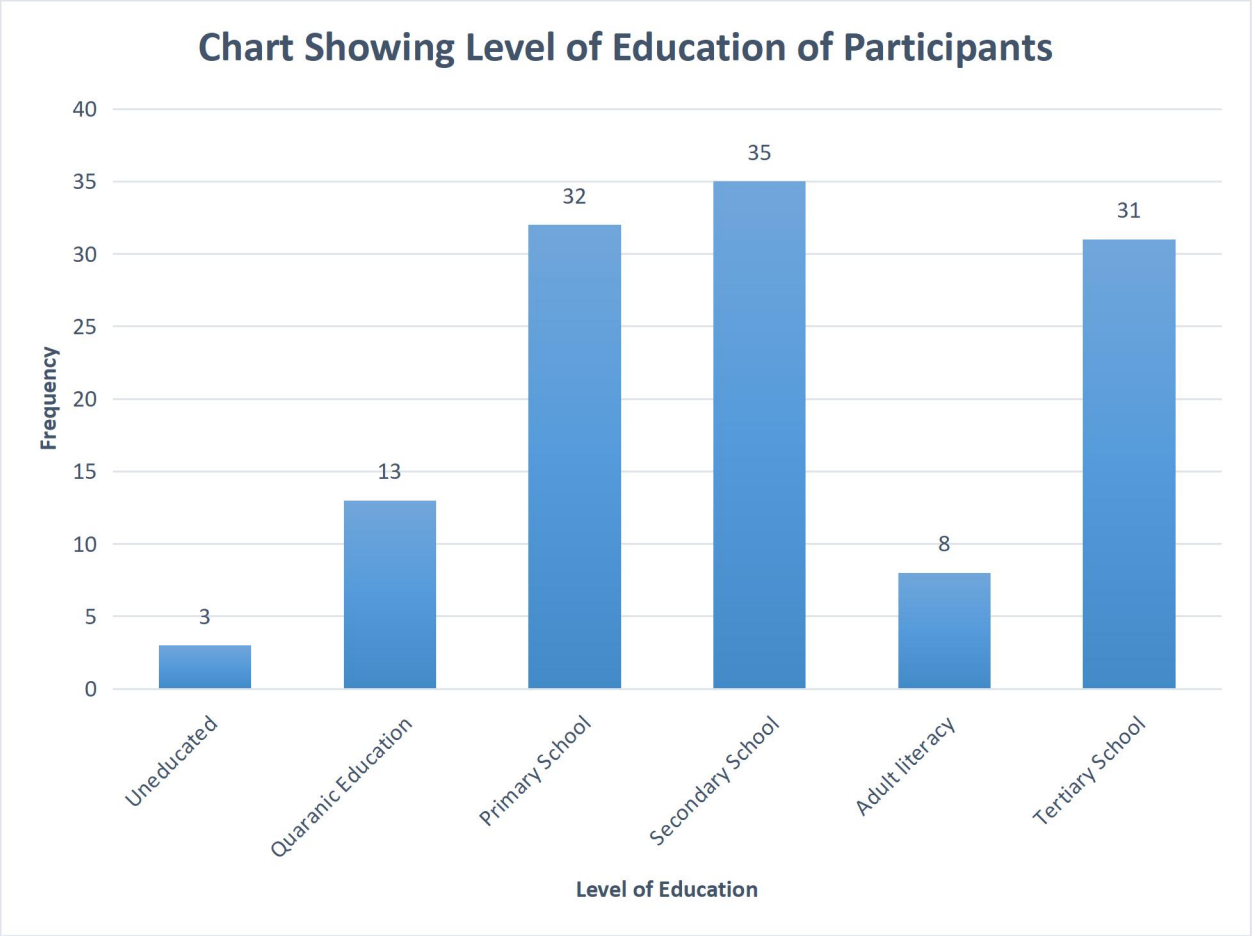

Figure 4.2: Chart showing level of education of participants.

Among the participants for this study, 3 were uneducated, 13 participants had a quaranic education, 32 of them completed primary school only, 35 completed only secondary school education, 8 participants were educated through adult literacy and 31 participants completed tertiary school.

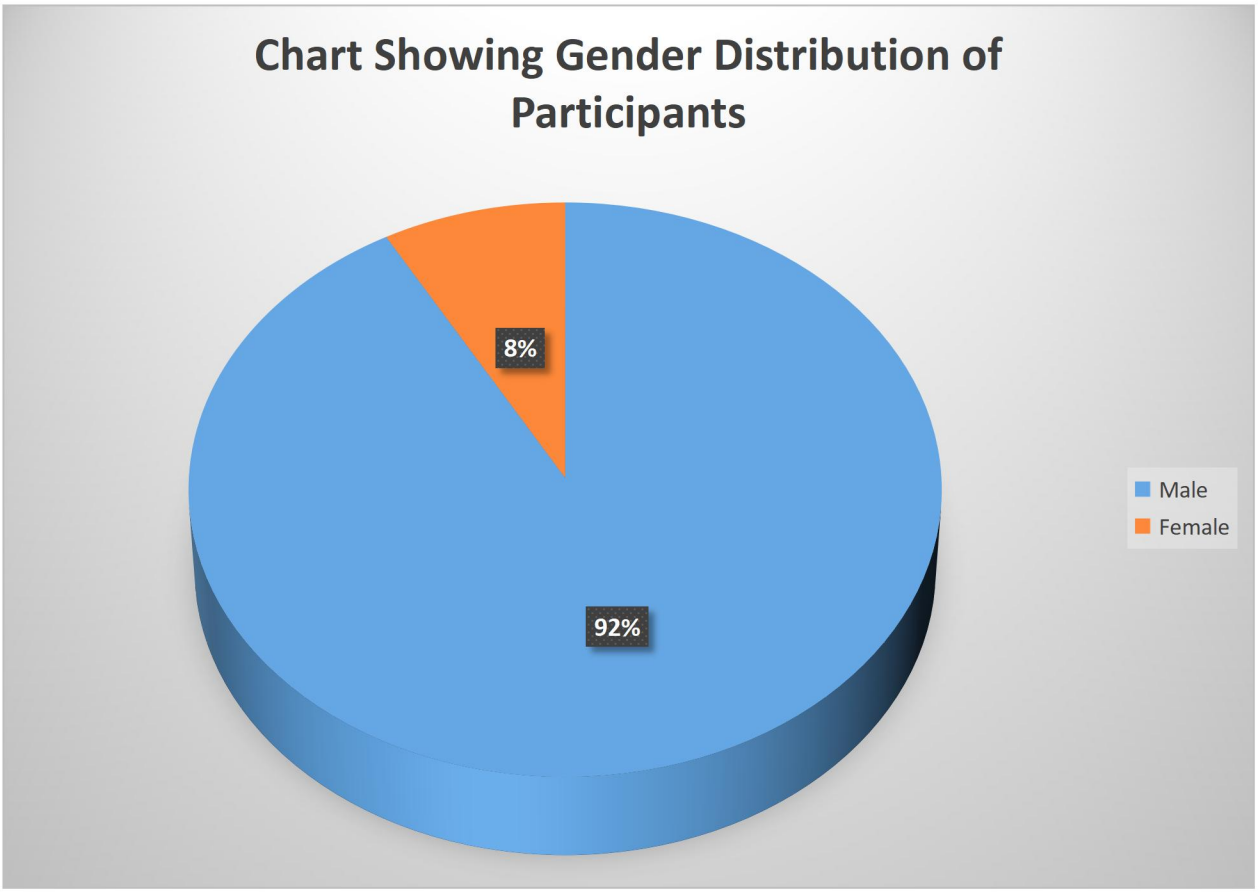

Figure 4.3: Chart showing gender distribution of participants.

Majority of participants for this study, which constituted 92% were male while 8% of participants were female.

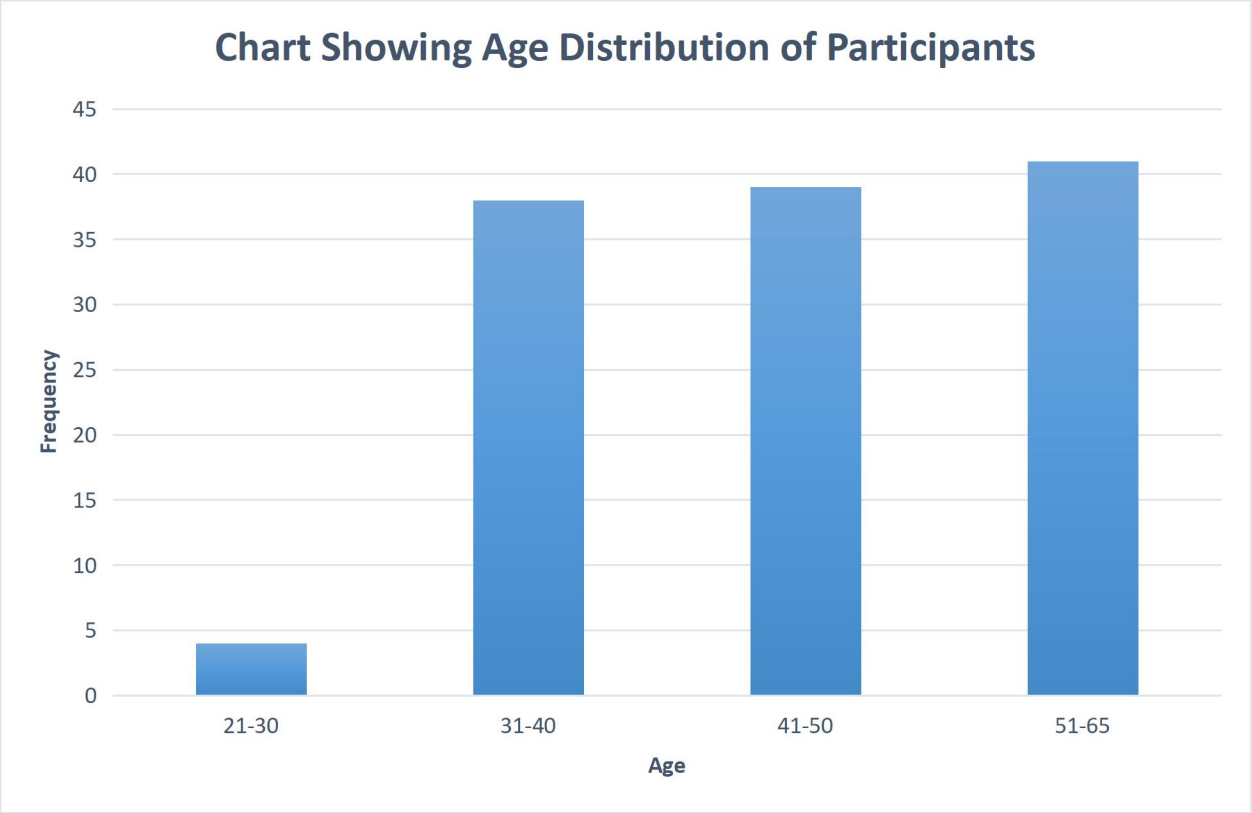

Figure 4.4: Chart showing Age distribution of participants.

Majority of participants for this study were aged between 51-65 years (41 participants). 39 participants were aged 41-50 years, 38 participants were aged 31-40 years and 4 participant were in the least age group, 21-30 years of age.

Table 4.2: Showing Responses of Participants to Awareness of Eye Problem and Growth in the Eye

VARIABLE	FREQUENCY	PERCENT (%)
Have you ever noticed any growths on your eyes?		
Yes	14	11.5
No	108	88.5
Have you ever had any eye problem in the course of driving?		
Yes	49	40.2
No	68	55.7
No response	5	4.1
How often do you experience eye problem while working? (n=78)		
Often	32	41.0
Monthly	8	10.3
Once in 3 months	2	2.6
Once in 6 months	3	3.8
Once in a year	33	42.3

Based on the table above, 108 (88.5) participants had never noticed any growth on their eyes while 14 (11.5%) participants reported to have noticed a growth on their eyes. Majority (55.7%) of the participants never had any eye problem in the course of driving but it was recorded that 32 (41%) participants often experienced eye problem while working, 8 (10.3%) experienced eye problem on a monthly basis, 2 (2.6%) had eye problem once in 3 months, 3 (3.8%) experienced eye problem once in 6 months while 33 (42.3%) participants experienced eye problem once in a year.

Table 4.3 : Showing Oculo-visual History of Participants

VARIABLE	FREQUENCY	PERCENT (%)
Sources of discomfort**		
Sunlight	59	34.1
Dusts	52	30.1
Sand	37	21.4
Others	25	14.5
Was there any external itching?		
Yes	54	44.3
No	68	55.7
What form of treatment did you have? (n=15)		
Glasses	8	53.3
Eye drops	7	46.7
Can you see well enough when working?		
Very well	74	60.7
Fairly	42	34.4
Poor	6	4.9
Cannot see well	0	0.0
Have you ever had any eye surgeries?		
Yes	0	0.0
No	122	100.0

**: Multiple choice

The major source of discomfort for the participants of this study was sunlight, as reported by 59 (34.15) participants. 68 (55.7%) participants noted that there was no external itching while 54(44.3%) complained of external itching. Some participants opted in for glasses (53.3%) and eye drops (46.7%) as a form of treatment for the ocular discomfort they experienced. Majority (60.7%) of the participants noted that they could see well enough when working and no participant had ever undergone any eye surgeries.

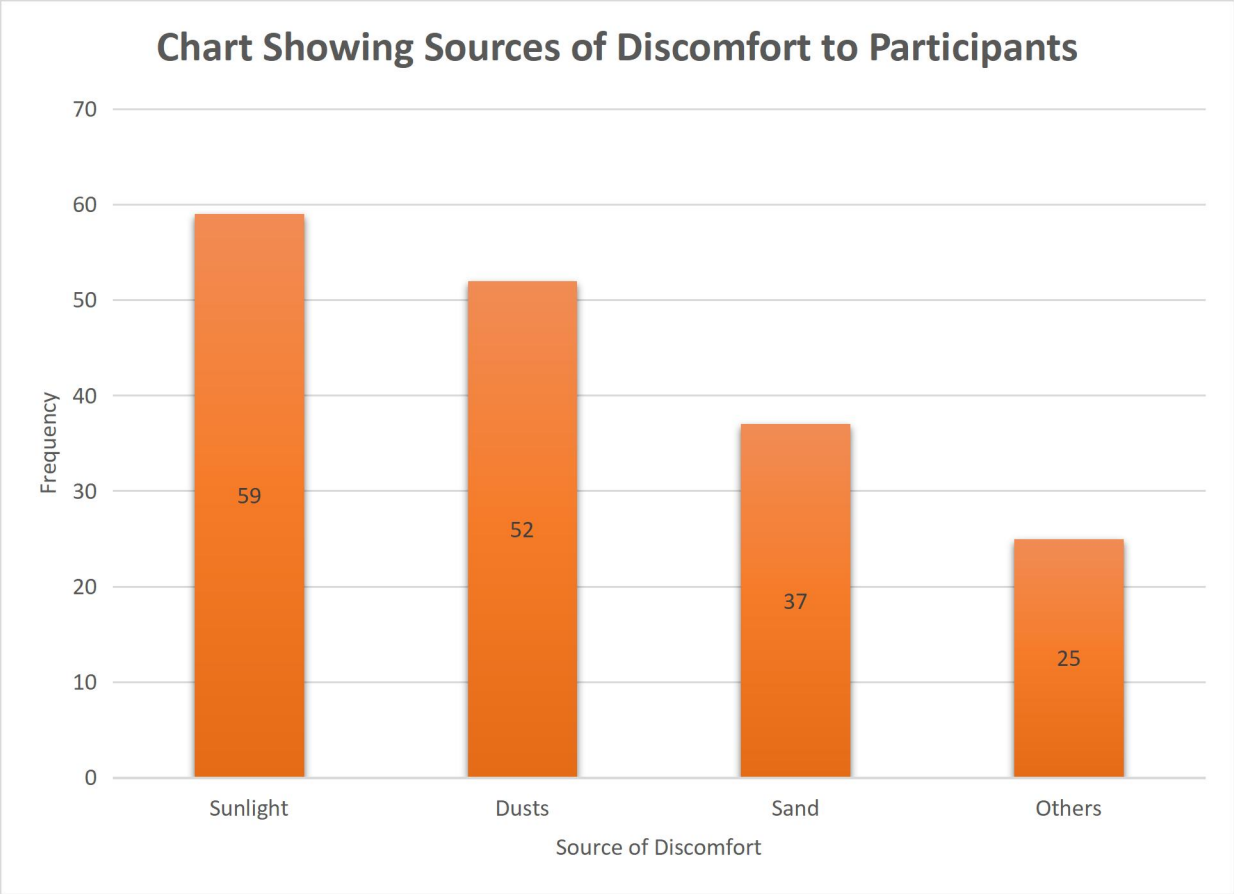

Figure 4.5: Chart showing sources of discomfort to participants.

The major source of discomfort as depicted in the chart above was sunlight, as reported by 59 participants. Other participants complained of Dust (52) and Sand (37) as their source of discomfort while 25 participants attributed their source of discomfort to other causes.

Table 4.4: Showing Knowledge and Use of Protective Eye Devices in Participants

VARIABLE	FREQUENCY	PERCENT (%)
Do you know about protective eye devices?		
Yes	50	41.0
No	72	59.0
Have you used one?		
Yes	29	23.8
No	93	76.2
Do you have one?		
Yes	24	19.7
No	98	80.3

As seen in the above table, Most (72) participants in this study were reported to not know about protective eye devices and as such, a vast majority (93) had never used one before, neither do they have one (98 participants). In contrast, 41% (50) of participants knew about protective eye devices and only 29 (23.8%) of them had used one before with 24 (19.7%) having ownership of protective eye devices.

Table 4.5: Showing Crosstabulation of the Presence of Pterygium and Selected Sociodemographics of Respondents and Level of Association

VARIABLE	PRESENCE OF PTERYGIUM		P-value
	Absent	Present	
Gender			**0.017***
Male	57 (86.4)	55(98.2)	
Female	9 (13.6)	1(1.8)	
Age			**0.006***
21-30	3 (4.5)	1 (1.8)	
31-40	29 (43.9)	9 (16.1)	
41-50	17 (25.8)	22 (39.3)	
51-65	17 (25.8)	24 (42.9)	
Total	66 (100.0)	56 (100.0)	
Level of Education			**0.406**
Uneducated	0 (0.0)	3 (5.4)	
Quaranic Education	7 (10.6)	6 (10.7)	
Primary School	18 (27.3)	14 (25.0)	
Seondary School	19 (28.8)	16 (28.6)	
Adult Literay	6 (9.1)	2 (3.6)	
Tertiary Education	16 (24.2)	15 (26.8)	
Total	66 (100.0)	56 (100.0)	
Number of Working Hours			**0.138**
6-8	8 (12.1)	9(16.1)	
9-11	22 (33.3)	9 (16.1)	
12-14	23 (34.8)	26(46.4)	
15-17	11 (16.7)	12(21.4)	
≥18	2 (3.0)	0 (0.0)	
Total	66 (100.0)	56 (100.0)	

*: statistically significant

From the table above showing cross tabulation of the presence of pterygium and selected socio demographics, it is seen that Gender has a significant effect on the presence of pterygium (p=0.017), amongst the participants. Also, age of the participants had a significant effect on the presence of pterygium (p=0.006).

Table 4.6: Showing Pattern Distribution of Pterygium among Participants

VARIABLE	FREQUENCY	PERCENT (%)
Presence of Pterygium (N=122)		
Absent	66	54.1
Present	56	45.9
Grade of Pterygium (n=56)		
Grade 1	40	71.4
Grade 2	13	23.2
Grade 3	3	5.4
Affected Eye (n=56)		
Right Eye only	3	5.4
Left Eye only	3	5.4
Both Eyes	50	89.2
Position of Pterygium (n=56)		
Nasal	33	58.9
Temporal	11	19.6
Binasal	12	21.5
Is the pterygium inflamed? (n=56)		
Yes	12	21.4
No	44	78.6

Pterygium was recorded to be present in 56 (45.9%) participants of this study and absent in 66 (54.1%), with most (40) participants having grade 1 pterygium. Both eyes were seen to be mostly affected by pterygium, as reported by 50 (89.2%) participants and the position of pterygium among 33 |(58.9%)participants was nasal, temporal in 11 (19.6%) participants and Binasal in 12 (21.5%) participants. 44 (78.6%) participants were recorded to not have an inflamed pterygium and 12 (21.4%) participants recorded pterygium inflammation.

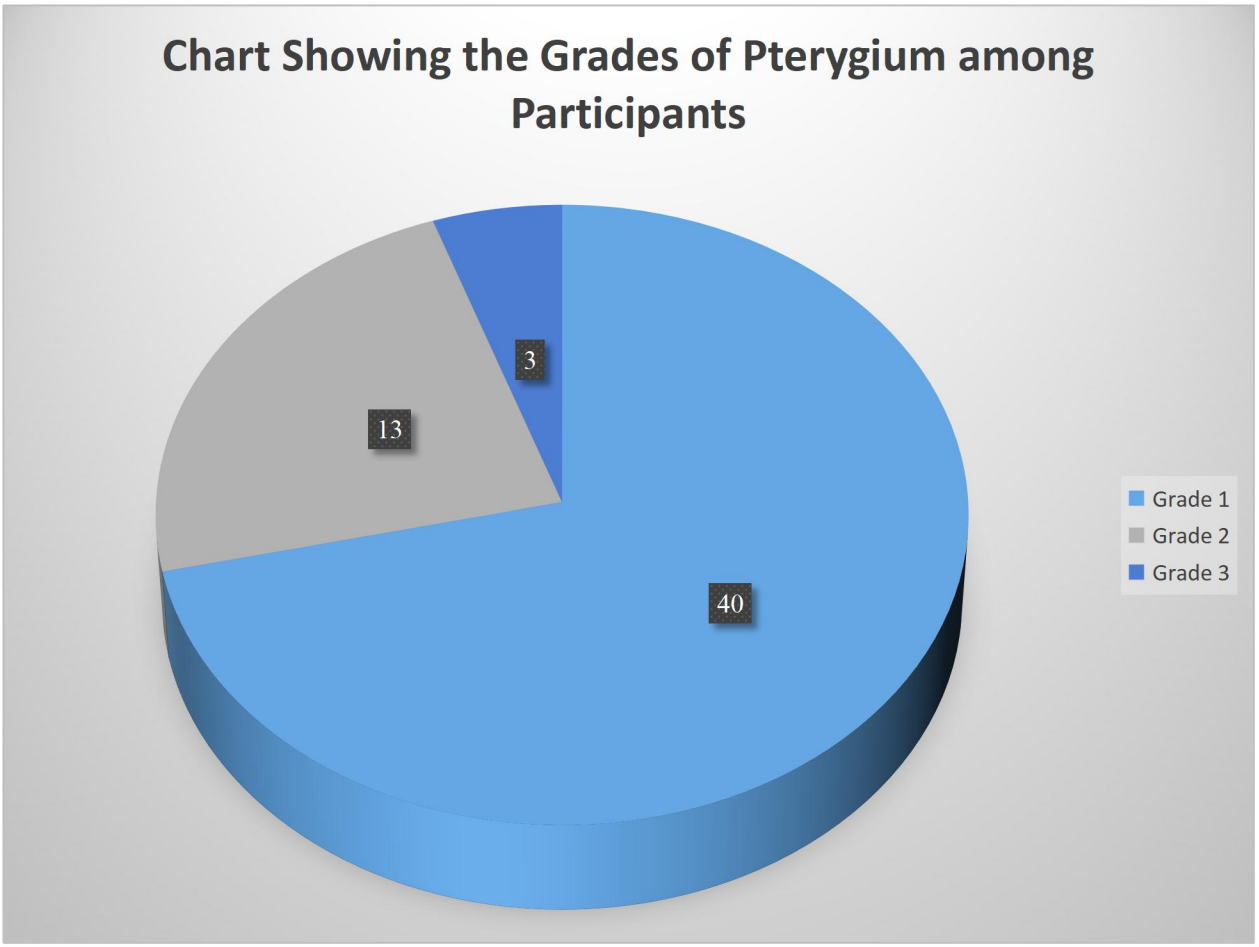

Figure 4.6: Chart showing the grade of pterygium among participants.

Grade 1 level of pterygium was seen in 71.4% of participants, 23.2% had grade 2 pterygium and 5.4% of participants had Grade 3 pterygium.

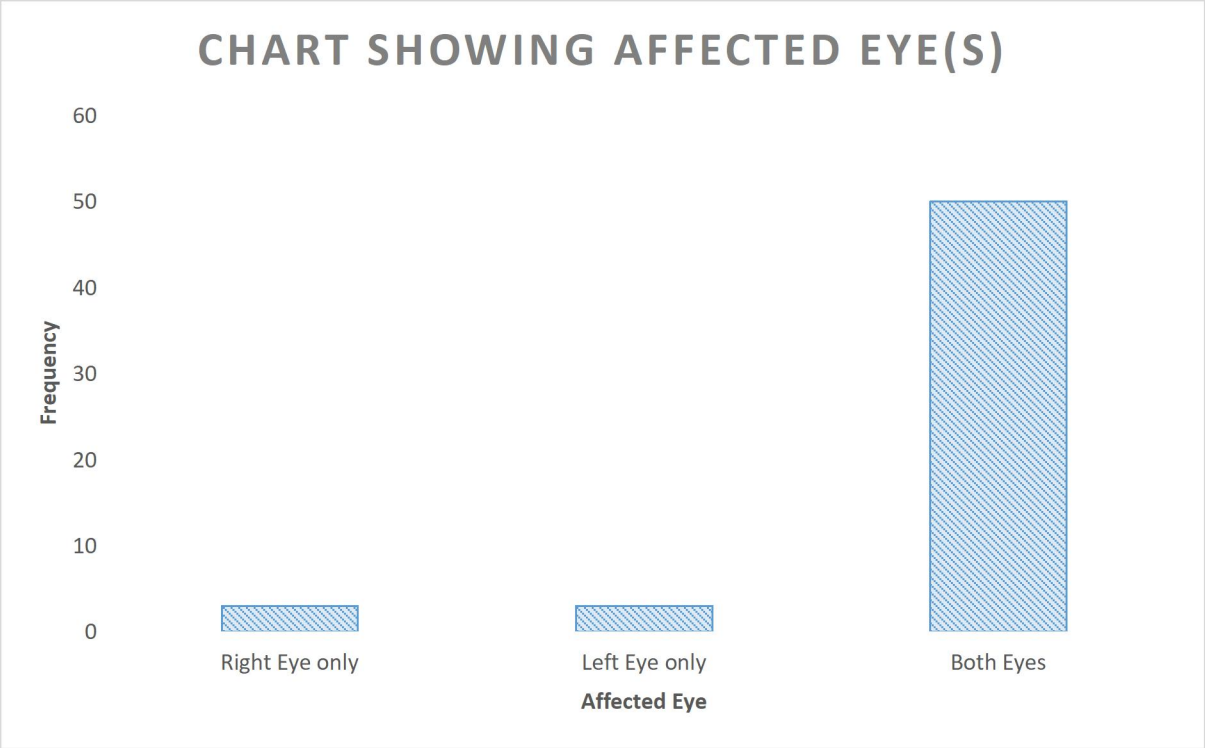

Figure 4.7: Chart showing affected eye(s).

The chart above depicted that most (89.2%) of the participants in this study had pterygium in both eyes.

CHAPTER FIVE

5.0 DISCUSSION

The study population that were used for this study was 122 commercial bus drivers, comprising 112 males and 10 females. The majority of the drivers that engaged in commercial driving in this study were between 20 - 65 years of age and this represents the working age group as well as active group in the area.

The drivers were grouped using three main criteria which were socio demographics, working experience as well as users of protective devices. Most of the drivers were in the age group 51-65years (33.6%) also a good number fell between the age group 41 - 50 years (32.0%).

Out of the total number of drivers, 56(45.9%) had pterygium, which differs from the prevalence noted in some other studies such as Adekoya *et. al* (2008) which found a prevalence of pterygium among commercial vehicle drivers in Ilorin, Nigeria to be 8.3%. The higher prevalence of pterygium may be due to a complex interplay of hereditary and environmental factors. There was no significant relationship between the amount spent on the job i.e. working hours and prevalence of pterygium, as seen in Table 4.5 (P =0.138).

Among the subjects, grade 1 pterygium was predominant (71.4%) followed by grade 2 (13%) which is similar to the study carried out by Monsudi *et.al* (2015) on 2760 patients in a tertiary hospital in North-Western Nigeria to evaluate the prevalence and severity of pterygium In that study, they found the prevalence was 3.6% with stage 1 occurring mostly (46.9%) followed by stage 2 (39.8%).

Out of the drivers found with pterygium (56), only the right eye was affected in 5.4%,,left eye only was also 5.4% while it was present in both eyes in 89.2%. Position of pterygium was also

noted as nasal (58.9%), temporal (19.6%) and binasal (21.5%).These findings correlate with the findings of Anbesse *et. al* (2017) who among 151 subjects found with pterygium, 149(98.7%) were developed pterygium on the nasal side and 15(9.9%) on temporal side of the either eye and 13(8.6%) have both. Rate of Inflammation of the pterygium was 21.4% (12) of the drivers found with pterygium.

In addition, most of the drivers (56) that had pterygium as shown in Table 4.5 were within the age group 51-65 with a population of 24 (42.9%). This findings differ from the peak prevalent age group in the study of Osahon *et al*., (1998) in Benin City. They found the peak prevalence rate to be in the age group 31-40 year.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

The study showed that the prevalence of pterygium among commercial bus drivers in Benin metropolis was high.

As seen in the study, there was no significant relationship between the prevalence of pterygium and the number of working hours among the commercial bus drivers (P=0.138). Grade 1 was found to be most common (71.4%), followed by Grade 2 (23.2%) and then Grade 3 (5.4%) in the 56 participants found with pterygium in the study.

Also from the result, we see that age (P=0.006) and gender (P=0.017) affected the prevalence of pteryguim (45.9%).

6.2 RECOMMENDATIONS

From the findings of this study, the following recommendations are made:

1. Regular eye exams should be conducted before the issuance of driver's license.
2. At association levels, there should be regular eye health talks to drivers.
3. Drivers should be encouraged to use protective eye devices especially in dry season.
4. To achieve maximum effect, pterygium prevention and education efforts should be targeted towards persons in occupations or recreations in sunny environments
5. For the continuation of this study, I suggest a work on bus drivers in other parts of state should be done.

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APPENDIX

QUESTIONNAIRE

Instructions to answer the questionnaire:

- This questionnaire will be treated with confidentiality and used strictly for the purpose of this research.
- The PART A consists of 17 questions (please answer all honestly) and should take you approximately 10 minutes to complete.

  for some questions you may tick (√) for the option.

1. Gender: Male ☐ Female ☐

2.Age : 20-30 [] 31-40[ ] 41-50[ ] 51-65 [ ]

3.Number of working hours per day_____

4.Level of education: uneducated [ ] Quaranic education [ ] primary [ ] secondary [ ] Adult literacy [ ]

5. Have you noticed any growths on your eyes? YES [ ] NO[ ]

6.Have you ever had any eye problem in the course of driving? YES[ ] NO [ ]

7.How often do you experience eye problem while working? Often [ ] Monthly [ ] Once in 3 months [ ] Once in 6 months [ ] Once in 1 year [ ]

8.What is the main source of eye discomfort during work? Sunlight [ ] Dusts [ ] Sands [ ] Others [ ]

9.What are the other possible sources of discomfort?

_____

10. Was there any external itching? YES [ ] NO [ ]

11. What form of treatment did you have? _____

12. Can you see well enough, when working? Very well [ ] Fairly [ ] poorly [ ] Can't see well 13. Have you ever had any eye surgeries? YES [ ] NO [ ]

14. Do you know about protective eye device? YES [ ] NO [ ]

15. Have you used one? YES [ ] NO [ ]

16. Do you have one? YES [ ] NO [ ]

17. How often do you use it? Weekly [ ] Monthly [ ] Bimonthly [ ] Irregular use [ ]

PART B:

FOR EXAMINER USE ONLY

Visual acuity (VA):

RE

LE

PINHOLE:

RE

LE

preliminary external test with penlight :

Internal examination with direct ophthalmoscope:

18.Grade of Pterygium: Grade 1 [ ] Grade 2 [ ] Grade 3 [ ]

19.Position of Pterygium : Nasal [ ] Temporal [ ]

20.Inflammation on Pterygium: Yes [ ] No [ ]

Adapted from; Ogbuehi KC, Okoloagu MN, Onwasigwe EN, et al. (2015). Prevalence and Severity of Pterygium among Commercial Motorcycle Riders in South Eastern Nigeria. *Journal of Ophthalmology*

Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Uneducated	3	2.5	2.5	2.5
	Quaranic Education	13	10.7	10.7	13.1
	Primary Education	32	26.2	26.2	39.3
	Secondary Education	35	28.7	28.7	68.0
	Adult Literacy	8	6.6	6.6	74.6
	Tertiary Education	31	25.4	25.4	100.0
	Total	122	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	112	91.8	91.8	91.8
	Female	10	8.2	8.2	100.0
	Total	122	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	4	3.3	3.3	3.3
	31-40	38	31.1	31.1	34.4
	41-50	39	32.0	32.0	66.4
	51-65	41	33.6	33.6	100.0
	Total	122	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Number of working hours per day	122	6	20	11.86	2.910
Valid N (listwise)	122				

Number of working hours

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	17	13.9	13.9	13.9
	2.00	31	25.4	25.4	39.3
	3.00	49	40.2	40.2	79.5
	4.00	23	18.9	18.9	98.4
	5.00	2	1.6	1.6	100.0
	Total	122	100.0	100.0	

Number of working hours per day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	3	2.5	2.5	2.5
	7	6	4.9	4.9	7.4
	8	8	6.6	6.6	13.9
	9	12	9.8	9.8	23.8
	10	14	11.5	11.5	35.2
	11	5	4.1	4.1	39.3
	12	26	21.3	21.3	60.7
	13	9	7.4	7.4	68.0
	14	14	11.5	11.5	79.5
	15	14	11.5	11.5	91.0
	16	8	6.6	6.6	97.5
	17	1	.8	.8	98.4
	20	2	1.6	1.6	100.0
	Total	122	100.0	100.0	

Number of working hours * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Number of working hours	1.00	Count	8	9	17
		% within Presence of pterygium	12.1%	16.1%	13.9%
	2.00	Count	22	9	31
		% within Presence of pterygium	33.3%	16.1%	25.4%
	3.00	Count	23	26	49
		% within Presence of pterygium	34.8%	46.4%	40.2%
	4.00	Count	11	12	23
		% within Presence of pterygium	16.7%	21.4%	18.9%
	5.00	Count	2	0	2
		% within Presence of pterygium	3.0%	0.0%	1.6%
Total		Count	66	56	122
		% within Presence of pterygium	100.0%	100.0%	100.0%

Number of working hours * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Number of working hours	1.00	Count	8	9	17
		% within Number of working hours	47.1%	52.9%	100.0%
	2.00	Count	22	9	31
		% within Number of working hours	71.0%	29.0%	100.0%
	3.00	Count	23	26	49
		% within Number of working hours	46.9%	53.1%	100.0%
	4.00	Count	11	12	23

		% within Number of working hours	47.8%	52.2%	100.0%
	5.00	Count	2	0	2
		% within Number of working hours	100.0%	0.0%	100.0%
Total		Count	66	56	122
		% within Number of working hours	54.1%	45.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.965[a]	4	.138
Likelihood Ratio	7.862	4	.097
N of Valid Cases	122		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .92.

Age * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Age	20-30	Count	3	1	4
		% within Age	75.0%	25.0%	100.0%
	31-40	Count	29	9	38
		% within Age	76.3%	23.7%	100.0%
	41-50	Count	17	22	39
		% within Age	43.6%	56.4%	100.0%
	51-65	Count	17	24	41
		% within Age	41.5%	58.5%	100.0%
Total		Count	66	56	122
		% within Age	54.1%	45.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.628[a]	3	.006
Likelihood Ratio	13.146	3	.004
N of Valid Cases	122		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.84.

Age * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Age	20-30	Count	3	1	4
		% within Presence of pterygium	4.5%	1.8%	3.3%
	31-40	Count	29	9	38
		% within Presence of pterygium	43.9%	16.1%	31.1%
	41-50	Count	17	22	39
		% within Presence of pterygium	25.8%	39.3%	32.0%
	51-65	Count	17	24	41
		% within Presence of pterygium	25.8%	42.9%	33.6%
Total		Count	66	56	122
		% within Presence of pterygium	100.0%	100.0%	100.0%

Level of Education * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Level of Education	Uneducated	Count	0	3	3
		% within Presence of pterygium	0.0%	5.4%	2.5%
	Quaranic Education	Count	7	6	13
		% within Presence of pterygium	10.6%	10.7%	10.7%
	Primary Education	Count	18	14	32
		% within Presence of pterygium	27.3%	25.0%	26.2%
	Secondary Education	Count	19	16	35
		% within Presence of pterygium	28.8%	28.6%	28.7%
	Adult Literacy	Count	6	2	8
		% within Presence of pterygium	9.1%	3.6%	6.6%
	Tertiary Education	Count	16	15	31
		% within Presence of pterygium	24.2%	26.8%	25.4%
Total		Count	66	56	122
		% within Presence of pterygium	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.081[a]	5	.406
Likelihood Ratio	6.299	5	.278
N of Valid Cases	122		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.38.

Presence of pterygium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Absent	66	54.1	54.1	54.1
	Present	56	45.9	45.9	100.0
	Total	122	100.0	100.0	

Grade of Pterygium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	54.1	54.1	54.1
	Grade 1	40	32.8	32.8	86.9
	Grade 2	13	10.7	10.7	97.5
	Grade 3	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

Affected Eye

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	54.1	54.1	54.1
	Right Eye	3	2.5	2.5	56.6
	Left Eye	3	2.5	2.5	59.0
	Both Eyes	50	41.0	41.0	100.0
	Total	122	100.0	100.0	

Position of Pterygium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	54.1	54.1	54.1
	Nasal	33	27.0	27.0	81.1
	Temporal	11	9.0	9.0	90.2
	Nasal and Temporal	12	9.8	9.8	100.0
	Total	122	100.0	100.0	

Inflammation on Pterygium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	54.1	54.1	54.1
	No	44	36.1	36.1	90.2
	Yes	12	9.8	9.8	100.0
	Total	122	100.0	100.0	

Have you noticed any growths on your eyes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	108	88.5	88.5	88.5
	Yes	14	11.5	11.5	100.0
	Total	122	100.0	100.0	

Have you ever had any eye problem in the course of driving?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	4.1	4.1	4.1
	No	68	55.7	55.7	59.8
	Yes	49	40.2	40.2	100.0
	Total	122	100.0	100.0	

Case Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sources of Discomfort[a]	106	86.9%	16	13.1%	122	100.0%

a. Dichotomy group tabulated at value 1.

Sources of Discomfort Frequencies

		Responses		
		N	Percent	Percent of Cases
Sources of Discomfort[a]	Sunlight	59	34.1%	55.7%
	Dust	52	30.1%	49.1%
	Sand	37	21.4%	34.9%
	Others	25	14.5%	23.6%
Total		173	100.0%	163.2%

a. Dichotomy group tabulated at value 1.

How often do you experience eye problem while working?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		44	36.1	36.1	36.1
	Often	32	26.2	26.2	62.3
	Monthly	8	6.6	6.6	68.9
	Once in 3 months	2	1.6	1.6	70.5
	Once in 6 months	3	2.5	2.5	73.0
	Once in a year	33	27.0	27.0	100.0
	Total	122	100.0	100.0	

Was there any external itching?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	68	55.7	55.7	55.7
	Yes	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

Was there any external itching?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	68	55.7	55.7	55.7
	Yes	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

Can you see well enough, when working?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very well	74	60.7	60.7	60.7
	Fairly	42	34.4	34.4	95.1
	Poorly	6	4.9	4.9	100.0
	Total	122	100.0	100.0	

Have you ever had any eye surgeries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	122	100.0	100.0	100.0

What form of treatment did you have?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		107	87.7	87.7	87.7
	Eye glasses	8	6.6	6.6	94.3
	Eye drops	7	5.7	5.7	100.0
	Total	122	100.0	100.0	

Gender * Presence of pterygium Crosstabulation

			Presence of pterygium		
			Absent	Present	Total
Gender	Male	Count	57	55	112
		% within Presence of pterygium	86.4%	98.2%	91.8%
	Female	Count	9	1	10
		% within Presence of pterygium	13.6%	1.8%	8.2%
Total		Count	66	56	122
		% within Presence of pterygium	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.654[a]	1	.017		
Continuity Correction[b]	4.189	1	.041		
Likelihood Ratio	6.576	1	.010		
Fisher's Exact Test				.020	.017
N of Valid Cases	122				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.59.

b. Computed only for a 2x2 table

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Number of working hours per day	122	6	20	11.86	2.910
Valid N (list wise)	122				

Do you know about protective eye device?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	72	59.0	59.0	59.0
	Yes	50	41.0	41.0	100.0
	Total	122	100.0	100.0	

Have you used one?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	93	76.2	76.2	76.2
	Yes	29	23.8	23.8	100.0
	Total	122	100.0	100.0	

Do you have one?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	98	80.3	80.3	80.3
	Yes	24	19.7	19.7	100.0
	Total	122	100.0	100.0	